

2013-2014 SARE



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SUSTAINABLE AGRICULTURE RESEARCH & EDUCATION



REPORT FROM THE FIELD

SARE is...



GRANTS FOR INNOVATIVE RESEARCH AND EDUCATION

SARE offers grants to farmers, ranchers and ag professionals for on-farm research, education, and professional and community development. SARE-supported projects address soil health, pest management, energy, livestock production, stewardship, marketing, systems research and more.

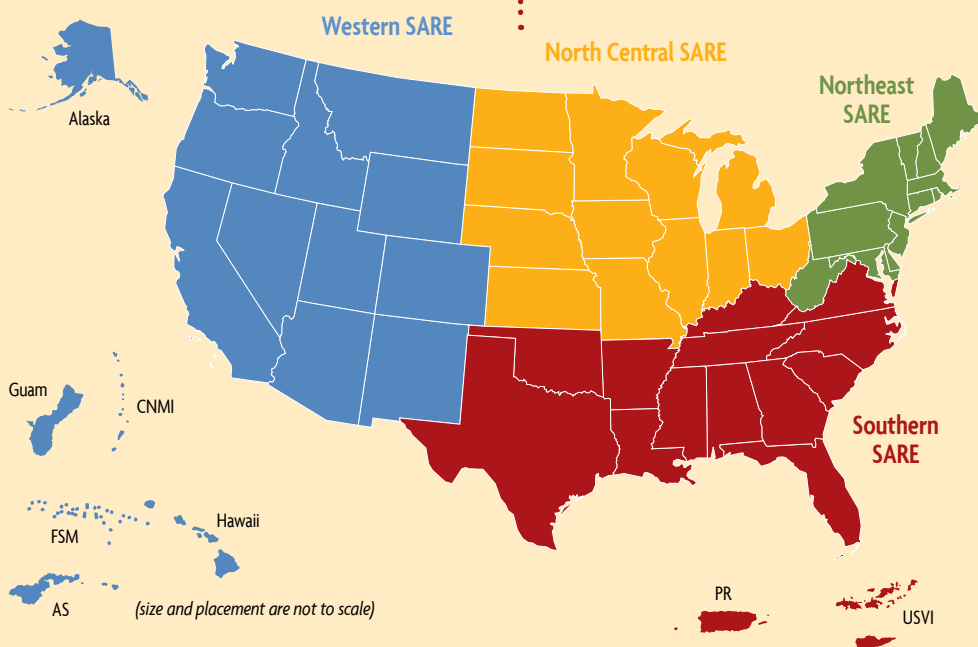


LOCAL LEADERSHIP, NATIONAL IMPACT

Four regional councils—including farmers, educators, scientists, government, NGOs and other stakeholders—set priorities and make grants.

ENGAGEMENT 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 (see back cover).



FARMER LEADERSHIP

Hundreds of producers from all corners of the nation **share their on-farm research results and advise SARE.**

Cover photo: University of Maryland graduate student Natalie Lounsbury is researching the potential of a forage radish cover crop to improve yields in organic no-till vegetable systems (page 19). Photo by Edwin Remsburg, University of Maryland. **Photo credits** (clockwise from top left): Andy Clark, SARE; Jeff Mitchell, University of California; David Visser, University of California; Joan Benjamin, NCR-SARE; Al Kurki, NCAT.

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United States
Department of
Agriculture

National Institute
of Food and
Agriculture





Robert Hedberg, SARE Director.
Photo by Marie Flanagan, North Central Region SARE

[LETTER FROM THE DIRECTOR]

The People Behind 25 Years of Sustainable Agriculture Research and Education

In 1988, Congress provided funding for a new USDA program to answer a growing call for greater investment in sustainable agriculture research. The specific details of the program, which would eventually be known as Sustainable Agriculture Research and Education (SARE), were vigorously debated, refocused and approved in the 1990 Farm Bill. Today, after a quarter century of steady investment in the sustainability of American agriculture, it is worth revisiting SARE's original purpose and highlighting some of the ways we have been able to address past, current and emerging needs.

As originally defined by Congress, SARE's purpose is to fund research on agricultural systems that maintain and enhance the quality and productivity of the soil; conserve soil, water, energy, natural resources and wildlife habitat; maintain and enhance the quality of surface and ground water; protect the health and safety of people involved in food and farm systems; promote the well being of animals; and increase employment opportunities in agriculture.

The following pages contain stories of 12 recent projects from SARE's four regions, which in their diversity reflect the many ways SARE remains true to its original purpose. These stories include the use of cover crops and conservation tillage to improve soil health and protect natural resources; the development of direct marketing options, processing infrastructure and season extension techniques to improve small-farm profitability and keep more consumer food dollars within local economies; and the expansion of tools to help grass-based beef and dairy farmers improve livestock comfort and reduce the capital investment needed to succeed.

These stories speak for themselves, and as you read them, I hope you will think of the many people behind SARE who have contributed to the program's relevance, longevity, evolution and success. Along with the thousands of scientists, educators, farmers and ranchers who have participated in the 5,000-plus research and education projects supported by SARE in the last 25 years, there are many other important, behind-the-scenes contributors who deserve mention.

SARE's staff has been exceptional. The regional staffs, each led by a regional coordinator, have excelled at managing the competitive grants programs, publicizing research results and providing training opportunities. The national outreach staff has done an excellent job getting research results and technical information into the hands of farmers through print and electronic publications, and online tools that facilitate access to the ever-growing body of information on important sustainable agriculture subjects.

Another factor that has contributed immensely to SARE's success was the decision at the outset to create regional administrative councils. Over the years, hundreds of farmers, ranchers and representatives from federal, state, public and private organizations have shaped the SARE program through service on these councils. Administrative council members have devoted countless hours to reviewing project proposals and using their expertise to guide SARE dollars toward sustainable solutions to the most pressing regional needs.

More than anything else, the passionate community of grantees, staff, administrative council members and external supporters has shaped SARE's long track record of success, and will ensure SARE remains an important catalyst for change long into the future.

Robert Hedberg
SARE Director

Read on to learn about SARE's work across America > > >

SARE Offices

Contact your regional office or visit its website for requests for proposals, application deadlines and other grant information.
Contact SARE Outreach or visit www.sare.org for questions about SARE information materials.

North Central SARE
(hosted by the University of Minnesota)
www.northcentralsare.org
(612) 626-3113
ncrsare@umn.edu

Northeast SARE
(hosted by the University of Vermont)
www.nesare.org
(802) 656-0471
nesare@uvm.edu

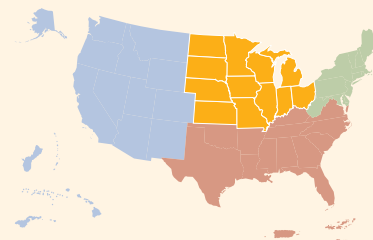
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(hosted by the University of Georgia and Fort Valley State University)
www.southernsare.org
(770) 412-4787
ssare@uga.edu

Western SARE
(hosted by Utah State University)
www.westernsare.org
(435) 797-2257
wsare@usu.edu

SARE Outreach
(hosted by the University of Maryland)
www.sare.org
(301) 405-7955
info@sare.org



NORTH CENTRAL SARE



From the sand hills of Nebraska to Appalachian Ohio, farmers and ranchers rise to meet challenges, advancing innovative ideas that increase the bottom line, conserve natural resources and improve quality of life for themselves and their communities. As SARE celebrates 25 years, the North Central Region program reflects on the diverse range of agricultural enterprises we have reached—operations large and small, rural and urban, crop and livestock, conventional and organic, and everything in between.

Across the Midwest, savvy producers have demonstrated that products that are different in appearance, season or origin can command a higher price than their traditional counterparts. Since 1988, NCR-SARE has supported research and development in specialty crops and the lucrative markets they offer. For example, in this report you will read about Michigan hops farmers who used SARE grants to advance cost-saving production methods and integrated pest management, contributing to their crop's renaissance in the state (see p. 6). You will also learn about SARE-supported researchers in Missouri whose development of the regional elderberry industry is a model for how farmers and Extension can partner to build specialty crop markets from the ground up (see p. 7).

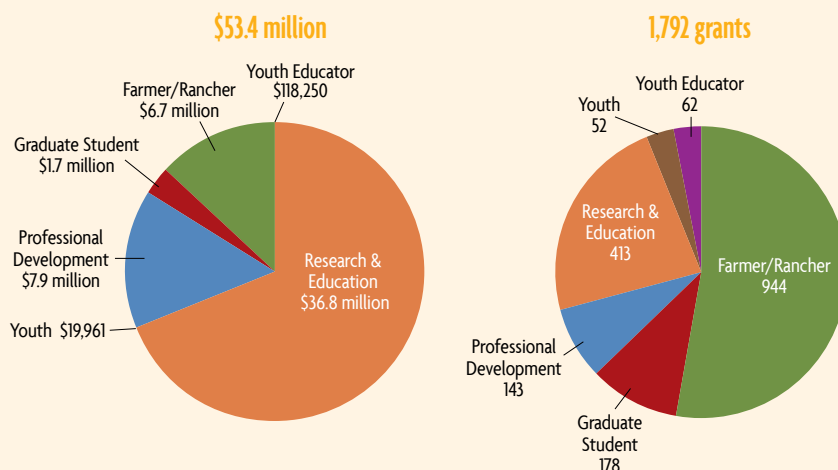
NCR-SARE also funds projects that conserve natural resources while bolstering agricultural profitability and productivity. As corn and soybean farmers seek new opportunities in the emerging biofuel industry, many worry that removing crop residues for ethanol could seriously hurt soil health and long-term productivity. That is why researchers like Humberto Blanco, José Guzmán and Mahdi Al-Kaisi have received SARE grants to study residue removal's impact on both soil, air and water resources, and crop yields (see p. 5).

While producers across the region are confronted with scarcity of resources and higher prices of crop inputs, more are planting cover crops, a time-tested method that revitalizes soil, curbs erosion and manages pests. Some of the first grants NCR-SARE awarded in 1988 went to cover crop research. Fast forward to 2012, when an estimated 1.5 million to 2 million acres of cover crops were planted in the United States. To better understand this trend, NCR-SARE funded a national survey of farmers who grow cover crops, and found that during the 2012 drought, corn and soybean fields that had been cover cropped yielded 9.6-14.3 percent better than fields without cover crops. (Learn more at www.northcentralsare.org/covercropsurvey.) Now, NCR-SARE is partnering with others to hold a national meeting on cover crops and soil health in February 2014.

These efforts show that no idea is too big and no farm is too small in the North Central region. But the work featured here is just a sample of the thoughtfulness, innovation and determination that make up our region's vast, enduring agriculture.

Learn more about our work by visiting us online at www.northcentralsare.org.

From 1988 to 2013, North Central SARE has awarded...



As Ohio SARE Co-Coordinator, Alan Sundermeier's focus has been on using cover crops to enhance soil health. Sundermeier, Michigan SARE Co-Coordinator Dale Mutch and Dean Baas and others formed the Midwest Cover Crops Council to promote research and educational outreach throughout the North Central Region, and to increase acres planted to cover crops. Photo by Randall Reeder

Research Seeks a Balance Between Crop Residue Removal and Soil Conservation

When farmers harvest grain crops, plant residue is left behind, and it is anything but trash. In fact, farmers increasingly face a quandary: Leaving residue on the field provides long-term benefits to the soil, but it can also be sold as cattle feed during a drought or on a regular basis to ethanol producers.



Kansas State University graduate student Yuxin He uses a double-ring infiltrometer to study how wheat straw residue affects water infiltration, part of KSU soil scientist Humberto Blanco's research on crop residue removal's impact on soil properties. *Courtesy Kansas State University*

To help farmers find the right balance, researchers throughout the Midwest, some supported by SARE grants, are studying the effect of residue removal on yield and soil quality under different field-management practices. Their goal is to identify acceptable residue removal rates that offer both soil protection and increased profitability.

"We need to think about residue removal in terms of the long-term impact on productivity and soil sustainability," says Iowa State University (ISU) agronomist Mahdi Al-Kaisi. "We're trying to think ahead to educate farmers and agronomists about potential implications of residue removal."

The argument for selling corn residue is strong. When the 2012 drought crippled production in many parts of the country, some farmers salvaged what they could by selling their crop as livestock feed.

Meanwhile, ethanol derived from corn residue—rather than corn grain—is fast becoming reality. Two commercial-scale cellulosic ethanol refineries in Iowa are scheduled to begin operation in 2014, and another is near completion in Kansas. Combined, the three plants will be able to process nearly 1 million tons of residue each year.

With a 2009 SARE grant, Al-Kaisi and ISU graduate student José Guzmán determined that corn yields were unaffected by one to three years of total residue removal. This held true under both conventional tillage and no-till, and with various fertilization rates. However, soil quality suffered immediately when 25-35 percent of residue was removed, leading to decreased water infiltration and increased erosion.

"This is one important thing to stress to farmers. You might not see a decrease in

yields in the first five years, but you will see significant decreases in soil physical properties, and it can take five or 10 years to recover those properties," says Guzmán, now a post-doctoral researcher at Ohio State University.

Guzmán and Al-Kaisi found that well-drained fields can tolerate repeated residue removal better than poorly drained ones, which, Al-Kaisi says, shows there is no one-size-fits-all recommendation. Farmers should carefully assess field conditions and local weather patterns before deciding how much residue to remove, and how often.

With a 2010 SARE grant, University of Nebraska soil scientist Humberto Blanco established a multi-year study on six farms in western Kansas to look at the effect of residue removal on soil in no-till corn, wheat and sorghum production. He found that the top inch of soil was more vulnerable to erosion after

removing more than 75 percent of crop residue.

Blanco says his research was guided largely by farmer inquiries. "All six farmers were very interested in this project because they know the value of residue for their

soil. But they were interested in the question of how much can be removed. They said the additional income would be nice, if they have more residue than they need to protect their soil."

For more information, go to www.sare.org/project-reports and search for ENC07-094, GNC09-111 or LNC10-318.



In this south-central Nebraska field, researchers compared the removal of 85 percent of residue (right) and no removal (left) in no-till continuous corn. They found the high removal rate caused moisture loss that led to soil cracking and crusting. *Photo by Humberto Blanco, University of Nebraska*

FREE RESOURCES!

SARE bulletin: *Clean Energy Farming*. To order free copies or download: www.sare.org/energy.

Grantee product: *The Energy Independence, Bioenergy Generation and Environmental Sustainability Training Series*. Access this online series at www.sare.org/bioenergy-training.

A Bright Future for Hops Farmers in Michigan

Craft beer brewing has enjoyed a mighty resurgence in the United States over the last 30 years. As small breweries spring up seemingly everywhere, so does the opportunity for nearby farmers to supply them with locally grown hops. In Michigan, a top brewing state, this supply-and-demand scenario is translating into not just a new crop for farmers, but a new crop of farmers.



To reduce establishment costs, Michigan farmer Brian Tennis experimented with growing a dwarf hop variety on a short-trellis system of 12-foot-tall poles. Conventional hops trellises can be up to 21 feet tall. Photo by Brian Tennis

“We’ve always been craft beer fans. When we found we could grow hops, we started with one acre five years ago, just to see if we could grow them. Then the demand was so high, we started planting more,” says Brian Tennis, who now grows 10 acres of certified organic hops on his farm, New Mission Organics, in Traverse City, Mich.

In a 2008 Michigan State University (MSU) Extension survey of 69 breweries in the state, all expressed an interest in sourcing local hops. Plus, they are paying a premium of about \$14 per pound for local hops, versus \$4 per pound on the commodity market, says MSU Extension Educator Robert Sirrine.

There are more than 140 breweries in Michigan. However, the cost of starting a hop yard can seem daunting to a beginning farmer: A trellis system of tall poles and wires is needed for the vine-like plant; full yields are not attained until the second or

third year; and expensive harvesting and processing equipment are required.

That is why Tennis used a 2010 SARE grant to explore using a low-trellis system of 12-foot poles instead of conventional poles, which can be up to 21 feet tall. He found a low-trellis system was 40 percent cheaper to build and yields well when growing a semi-dwarf variety.

“If we didn’t have the grant, we wouldn’t be nearly as successful as we are now,” Tennis says.

Jeff and Bonnie Steinman started growing hops as a backyard hobby in 2007. Today, they co-own Hop Head Farms in Hickory Corners, Mich., where they grow 30 acres for distribution in Michigan and nearby states.

The Steinmans used a 2010 SARE grant to study the effectiveness of biological insect control methods on their hops. Their main threats are leafhoppers and spider

mites, which they discovered can be managed without pesticides, largely through beneficial insect releases and by encouraging native insect populations.

“We found we have a lot of naturally occurring beneficial insects, and by keeping down our sprays we invite them in and they stick around,” Bonnie says. The SARE-funded project “gave us the boost to do the research we were able to do, and to beef up what we felt would be a valuable practice.”

Expensive equipment poses a challenge to the scaling up of local hops production—for example, hops harvesters cost a minimum of \$50,000—but farmers like Tennis and the Steinmans are already finding solutions.

The Steinmans built a \$3 million facility that allows them to harvest, dry, pelletize and package their hops. Extra capacity means they can buy and process hops from nearby farmers, too. In 2011, Tennis and others started the Michigan Hop Alliance, a cooperative that shares equipment and aggregates crops from 10–12 farmers.

For more information, go to www.sare.org/project-reports and search for FNC10-804 and FNC10-826.



Hops grown by Michigan farmers Jeff and Bonnie Steinman make their way into the craft beers of many local brewers, including this shipment produced by New Holland Brewing Company. Courtesy Hop Head Farms

FREE RESOURCES!

SARE conference: *Scaling Up Local Food*. Information about this 2010 North Central SARE conference, including a list of resources, is available at www.northcentralsare.org/scalingup.

SARE bulletin: *Diversifying Cropping Systems*. To order free copies or download: www.sare.org/diversify.

Building a Farmer-Based Industry from the Ground Up

Elderberries. You might know them from the wild, or if you are an aficionado of craft wines, jellies and tonics. But with emerging interest in them as an antioxidant-rich health food, a group of Missouri farmers and researchers are helping to pull this tart, black berry out of the obscure and into the mainstream.

For farmers, the picture looks promising: According to University of Missouri market research conducted in 2011, one-third of consumers are familiar with elderberries, and demand is growing for locally raised berries versus European imports. Also, the return on elderberries is very high. It costs between \$2,500 and \$4,500 to establish an acre of plants, plus another \$1,500 or so in annual management costs. By the third year, an acre can yield about 5,000 pounds of berries, and a pound is worth anywhere from \$0.50 to \$25, depending on whether it is used in jams, pies and wines, sold wholesale in bulk, or is processed into high-value concentrate.

University of Missouri Center for Agroforestry researcher Michael Gold, who, along with colleagues Ina Cernusca and Larry Godsey, led the market study with funding from a 2010 SARE grant, says that it was the missing piece in what has been a successful, 15-year effort by his colleagues Patrick Byers

and Andrew Thomas to develop cultivars and management information for commercial production in the Midwest. Previously, the only commercial varieties available were suited to the Northeast.

“What we already knew was the production side of things, but nobody had really done anything to add the market and consumer side,” Gold says. “Now we have the first solid understanding of elderberry’s market potential in the United States.”

Two other key outputs of Gold’s SARE-funded research are a 12-page production guide and the Elderberry Financial Decision Support Tool developed by Godsey, a detailed enterprise budget calculator that can help both farmers and lenders assess the risk and potential of growing elderberries.

For elderberry farmer Terry Durham, of Hartsburg, Mo., this multi-tier



Pioneering elderberry farmer Terry Durham, of Hartsburg, Mo., (right) hosts many farm tours as part of a collaborative effort to build a strong regional market around the lucrative berry. Photo by Mike Gold, University of Missouri

research has been vital to creating what he calls “a farmer-based industry.”

“This is the way land grant universities are supposed to work,” he says. “They’re supposed to be working with and ahead of farmers to bring them new opportunities. This whole project has worked like that.”

Durham began growing elderberries in 2006 after getting a handful of cuttings of local varieties from Byers and Thomas. Now he is up to 37 acres. Through his business, River Hills Harvest, he offers processing for 40 local farmers and distributes juices, jellies and other products to co-ops and grocery stores throughout Missouri and northern Arkansas. Farmers have the option of buying their processed berries back from River Hills Harvest at below-wholesale prices in order to distribute under their own brand.

“We encourage our growers to develop their own elderberry products,” Durham says. “Once they do all the steps to develop their market, we’ll bring them in.”

Durham further promotes the industry by speaking at workshops and collaborating with growers as far away as Minnesota and North Carolina. At the research

level, the University of Missouri team remains busy, improving the varieties and studying the health benefits of elderberries, which builds on research that has already been done abroad.

For more information, go to www.sare.org/project-reports and search for LNC10-324.



Elderberries grow in dense clusters that must be harvested by hand, and are difficult to destem when fresh. Farmers and researchers are exploring ways to improve the efficiency of destemming. Courtesy the University of Missouri

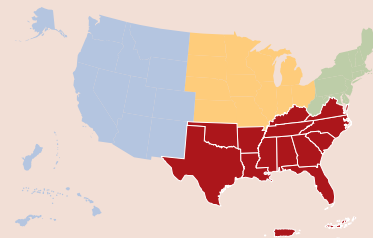
FREE RESOURCES!
Grantee product: *Growing and Marketing Elderberries in Missouri*. Find the University of Missouri’s guide and financial decision-making tool at www.sare.org/elderberries.

SARE book: *Building a Sustainable Business*. Download for free or purchase hard copies: www.sare.org/business.

Grantee product: *Marketing for the Ag Entrepreneur*. University of Nebraska webinars available at www.sare.org/agri-marketing.



SOUTHERN SARE



The three projects profiled here reflect topical areas that Southern SARE has prioritized throughout our 25-year history, because they are of top importance to the farmers, ranchers and communities of our region. Whether it is through strengthening agriculture's infrastructure, preserving precious resources, exploring new opportunities or meeting production challenges, Southern SARE will continue its long-standing tradition of getting behind the innovative ideas that improve the sustainability of our region's agriculture and the quality of life for farmers, ranchers and communities.

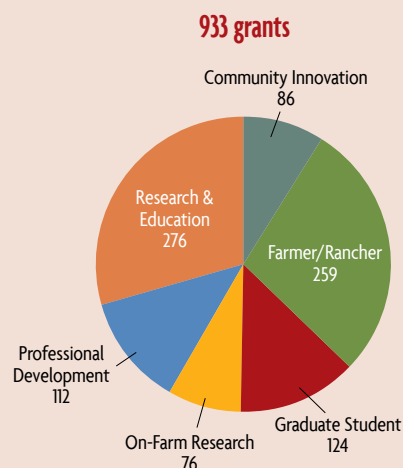
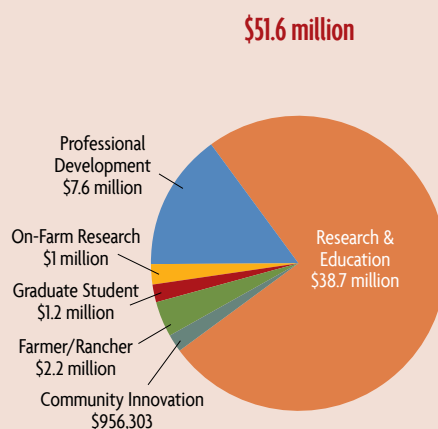
Since 2000, with initial funding and many subsequent grants from Southern SARE, the Southern Consortium for Small Ruminant Parasite Control (recently renamed American Consortium for Small Ruminant Parasite Control) has been leading training workshops for goat and sheep producers to sustainably control intestinal worms. The impact of the group's efforts has been widespread. The trainings have reached hundreds of producers across the South; over 40,000 FAMACHA evaluation cards, a simple parasite-control guide, have been distributed to nearly 1,600 specialists; and resources, such as the Small Ruminant Toolbox, provide much-needed education (see p. 10).

Like alternative livestock enterprises, interest in local food systems continues to grow across the South, among both farmers and consumers. But establishing profitable, long-term connections between farmers and buyers is a challenge when community infrastructure and marketing fall short. Southern SARE has helped bridge this gap by funding a range of projects that improve farmers' ability to process, market and deliver their products locally. A newer strategy lies in food hubs—entities that aggregate and market local produce on behalf of farmers. Aided by a SARE grant, a newly established food hub in Charleston, S.C., is earning that area's farmers a premium by marketing their produce to local retailers and chefs (see p. 11). The Georgia Sustainable Ag Consortium, created in 2011 through a Southern SARE Planning Grant, is leading efforts to meet farmer demand for more food hubs across that state.

Southern SARE continues to help farmers and researchers refine those time-tested practices that have long formed the backbone of sustainable agriculture systems. For example, SARE has been funding cover crops projects for 25 years, and still there is much work to be done. Newer cover crops research is helping farmers break the cycle of mono-crop production in Oklahoma, improve soil health in North Carolina, and conserve water in Texas. A Georgia farmer is leading the way for his neighbors by using cover crops as winter forage for grazing livestock (see p. 9).

Learn more about our work by visiting us online at www.southernsare.org.

From 1988 to 2013, Southern SARE has awarded...



Through workshops, publications and other outreach, Alabama SARE Co-Coordinator Ayanava Majumdar provides hundreds of farmers with information about Alabama Cooperative Extension's latest research on biological pest control. A key technique is the use of trap crops—such as squash—to control pests by luring them away from cash crops. *Photo by Candace Pollock, Southern SARE*

Southeastern Georgia Farmer, Partnering with Extension, Shows the Way to Better Soil

Jonny Harris noticed long ago that feeding winter cover crops to his cattle improves their diet, his fields and his bottom line. He wanted to show other southeastern Georgia farmers they can reap the same benefits, but he knew he needed more evidence than decades of personal experience.



University of Georgia Extension agents Randy Franks (center) and Mark Frye (right) collect samples of triticale on Jonny Harris's farm in Screven, Ga. Harris (left) partnered with researchers to study the potential of forage cover crops to improve soil health and provide high-quality hay for livestock. Photo by Candace Pollock, Southern SARE

"I understood that it was good, but we needed documentation. I couldn't go to my neighbor and say if you use this as a forage cover crop, you can get this much production and market it for this much," Harris says.

So, Harris applied for and received a 2011 SARE grant and, partnering with University of Georgia (UGA) Extension, began conducting cover crop trials that would yield the data they needed. By the second of three years, they have already begun to see convincing results.

An economic analysis of Harris' trials revealed that while forage cover crops can be costly to produce, their nutritional value provides a cost-effective option for farmers. "On a per acre basis, they are expensive. There's no way of getting around that," says UGA Extension Livestock Economist Curt Lacy. "But when you convert that cost to how much nutrition you get per acre in terms of total digestible nutrients and crude protein, then it's very economical."

The cover crops they tested—grown on cultivated fields and harvested as baled silage—were a better value in terms of cost per pound of crude protein and total digestible nutrients than low-quality hay, corn, whole cottonseed and other feed options. Only high-quality hay was a better value.

Harris' Greenview Farms, in Screven, Ga., has been in his family since around 1860. It includes 2,800 acres of timberland, pasture for a herd of 1,000 cattle, and cultivated fields of cotton, corn, soybeans and peanuts. Harris has been using winter cover crops on his pastures since the 1950s and on his cultivated fields for the last 10 years.

The soils in Harris' test plots have improved noticeably. Southeastern Georgia's soils are sandy and low in organic matter, which means they do a bad job of holding water and plant nutrients. In the trials, his soil's water-holding capacity has increased 15 to 20 percent, and soil organic matter has increased as much as 1 percent.

"What's really outstanding is the quality

of the soil, and how it's improving dramatically," says UGA Forage Extension Specialist Dennis Hancock, who is working with Harris. "I can tell just by the dark, rich color." The data they are collecting help document these changes.

Along with soil quality, cotton yields also appear to be improving in the trials. In 2012, they harvested 1,600 pounds of lint per acre when cotton was planted after a cover crop of ryegrass, and 1,100 pounds per acre when no cover crop was used.

In his trials, Harris planted 45-acre combinations of ryegrass, triticale and crimson clover, followed by a cotton crop. He fed his baled silage on farm and sold to dairy and beef farmers. One neighboring dairyman saw a 20 percent increase in milk production after just a few days of feeding his cows this nutrient-rich silage, Harris

says.

"Everything has been positive—the energy we're able to produce from this grass, the way cattle are transferring those nutrients into meat or milk or whatever else the farmer needs," Harris says. "We're just seeing an abundance of positives."

For more information, go to www.sare.org/project-reports and search for FS11-253.



Screven, Ga., farmer Jonny Harris shares the results of his research on cover crops and livestock forage with neighbors by hosting farm tours and workshops. Photo by Candace Pollock, Southern SARE

FREE RESOURCES!

SARE Topic Room: Cover Crops.
Find dozens of free educational materials and research projects on cover crops in this one-stop shop:
www.sare.org/cover-crops.

Empowering Southern Sheep and Goat Farmers through Information

With demand for their meat, milk and fiber growing throughout the country, sheep and goats offer an appealingly solid return on investment, particularly for many beginning, small-scale and limited-resource farmers. Success can be a challenge, though, because there is a lot to learn and local Extension educators may be unfamiliar with the nuances of small ruminant production.

"Information is power," says Linda Coffey, a small ruminant specialist with the National Center for Appropriate Technology. "You can make a lot of mistakes if you don't understand small ruminants."

That is why Coffey, using a 2008 SARE grant, led a multi-year project to create a comprehensive, first-of-its-kind set of educational materials on a wide range of small ruminant topics, including pasture and herd management, marketing, quality of life and whole-farm sustainability. She and a team of Extension educators in six Southern states used these materials—known as the Small Ruminant Toolbox—as the basis for workshops that trained 200 fellow educators through 2011. In turn, this large group has brought new information to more than 1,000 farmers.

"The results of the effort have been fabulous. It's had the multiplying effect that it was intended to have," says University of Arkansas Extension Specialist Steve Jones, a project collaborator.

Helping sheep and goat farmers learn about and use current research has had a noticeable impact on Arkansas, Jones says. For example, two on-farm demonstrations showed how to use forage brassicas as an alternative to feeding hay and supplements. "We estimate that farmers saved \$2 a head on average as a result of the on-farm demos," he says. "One farm in particular so far has saved over \$3,000, and the

potential is there to save up to \$15,000."

The toolbox includes guidance on how to structure a workshop, dozens of PowerPoint presentations, an 897-page manual, a checklist to help farmers evaluate and improve their whole-farm sustainability, and other materials. The entire collection was put on 1,300 USB flash drives that were distributed throughout the six states—Arkansas, Georgia, Kentucky, North Carolina, Oklahoma and Tennessee.

The 60-page Small Ruminant Sustainability Checklist is the centerpiece of both the toolbox and corresponding workshops, and was a critical missing piece before the project started, Coffey says. "Although whole-farm planning is important for success, the topic is not typically covered in sheep and goat production workshops."

The checklist should be used annually to help farmers find specific ways of adjusting their practices to the changing realities of the marketplace and their farm, all while

improving their profitability and sustainability. It focuses on pasture and herd management, marketing, record keeping and quality of life issues, among other areas of production. "It makes the farmer stop and think about aspects of raising and marketing small ruminants that he or she may not

have thought about before," says Tennessee State University Small Ruminant Extension Specialist An Peischel, another project collaborator.

Tennessee, which ranks second nationally in small ruminant production, is another success story. The Small Ruminant Toolbox included resources from the established Tennessee Master Meat Goat Producer Program, and together, both sets of materials are now available to Extension agents and farmers in all 95 counties in the state.

FREE RESOURCES!

Grantee product: *The Small Ruminant Sustainability Checklist*. Download for free at www.sare.org/ruminant-toolbox.

SARE fact sheet: *Sustainable Control of Internal Parasites in Small Ruminant Production*. Download for free at www.sare.org/ruminant-factsheet.

National Sustainable Agriculture Information Service (ATTRA): A large collection of livestock production publications is at attra.ncat.org/attra-pub/livestock.



Fort Valley State University researchers Dill Sandeep (first), Brou Kouakou (second), Tom Terrill (fourth) and Will Getz (kneeling) work locally with goat and sheep farmers like Jerry Culp (third) on a range of issues related to small ruminant production. Getz contributed to the National Center for Appropriate Technology's effort to share information with producers throughout the South. Photo by Candace Pollock, Southern SARE

For more information, go to www.sare.org/project-reports and search for ES08-089.

Charleston Food Hub Brings Efficiency to the Market

In 2011, when Beaufort, S.C., farmer Urbie West was seeking new opportunities to get his produce to local consumers, a friend pointed him to GrowFood Carolina, a wholesaler that distributes local produce to businesses in nearby Charleston. GrowFood, which was newly launched, proved to be just what West needed.



Richard Ward, of Blue Pearl Farms in McClellanville, S.C., delivers blueberries to GrowFood Carolina's warehouse. GrowFood markets and distributes produce for 40 farmers in the Charleston area. Photo by Sara Clow, GrowFood Carolina

"They've taken everything extra we've produced," says West, a fifth-generation farmer who raises produce on 45 acres and does most of his business through a large community supported agriculture (CSA) program. What is more, he adds, GrowFood gets him a premium price: West earns up to 25 percent more than he used to earn through conventional distributors.

GrowFood Carolina, which received a 2010 SARE grant to conduct pre-launch

market research and outreach to farmers, businesses and the community, is an example of a food hub, an increasingly common entity in the food system. Farmers deliver produce to GrowFood's downtown Charleston warehouse and GrowFood distributes it to local grocery stores and restaurants—mostly high-end businesses that will pay the premium farmers like West seek.

The potential for this model is considerable: Only 10 percent of produce eaten by South Carolinians is grown in the state.

The 40 farmers currently in GrowFood's network keep whatever their produce sells for, minus a 20 percent fee that covers GrowFood's services. Along with distribution, GrowFood staff promote farmers' stories and values, build an extensive customer base, and work tirelessly with individual farmers to ensure that together they can supply customers with what they need, when they need it.

"Chefs are just so excited because really what we're doing is building efficiencies in the market," says GrowFood General Manager Sara Clow. "They still have direct relationships with some growers, but if all 40 of our growers were trying to show up at their back door every day, it wouldn't work."

Edward Hudson, of Rowesville, S.C., echoes that sentiment, from the farmer's perspective. "We couldn't do it without them," he says. "There are only so many hours in the day; you can't market everything the way you want to."

In many ways, Hudson and West are typical GrowFood farmers, all of whom reside within 120 miles of Charleston. Both run highly diversified produce operations, rely heavily on CSAs as a marketing outlet, and are eager to expand the variety and volume

of crops they market through GrowFood.

This enthusiasm is a key to the economic sustainability of GrowFood, a nonprofit. Their goal is to shed their reliance on grant funding by growing annual gross sales to \$2 million by 2017, Clow says. In 2012, they made \$260,000 in gross sales. Along with cultivating more demand in the community, their plan for growth includes "not just finding new farmers, but also growing the farmers we're already working with," she says. For example, GrowFood staff work closely with partner farmers on yearly crop planning to help them take full advantage of existing market demand.

During their SARE-funded project, GrowFood sought to assist farmers with technical support, regulatory compliance, beneficial planning and community education. In addition, Clow meets regularly with farmers to discuss strategies for planting the crops she needs to meet her clients' demand. "We still need to do a better job of planting rotations of certain crops, because GrowFood seems to have year-round markets for some things," West says.

For more information, go to www.sare.org/project-reports and search for CS10-078.



During its SARE-supported start-up phase, GrowFood Carolina developed a business strategy and brand identity. Courtesy GrowFood Carolina

FREE RESOURCES!

SARE conferences: Proceedings from recent regional conferences on local food systems, available at www.sare.org/past-conferences.

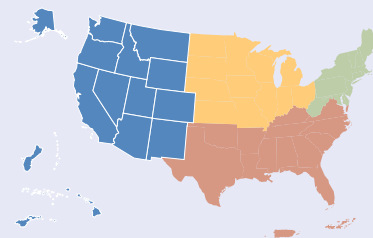
SARE book: *Building a Sustainable Business*. Download for free or purchase hard copies: www.sare.org/business.

SARE online course: Strategic Farm/Ranch Planning and Marketing. For ag educators, available at www.sare.org/course-2.

Check out USDA's food hubs portal: www.ams.usda.gov/foodhubs.



WESTERN SARE



As SARE approached our 25th anniversary, the Western region laid the groundwork for the future by listening closely to our stakeholders. We did this by holding seven subregional conferences, where we collected ideas from farmers, ranchers, researchers and agricultural professionals about the directions research and education on sustainable agriculture should take in the next 20 years. In response to some of the top priorities we heard, Western SARE recently hosted two major events—one on the gaps in agriculture infrastructure and another on water-use efficiency and water scarcity.

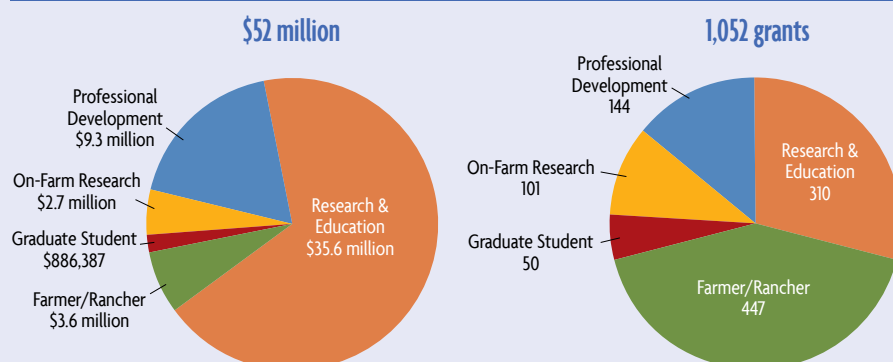
The *Strengthening Agriculture's Infrastructure: Adding Value, Breaking Down Barriers, Increasing Profits* conference, held in December 2012, brought together more than 215 food and farming leaders to explore ways to reconfigure the nation's food system so more value stays in food-producing communities. This event has laid the groundwork for future efforts to build agriculture's infrastructure. Western SARE is following up with an Infrastructure Workshop in Guam targeting the unique needs of those in the Pacific Islands, to be held in May 2014.

The *Water: The Foundation of Agricultural Sustainability* conference, held in August 2012, included 113 farmers and ranchers, Extension educators and researchers, and others from across the Southwest. Hosted by Western SARE's Professional Development Program and New Mexico State University, this event addressed agriculture's water challenges—those related to both severe drought and a growing demand by non-farming uses—by sharing some of the latest, most promising technologies and techniques in water-use efficiency.

Along with events, Western SARE continues to invest in the sustainability of American agriculture through our innovative competitive grants programs. In the San Joaquin Valley—one of the world's most agriculturally productive regions—the University of California's Jeff Mitchell has used two SARE grants to help farmers ensure their long-term sustainability by adopting conservation tillage, a system shown to use less water, fuel and fertilizer while maintaining yields (see p. 14). For mid- and large-scale dairy and livestock operators, traditional methods of handling dead animals are either becoming more costly or are falling under closer scrutiny, so Colorado State University's Jessica Davis, working with colleagues in surrounding states, developed in-depth training materials on livestock composting, an alternative disposal method that holds promise for achieving environmental protection, economic sustainability and job creation (see p. 13). In suburban Washington, Laura Plaut of Common Thread Farms used a SARE grant to work with an impressive and enduring team of parents, farmers and educators to get more local, sustainably grown food into schools. A major success was starting 14 school gardens that are helping make food service staff more comfortable with the idea of serving up local produce, thus creating new opportunities for area farmers (see p. 15).

Learn more about our work by visiting us online at www.westernsare.org.

From 1988 to 2013, Western SARE has awarded...



In 2012, Colorado SARE Coordinator Dennis Lamm retired after 18 years on the job. During his tenure, Colorado SARE funded numerous projects that benefited local farms and ranches. In his work, Dennis demonstrated not only great knowledge and ability, but also a great passion for sustainable agriculture. Thus, he strived to make the SARE program more effective and make sustainability a larger component of agriculture by serving on the national SARE Outreach Steering Committee, hosting the Extension SARE Fellows on a Colorado tour and providing straightforward feedback on administrative matters. Photo by Fred McClanahan

Meeting the Need for Livestock Mortality Alternatives

Since the discovery of mad cow disease in the United States in 2003, new regulations to keep our food system safe have inadvertently increased costs for farmers and ranchers. Rendering businesses, which convert animal carcasses into saleable products, are a prime example: Required to comply with new safety standards, they began charging farmers significantly more for disposal services.



At the Montana State University Northern Agricultural Research Center, Andy Matakis (left) and Darin Boss (right) prepare a livestock composting bin. When properly managed, such bins can compost animal carcasses even during freezing winter weather. Photo by Julia Dafoe, Montana State University

Dairy farmer Joe Gonzalez, of Las Cruces, N.M., went from receiving 2 cents per pound from local renderers to paying \$25 per carcass. Once he realized it would cost \$1,000 each month to remove animals from his farm, he knew it was time for a change. “I figured, well, instead of giving out so much money to somebody else, I had to figure out a different way to handle my mortalities,” he says.

Gonzalez began composting his mortalities on the farm, which costs a mere tenth of what he was paying renderers. Now, supported by a 2009 SARE grant, a multi-state team of researchers and educators is showing other farmers across the West that composting is a safe, easy and economic alternative to rendering.

The team, led by Colorado State University soil scientist Jessica Davis, created training materials that detail mortality composting strategies specifically suited to the West’s diverse climates—from hot and arid to cold and snowy. Materials include a manual, training video and PowerPoint presentation, all in both English and Spanish. They also created a decision-making tool that compares the cost of composting to other disposal methods, to help farmers make informed choices.

The project demonstrated that with the right equipment and proper management, any farmer can begin on-farm mortality composting. “We found that this could be done for small farmers with just a few acres

up to feedlots, and everything in between. There’s no scale limitation,” Davis says.

This is demonstrated by Gonzalez and Belgrade, Mont., goat farmer Nathan Brown, both of whom appear in the training video. Gonzalez manages a herd of about 2,500 cows and composts about 40 calf mortalities each month; Brown keeps about 370 goats and composts 25-40 kids each year.

The team’s efforts, which have been shared with hundreds of Extension and USDA educators, farmers and others across the region, have come at a critical time—composting is on the rise. From 2002 to 2007, the percentage of U.S. dairy farms that compost calves and cows jumped from 10.1 percent to 24.2 percent and from 6.9 percent to 16.8 percent, respectively. Meanwhile, the use of all other methods, including burial, incineration, rendering and landfills, either remained unchanged or decreased, according to the USDA

National Animal Health Monitoring System.

Brown began composting his animals out of concern for the environmental impact of burial. “Here on our farm we have a really high water table. It’s about 3 feet down, and we really didn’t want to bury mortalities for fear of contaminating ground water,” he says.

Montana State University Extension Specialist Thomas Bass, who collaborated with Davis, used another 2009 SARE grant to add a crucial element: demonstrating that animal composting can be done in cold, semi-arid regions. “Many people assume that it’s not possible to compost large carcasses in the Northern Plains and Rocky Mountains,” he says. “However, this is simply not true. By following just a few simple tips, this can be a viable practice in our region.”

For more information, go to www.sare.org/project-reports and search for EW09-013 and FW09-305.

FREE RESOURCES!

Grantee products: *Livestock Mortality Composting*. The manual, financial decision-making tools and other resources are at www.sare.org/mortality-composting.

Manure Composting for Livestock and Poultry Production, from Montana State University: www.sare.org/manure-composting.

Agricultural Composting and Water Quality, from Oregon State University: www.sare.org/compost-and-water-quality.

Conservation Agriculture Gaining Ground in the Central Valley

Farmers in California's Central Valley face the same problems as farmers everywhere—sharply rising fuel and input costs, increased competition for water, and growing concerns over air, water and soil quality. But here, in one of the most agriculturally productive regions of the world, these problems present themselves on a scale as sweeping as the valley itself.



On the Chowchilla, Calif., farm of Richie and Shannon Iest, researchers and farmers examine the root structure and early growth of strip-tilled dairy silage corn. Conservation tillage systems are emerging as a way for large-scale California farmers to improve yields and conserve natural resources. Photo by Jeff Mitchell, University of California

So it is no surprise that a group of Central Valley farmers, University of California researchers and others joined together to promote what they consider to be not just a step in the right direction, but a complete about-face. They are turning to conservation agriculture, an umbrella term for reduced tillage, diverse crop rotations, cover crops, precision irrigation and other practices that have proven to maintain or improve crop yields with fewer inputs while protecting natural resources.

"We're producing more crops now with less input. That's definitely a win-win," says Hanford, Calif., dairy farmer Dino Giacomazzi, an early innovator and member of the group, known as the Conservation Tillage Workgroup.

Giacomazzi, who milks 900 Holsteins and farms 1,000 acres, served as a farmer-advisor on a 2006 SARE-funded project that compared corn production using conventional tillage and strip-till over two years, and found strip-till can save farmers \$50-\$70 per acre. The saving comes from eliminating four to five tractor trips across a field, which translates into burning considerably less diesel fuel and reducing dust emissions by 50-90 percent.

"Probably the most important thing we've learned from converting from a conventional system to a conservation farming system...is understanding that it's a whole new system and whole different way of thinking about farming," Giacomazzi says.

There are important implications for water conservation, too. Reduced tillage leads to more crop residue left on fields, a combination that UC Davis Vegetable Crops Specialist Jeffrey Mitchell and others have shown can cut rainfall- and irrigation-water loss by 13 percent. Along with corn and other feed crops, their work has focused on "thirsty" crops such as tomatoes and cotton.

While reduced tillage and other conservation principles are widely used in the Midwest and other parts of the country, they have been slower to catch on in the Central Valley. The Conservation Tillage Workgroup's research and outreach is helping to change that: According to an annual survey, 700,000 acres in the Central Valley were under minimum tillage in 2010, up from 64,000 acres in 2004.

To further show that conservation systems can help meet California farmers' pressing needs, Mitchell, in response to new water quality regulations, received a 2008 SARE grant to explore

whether triple cropping and reduced tillage could improve nutrient management for dairy farmers. Based on trials in Modesto and Turlock, Mitchell found that growing three forage crops annually captured up to 329 more pounds per acre of

nitrogen from the soil than a two-crop system—meaning those nutrients stayed out of nearby waterways.

A newer focus for Mitchell and his colleagues is merging overhead, precision irrigation with conservation tillage systems, which could further reduce costs for farmers and help them deal with an uncertain water supply. "It hasn't been done in California yet," says Mitchell. "But the experience base for trying now exists with farmers here in the Central Valley."

For more information, go to www.sare.org/project-reports and search for FW06-308 and SW08-060.

FREE RESOURCES!

SARE Topic Room: Cover Crops. Find dozens of free educational materials on cover crops in this one-stop shop: www.sare.org/covercrops.

Find research papers, videos and more on the Conservation Tillage Workgroup's website at <http://casi.ucanr.edu>.

Nurturing a Culture Shift in School Cafeterias

When Laura Plaut wanted to help build a farm-to-school program in Whatcom County, Wash., she figured the best approach was to focus on local farmers, by equipping them with the special tools and knowledge needed to meet the requirements of an institutional buyer. Turns out, she was wrong.



Kids and their parents enjoy squash soup, kale salad, apple cider and other offerings at the 2012 School Garden Harvest Dinner, organized by Common Threads Farm, a Bellingham, Wash., nonprofit. This event was part of a larger effort encouraging cafeteria administrators to put more locally sourced foods on their menus. *Courtesy Common Threads Farm*

What Plaut quickly discovered—and caused her to re-focus of her 2009 SARE-funded project—was that in her community, the more immediate barriers to farm-to-school opportunities were not with farmers knowing how to work with schools, but rather with school administrators being ready to work with farmers.

In order to start bringing more local produce into school cafeterias, a culture shift was needed among districts' food service administrators, Plaut found. "I think they're so overwhelmed with the idea of feeding kids within federal dietary guidelines and given their budget constraints," she says. "It's not that they don't care philosophically, it's that they don't know how to take their caring and translate it into daily practices."

So Plaut, executive director of Common Threads Farm, an educational nonprofit in Bellingham, used her SARE funding to help start a network of school gardens, because

she feels that getting kids excited about growing fresh food will make them more willing to eat it when it gets served in the cafeteria.

Today, there are gardens at 14 schools, including 11 in the Bellingham school district, the largest in the county. Between recess, art projects and class activities, the gardens are in constant use. The program employs professional garden educators, which Plaut says takes the burden off overstretched teachers and makes them more willing to incorporate the gardens into their curricula.

The gardens have also proved to be one of the most successful inroads with food service administrators to date. By fall 2013, Bellingham district officials were planning to establish a protocol for using their gardens' produce in their cafeterias, which Plaut thinks will open the door to food staff working with farmers. "I'm hoping the work we're doing now with school gardens will

also make food service increasingly friendly to local farmers," Plaut says.

Along with establishing the gardens, Plaut found herself attending meetings with parents and administrators, and lots of them. She joined local farm-to-school advisory committees and helped create educational resources on local-food procurement for food service staff. One of the larger objectives of these meetings, Plaut says, was to show administrators that "this is a community that's dying to see this happen."

Through her experiences, Plaut learned that when school food service administrators are not ready to embrace change, parental involvement is critical. "I think parents are really important players in any kind of school reform, and it's as true with lunch as with anything else," says Plaut,

a mother herself. "I think par-

ents are more important than farmers on this

one, because from the school district's perspective, parents are the customer."

Specifically, those parents who might otherwise pack lunch for their children need to

be shown that the cafeteria

can also be a good, nutritious option that supports farmers in their community. Slowly in Whatcom County, that is happening.

For more information, go to www.sare.org/project-reports and search for FW09-016.

FREE RESOURCES!

Courses and curricula: Links to web-based youth curricula can be found at www.sare.org/youth-education.

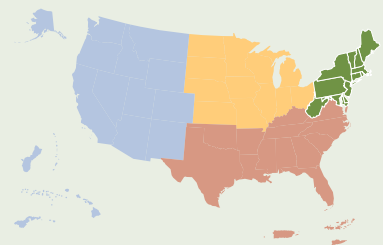
SARE bulletin: *Marketing Strategies for Farmers and Ranchers*. To order free copies or download: www.sare.org/marketing.



This poster won a school-garden art contest at Larrabee Elementary School in Bellingham, Wash. The garden at Larrabee Elementary was established during a SARE-funded project to strengthen farm-to-school connections. *Courtesy Common Threads Farm*



NORTHEAST SARE



Over the past few years, the Northeast region has been thinking hard about how we communicate with the agricultural community in a way that expresses our shared values. Too often, we have been caught up in explaining the rules and regulations of our grant programs—the deadlines, the eligibility, the criteria and so forth. What is just as important to explain are the things that drive us to be involved in grant making, and what we hope to help our grantees achieve with their projects. In a nutshell, we want to support innovation: the testing and sharing of new ideas and practices that can promote sustainability. This goal holds true for all our grantees, whether they are farmers, researchers, educators or agency personnel.

Of course, the way we communicate has to reflect our immediate needs as an organization as well as our long-term goals. Thus, Northeast SARE is striving to help farmers and their allies understand and succeed with our grants process, while recognizing that ultimately what we want is for these grants to foster the changes in behavior and conditions that improve our agricultural system. So dot your i's and cross your t's when filling in the boxes, but think outside them—that is where we are headed.

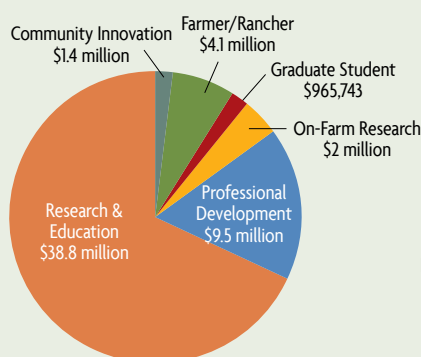
A quick perusal of the SARE grants database supports the notion that our program is a hub of research and development. Unlike most other grant programs, we do not have a specific subject matter focus. Instead, our reviewers look for creative approaches to problem-solving backed by strong methodology that documents both what works and what does not. From cover crops, direct marketing and grazing to emerging concepts around aquaculture, food hubs and soil health—as time goes on the Northeast is continually hearing from new constituents of the food system. Yet, as ideas in grant proposals evolve, the passion of our applicants for their work is ever-present.

SARE has always recognized that sustainable farming is not a fixed event, some point in the future where we arrive and declare the work is done. It is a process, driven by ideas and aspirations and by occasional injections of research money, which helps us understand which new approaches will prove most successful. This is why SARE dollars are invested strategically, in a way that rewards innovation and promise, and also why a heightened awareness of the background music—the vision of a more vibrant system of farms and farm communities—must also be part of the equation. How we communicate is being shaped by our quarter century of relationships with the farmers, researchers and farm advisors we serve; we can only hope we have the melody right.

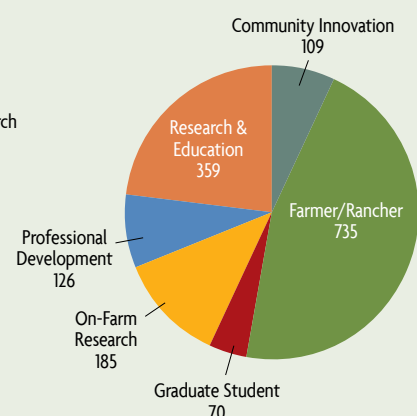
Learn more about our work by visiting us online at www.nesare.org.

From 1988 to 2013, Northeast SARE has awarded...

\$56.7 million



1,584 grants



Regional SARE Educator Jason Challandes, of Delaware State University Cooperative Extension, has spent the last five years promoting season extension strategies in the southern part of the Northeast region. His programming has helped increase the number of high tunnels in Delaware from five to 30, and he continues to focus on high tunnel production research. *Courtesy Jason Challandes*

Nutrient Management Boosts the Profitability, Stewardship of New York Dairies

From feed and fertilizer to manure and milk, managing the complex cycle of nutrients on a dairy farm requires accurate information, which often means the difference between maximized efficiency and lost profit. Or, as Lowville, N.Y., dairy farmer Marc Larabee puts it, “If you don’t measure, you can’t manage it because you’re always guessing.”



Marc Larabee, of Grace-Way Dairy Farm in Lowville, N.Y., is one of hundreds of farmers working with Cornell Cooperative Extension researchers to improve their nutrient management through data collection and recordkeeping. Photo courtesy Cornell Cooperative Extension

For Larabee and hundreds of other New York dairy farmers, the guesswork is being taken out of nutrient management, thanks to a SARE-funded team of Cornell University researchers, educators, farmers and consultants who are developing and promoting a suite of on-farm nutrient assessment tools. The farmers who use these tools to understand how nutrients enter, exit and remain on their fields are then able to modify practices to improve environmental stewardship, profitability and in some cases, productivity.

A group of 54 farmers who have conducted these assessments for at least four years made improvements that have allowed them to maintain farm production levels while cutting their use of nutrients

by 30-50 percent. Improvements can take many shapes depending on each assessment’s results: One farmer might apply less fertilizer or use manure more effectively and still maintain crop yields; another might increase production of home-grown forages and buy less feed; while a third might refine their herd’s diet to lower feed costs or increase milk production, or both.

Both conventional and organic farms in New York have participated in assessments, ranging in size from small dairies to concentrated animal feeding operations.

Crop consultant Peg Cook, who works with Larabee, says the assessments have helped many of her clients who ordinarily buy commercial fertilizer see the value of

manure as a free, farm-generated source of nutrients. “Several farmers have come to me saying that I’ve helped them save \$6,000-\$10,000 on their fertilizer bill,” she says.

The team, led by Cornell nutrient management specialist Quirine Ketterings, received SARE grants in 2008 and 2009 to evaluate new additions to the assessment toolkit and to train more than 60 educators on their use. The most notable addition has been the corn stalk nitrate test, which was developed in Iowa for use at the end of a growing season to determine if a crop got the optimal amount of nutrients. “That’s been one of the most powerful tools over the last couple of years,” Ketterings says.

During these two SARE projects, the Cornell team collected nutrient data from hundreds of field samples. Based on that data, Ketterings estimates that in 2010, these tools saved farmers between 20 and 100 pounds of nitrogen per acre.

This translates into welcome savings for farmers who face rising input costs. The average cost of common nitrogen fertilizers nearly doubled between 2000 and 2010, according to USDA statistics.

Next, prompted by requests from farmers and crop consultants, Ketterings and her team received a 2012 SARE grant to make the corn stalk nitrate test easier to use. Previously, the test had to be taken in standing corn, which meant a time-consuming process of walking through fields to collect samples. But the Cornell team found the test can be taken from stalks after harvest with the results adjusted to ensure accuracy. “This means you can zoom around your fields in a four wheeler and do it quickly,” Ketterings says. “Farmers save money because it takes them less time.”

For more information, go to www.sare.org/project-reports and search for LNE08-271, ENE09-112, LNE11-307 and ONE12-162.

FREE RESOURCES!

Grantee product: *Whole-Farm Mass Nutrient Balance Calculator.*

The calculator, along with training materials, can be found at www.sare.org/MNB.

Grantee product: *Nutrient Management in Corn Production.* Selected Cornell University fact sheets are available at www.sare.org/corn-nutrient-management.

Abundant High Tunnels Provide a Community Boost in West Virginia

For years now, small-scale vegetable farmers have been turning to high tunnels—cheap, unheated structures similar to greenhouses—as a cost-effective way to extend the growing season and their on-farm income stream. But while high tunnels were popping up throughout many cold Northeastern states, in West Virginia they were not.



Farmers learn about planting crops in high tunnels during a West Virginia University-sponsored workshop. Following a planting schedule compatible with the local climate is one of the key factors in maximizing the profitability of high tunnels, and has been a focus of WVU research. Photo by Lewis Jett, West Virginia University

Until 2008 that is, when West Virginia University Extension Specialist Lewis Jett and his colleagues turned their attention to the technology, which has since proved invaluable not just for local farmers, but for local communities as well. That year, Jett received a SARE grant to begin a four-year project that taught hundreds of farmers and Extension educators how to use high tunnels successfully. The grant was a major impetus for the leap in adoption the state has recently seen: Whereas no more than 20 high tunnels were in use in 2007, there were more than 150 by 2012.

“Lewis has done a really good job getting this information out and available to farmers,” says Terry Hudson, who uses two high tunnels on a two-acre vegetable farm outside Charleston.

A state benefits from having a hundred new high tunnels because it means more healthy, locally raised food options are available to consumers. In West Virginia, schools have been particular beneficiaries. “It’s really helped our farm-to-school program,” Jett says. “That used to be an unattainable option for growers, but now

that we have tunnels in place, it’s really an option.”

Jett, who provides technical assistance to the West Virginia Department of Education’s Farm to School program, says that the majority of the 75 to 100 participating farmers are now using high tunnels to help them meet cafeterias’ seasonal demand.

Hudson, who collaborates with Jett on education projects, has fully embraced the potential of high tunnels to support local schools. One of his two tunnels is essentially a classroom, where he hosts both periodic field trips and regular visits from small groups of children with mental and physical disabilities.

“You ask a kid if they want collard greens, they say no way,” Hudson says. “But if they start to grow it, they get really excited. It’s amazing how much they actually buy into their particular plot.”

In his second tunnel, Hudson grows commercial crops year-round, using intensive, carefully timed rotations: He raises high-value crops like tomatoes, peppers and eggplants in warmer months and

leafy greens and root vegetables through the winter. By selling at farmers’ markets and to restaurants, he nets about \$13,400 per year from that high tunnel. He gives credit to Jett’s work because, before Jett and his colleagues began researching, holding workshops and publishing fact sheets, there was

no good information available on what crops you could grow in a West Virginia high tunnel, when you should try growing them, or how.

“We have unique micro-climates here—early and late freezes and frosts, strong winds and heavy snow,” Jett says. “These tunnels have really demonstrated that you can buffer the crop against our erratic climate and consistently grow a good crop.”

For more information, go to www.sare.org/project-reports and search for ENE08-109.

FREE RESOURCES!

SARE Topic Room: Season Extension. Find dozens of free educational materials on high tunnels and more in this one-stop shop: www.sare.org/season-extension.

Check out USDA’s Farm to School portal: www.fns.usda.gov/farmtoschool.

For Vegetable Farmers, a New No-Till Tool in Forage Radish

Vegetable farmers who want the myriad benefits of winter cover crops may be setting themselves up for a hectic spring schedule, when the challenge of planting during a narrow window of good weather becomes more complicated by the need to first terminate that winter crop.



University of Maryland graduate student Natalie Lounsbury and farmer Jack Gurley, of Sparks Glencoe, Md., discuss the use of forage radish as a cover crop in no-till organic vegetable systems. When managed correctly, August-planted forage radish can provide many weed, soil and nutrient services before farmers plant early spring vegetables. *Photo by Edwin Remsburg, University of Maryland*

To make their lives a little easier, University of Maryland (UMD) researchers are exploring the benefits of forage radish, a relatively new cover crop species that they have found fits well with no-till spring planting, and boosts farmers' yields and profits.

In a SARE-funded trial in 2012, an early-season, organic spinach crop planted after forage radish yielded 17,000 pounds per acre—worth \$34,000 at a conservative \$2 per pound. The spinach was raised without tillage, fertilizers or herbicides. “Not a whole lot of work,” says UMD soil scientist Ray Weil, who conducted this research with UMD graduate student Natalie Lounsbury. “I don’t usually think of silver bullets, but for planting early spinach I think we have one.”

A second year of trials saw wetter weather and somewhat lower yields, but spinach grown in plots following forage radish continued to outperform plots using both an oat cover crop and no cover crop.

Forage radish shows particular promise for organic farmers as an alternative to tillage, a time-consuming process used to control weeds, loosen compacted soil and prepare beds prior to planting. When seeded in August in the mid-Atlantic, forage radish suppresses winter weeds because of its quick growth and broad leaves. Its large taproot loosens the soil and helps the plant capture excess nutrients from deep in the ground, which keeps them from leaching into waterways and makes them

available to spring crops when the radish decomposes.

“Right now, forage radish seems to be the only cover crop that does all these things we need it to do,” Lounsbury says.

One of forage radish’s main advantages over other popular cover crop species is that it dies in winter and leaves little residue in spring. This gives the soil a chance to dry out and warm up, two conditions that are

essential for timely planting and successful germination of cash crop seeds. This played a major role in the UMD team’s positive results.

Dave Liker was one of a handful of farmers who collaborated with Lounsbury and Weil on their SARE project. A diversified organic farmer on 25 acres in Laurel, Md., Liker typically relies on spring tillage to manage his heavy, wet soils, and he has difficulty with high-biomass cover crops like rye and vetch because of the time it takes to terminate them. “Cover cropping is really difficult to manage organically,” he says. “The following season, when we need to work the ground, we need to work the ground.”

But when Liker tried a forage radish cover crop before a spring crop of no-till peas, he was happy with the result. “It was the best crop of peas I’ve ever had,” he says.

While forage radish is proving its value, Lounsbury cautions that it is not a cure-all. To avoid pest problems, farmers should not include it too frequently in rotations with other brassicas. Also, they need to pay attention to fertility before seeding forage radish.

“There is amazing weed suppression if you get a good cover crop stand, but if you don’t have enough fertility when you plant in August, then you’re not going to get a good stand,” she says.

For more information, go to www.sare.org/project-reports and search for LNE11-312.

FREE RESOURCES!

Grantee product: Natalie Lounsbury and Ray Weil present their research in a webinar available at www.sare.org/forage-radish-webinar.

SARE Topic Room: *Cover Crops*. Find dozens of free educational materials and research projects on cover crops in this one-stop shop: www.sare.org/cover-crops.

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:



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Photo by Edwin Remsburg

Farmer to farmer

Fields days, conferences, webinars, reports, social media and fact sheets—these are just a few of the ways SARE grantees are sharing results with each other and fulfilling the outreach requirement of their grant award.



Photo by Marie Flanagan, NCR SARE

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