

What is SARE?

Since 1988, the Sustainable Agriculture Research & Education (SARE) program has been the go-to USDA grants and outreach program for farmers, ranchers, researchers and educators who want to develop innovations that improve farm profitability, protect water and land, and revitalize communities. To date, SARE has awarded over \$389 million to more than 8,542 initiatives.

SARE is grassroots with far-reaching impact

Four regional councils of expert practitioners set priorities and make grants in every state and island protectorate.

SARE communicates results

SARE shares project results by requiring grantees to conduct outreach and grower engagement; and by maintaining an online library of practical publications, grantee-produced information products and other educational materials.



www.sare.org

SARE: Advancing the Frontier of Sustainable Agriculture in...

West Virginia

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

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

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

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

FNE20-962.

SARE in West Virginia

northeast.sare.org/sare-in-your-state/west-virginia

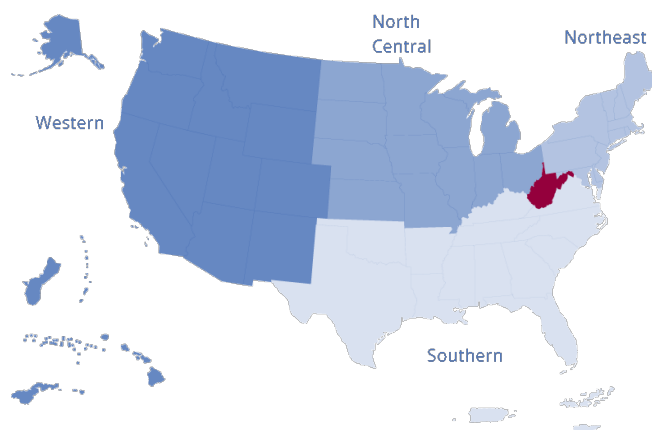
\$4,807,369
in total funding

115 grant projects

(since 1988)

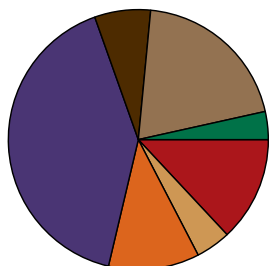
For a complete list of grant projects state by state, go to

www.sare.org/state-summaries



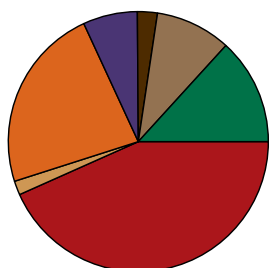
SARE Grants in West Virginia

Total awards: 115 grants



15 Research and Education
 5 Sustainable Community Innovation
 13 Professional Development Program
 47 Farmer/Rancher
 8 Graduate Student
 23 On Farm Research/Partnership
 4 Research Only

Total funding: \$4,807,369



\$2,082,878 Research and Education
 \$83,719 Sustainable Community Innovation
 \$1,107,834 Professional Development Program
 \$325,523 Farmer/Rancher
 \$119,411 Graduate Student
 \$451,657 On Farm Research/Partnership
 \$636,347 Research Only

Find a complete list of projects on page 3.

SARE's Impact



53 percent

of producers report using a new production technique after reading a SARE publication.

79 percent

of producers said they improved soil quality through their SARE project.

64 percent

of producers said their SARE project helped them achieve higher sales.

Learn about local impacts at:

northeast.sare.org/sare-in-your-state/west-virginia

Contact Your SARE State Coordinator

SARE sustainable ag coordinators run state-level educational programs for Extension and other ag professionals, and many help grant applicants and recipients with planning and outreach. Visit northeast.sare.org/state-pages/west-virginia to learn more.

Barbara Liedl
 West Virginia State University
 (304) 204-4037
liedlbe@wvstateu.edu

Doolarie Singh-Knights
 University of West Virginia
 (304) 293-7606
dosingh-knights@mail.wvu.edu



For detailed information on SARE projects, go to www.SARE.org

SARE is funded by the USDA's National Institute of Food and Agriculture (NIFA).

This report includes summaries of competitive grant programs only. Some competitive grant programs that are no longer offered may be included or excluded from the totals in this report depending on the grant program and SARE region.



AGRICULTURE PROJECTS FUNDED IN WEST VIRGINIA

by USDA's
Sustainable Agriculture Research and Education (SARE) Program

West Virginia has been awarded \$4,807,369 grants to support 114 projects, including but not limited to, 14 research and/or education projects, 13 professional development projects and 47 producer-led projects. West Virginia has also received additional SARE support through multi-state projects.

RESEARCH AND EDUCATION GRANTS

Project #	Project Title	SARE Support	Project Leaders
LNE21-420	Developing an Affordable Soil Health Test for the Appalachian Region to Incentivize Sustainable Agricultural Production	\$248,302	Dr.Eugenia Pena-Yewtukhiw West Virginia University
LNE20-401	Optimization of Preventative Biorational Strawberry Fruit and Root Disease Management Techniques	\$244,349	Dr.Mahfuz Rahman West Virginia University
LNE17-359	Obtaining preventative veterinary care in underserved areas	\$67,092	William Shockey West Virginia University
LNE16-350	Refining an attracticidal sphere management system for spotted-wing drosophila in small fruit production	\$198,902	Dr.Tracy Leskey USDA-ARS
LNE14-333	Enhancing the productivity of ewe lambs through the use of reproductive management	\$134,152	Marlon Knights West Virginia University
LNE14-334	Building attract-and-kill systems for management of the brown marmorated stink bug in apple orchards	\$249,967	Dr.Tracy Leskey USDA-ARS
LNE06-249	Evaluation of field density, cultivar preference, and northeast grower evaluation of the hornfaced bee as an alternative sustainable pollinator for highbush blueberry production	\$96,380	Dr.Todd West West Virginia University
LNE05-218	Multi-stakeholder collaboration for profitable and ecological cultivation of forest medicinals	\$103,500	Dennis Hosack Rural Action- Appalachian Forest Resource Center
LNE04-197	Understanding and Improving E-Commerce Use by Small Farms	\$85,317	Cheryl Brown West Virginia University
LNE04-207	Decision Enabling Data Collection and Management Project	\$100,081	Tom McConnell West Virginia University
LNE02-158	Comparison of Organic Farming Systems Using Off-Farm Nitrogen with & without Animals	\$149,968	Sven Verlinden West Virginia University
LNE00-139	Improving Farm Profits by Developing a Niche Market for Green-Certified Senior Calf Beef	\$112,621	W. Neil Gillies Cacapon Institute

LNE99-123	Systems of Transition from Conventional to Organic Agricultural Production	\$212,247	James Kotcon College of Agriculture, Forestry & Consumer Sciences
LNE98-105	Controlling Honeybee Mites with Essential Oils	\$80,000	Jamie Amrine West Virginia University

RESEARCH ONLY GRANTS

Project #	Project Title	SARE Support	Project Leaders
LNE21-427R	Stacking Robust Resistance to Septoria Leaf Spot from Wild Germplasm Accessions into the Cultivated Tomato	\$198,977	Dr.Vagner Benedito West Virginia University
LNE20-410R	Designing and Building Centrifuges to Clarify Maple and Walnut Syrup	\$49,824	Dr.Michael Rechlin Future Generations University
LNE20-411R	UV-C Light Application Technology for Field-Grown Strawberries to Control Fungal Diseases and Arthropod Pests	\$187,733	Dr.Tracy Leskey USDA-ARS
LNE19-387R	A Novel Phosphate Sorbent to Reduce Non-point Source Pollution and Increase Plant Production	\$199,813	Lian-Shin Lin West Virginia University

PROFESSIONAL DEVELOPMENT PROGRAM GRANTS

Project #	Project Title	SARE Support	Project Leaders
ENE23-186	Value-Added Coaching Program for West Virginia Agricultural Service Providers	\$149,999	Jennifer Totten Future Generations University
ENE23-184	Agritourism and Land Use: Good Neighbors and Good Business for Rural Resilience	\$149,900	Jodi Richmond WVU Extension - Mercer County Commision
ENE22-178	Sprout School: Developing a Comprehensive Farm to School Toolkit for Central Appalachia	\$150,000	Jennifer Totten Future Generations University
ENE21-168	Reading the Woods: Training West Virginia Agricultural Service Providers on Non-Timber Forest Products	\$149,878	Dr.A.L. "Tom" Hammett Future Generations University
ENE20-161	Building Efficacy and Financial Success among West Virginia Producers via Farmers Market Manager Education	\$85,958	Erica Gallimore West Virginia Farmers Market Association
ENE20-163	From Seed to Sale: Market-Driven High Tunnel Production Education for West Virginia Agricultural Providers	\$112,771	Lisa Jones West Virginia University
ENE12-126	Professional Development for Agricultural Service Providers in Pollution Discharge Elimination System	\$26,699	Dr.Doolarie Singh-Knights, Ph.D. West Virginia University
ENE08-109	An Educational Program to Expand Season Extension of Horticulture Crops in West Virginia	\$52,517	Dr.Lewis Jett West Virginia University
ENE03-077	Timber to truffles: West Virginia workshops in traditional and special forest products	\$61,614	Dr.David McGill WVU Appalachian Hardwood Center

ENE03-078	Increasing returns from farm woodlots with owner-operated processing of timber	\$79,895	Dr.David McGill WVU Appalachian Hardwood Center
ENE02-070	Consumer-Driven Marketing	\$40,503	Tom McConnell West Virginia University
ENE98-045	Re-Inventing the Appalachian Shepherd	\$6,500	Tom McConnell West Virginia University
ENE94-002	Extension Agent Training in Sustainable Agriculture	\$41,600	John Jett West Virginia University

FARMER/RANCHER GRANTS

Project #	Project Title	SARE Support	Project Leaders
FNE23-062	Off Grid Heating and Cooling for Greenhouses	\$30,000	Audra O'Dell Random Rabbit LLC
FNE22-026	Analysis of Organic Matter and Pipe Depth in a Geothermal Climate Battery High Tunnel	\$14,955	Tommye Rafes T. L. Fruits and Vegetables LLC
FNE21-970	Trialing Cultivating Chicken of the Woods Using Standard Mushroom Farm Technology While Confirming PCR Primer Sequence Traits in Fruiting Bodies	\$14,356	Sharon Briggs Peasant's Parcel Mushroom Farm
FNE21-982	A Practical Comparison of Cold Storage and Traditional Outdoor Hive Wintering Methods in Central West Virginia	\$7,317	Eric Grandon Sugar Bottom Farm LLC
FNE20-962	Low Cost Self-Sustaining Year-Round High Tunnel Temperature Control	\$14,781	Tommye Rafes T. L. Fruits and Vegetables LLC
FNE18-907	Here Comes the Sun: Solar Power as Energy Source in Remote High Tunnel Ventilation Systems	\$14,246	Tommye Rafes T. L. Fruits and Vegetables LLC
FNE17-870	Determination of optimum planting dates for strawberry production in southern West Virginia	\$13,725	Kent Gilkerson Sunset Berry Farm & Produce
FNE17-882	Defining honeybee pollen sources in Appalachia, July through October	\$14,968	Michael Staddon Honey Glen
FNE15-831	West Virginia Pollen Project 2015	\$14,990	Michael Staddon Honey Glen
FNE13-775	Hay net/plastic sleever	\$5,631	Lonnie Fast Fast Hay Movers Inc.
FNE12-759	Integrated trap crop and pheromone trap system for organic management of brown marmorated stink bug	\$14,998	Dr.Clarissa Mathews Redbud Farm, LLC
FNE10-678	Modified Use of Spored Oil for Profitable Production of Mushrooms	\$15,000	Lawrence Beckerle Mountaintop Quail Farms
FNE08-638	Using high tunnels to produce blackberries organically in West Virginia	\$6,318	William Jett Dr.Lewis Jett West Virginia University

FNE08-649	Open range woodlands: An untapped resource for small-scale farms	\$6,432	Chuck Talbott Black Oak Holler Farm, LLC
FNE08-651	Summer veggie snack mix: Product development and processing of excess summer vegetables into a value-added dried snack mix and soup blen	\$5,991	Pam West West Farm
FNE07-599	Medicinal herb seed and seedling rootlet production	\$7,115	David Carman
FNE06-577	Using three-quarter American chestnut hybrids for timber, wildlife, and nut production	\$5,234	Don W. Kines Mountain State Chestnuts
FNE06-593	Producing upscale pork for small-scale farmers: An Appalachian application	\$8,254	Chuck Talbott Black Oak Holler Farm, LLC
FNE05-554	Horn-faced bees vs. indigenous pollinators in blueberries	\$4,304	Robert McConnell McConnell Berry Farm
FNE04-519	Greenhouse Production of West Virginia '63 Tomato Seed	\$5,588	Karen Hyde
FNE04-522	Improved feasibility of sustainable salad production	\$9,199	Barry Landers Mountain State Innovations, INC
FNE04-526	Evaluating Marshall Ryegrass	\$1,699	Roy Metheney
FNE04-536	Pastured Rabbits	\$5,437	Cindy Welch Mountain Berry Farms
FNE04-538	An Economic Analysis of Precision Agriculture on Pastureland in Monroe County, WV	\$4,000	Brian Wicklline
FNE03-462	Yield Differences Between Log Cultivation of Shiitake Mushrooms and Indoor Enriched Blocks	\$5,740	Daniel Freeman Freeman Fungi
FNE03-475	Using Pasture Poultry as a Nitrogen Return for Summer Slump Grazing of Rape by Sheep	\$3,283	Isaac Lewis Greenwood Acres Farm
FNE02-417	Profitability of Ethnic Vegetable Varieties for Sale in Urban Niche Markets	\$2,811	Haroun Hallack Red Bud Farm
FNE02-438	Continuation and Refinement of Two Approaches to Farm-Grown Nitrogen	\$1,006	Susan Sauter
FNE02-440	West Virginia Herb Growers Research Project	\$6,879	Scott Snyder WV Herb Assoc.
FNE01-358	Essential Oil Distillation for West Virginia Herb Growers: A Smell-Good Project	\$6,035	Myra Bonhage-Hale La Paix Herb Farm
FNE01-365	Spuds - Under Organic Mulch vs. in the Soil	\$1,465	Sue Cosgrove LeeJun Farm

FNE01-397	Two Approaches to Farm-Grown Nitrogen	\$2,707	Susan Truxell Sauter
FNE00-295	Spuds - Under Organic Mulch vs. in the Soil	\$1,265	Sue Cosgrove LeeJun Farm
FNE00-326	American chestnut field trial.	\$4,335	Larry Boggs
FNE99-246	Intensive Grazing System	\$2,515	Milford Gibson
FNE99-279	Control of Eastern Red Cedar and Multiflora Rose by Nutrient Management and Intensive Grazing	\$8,500	Jason Teets Tiech Angus Farm
FNE99-283	Sustainable Production of Specialty Cut Flowers through Improved Soil Structure	\$2,154	Pam West West Farm
FNE99-286	Integrated Forest Farming: Medicinal Herb Cultivation, Mushroom Production, and Forest Restoration	\$7,995	Frederick D. Hayes
FNE99-291	Making the Farm Profitable Using Agroforestry	\$6,000	Bill Slagle
FNE98-225	Year Round Hydroponic Tomato Production	\$2,499	Donnie Tenney
FNE98-226	Expanding Local Production of Cage Cultured Hybrid Bass by Demonstrating an Integrated Approach with Limited Space and Equipment and Farmer Cooperation	\$4,996	Frederick D. Hayes
FNE97-163	Christmas Lights and Deer Scents	\$937	Myra Bonhage-Hale La Paix Herb Farm
FNE97-168	Evaluating Forage Quality and Yield in Pastures in the Shenandoah Valley	\$2,753	Bill Grantham
FNE95-110	Utilizing a Living Mulch System for Specialty Cut Flower Production & Pasture Regeneration	\$1,605	Pam Talley
FNE93-004	Evaluation of Five Organic Techniques for Controlling Flea Beetles on Kennebec Potatoes	\$755	Myra Bonhage-Hale La Paix Herb Farm
FNE93-007	Ginseng Production Project	\$1,750	Van & Edna Wysong
FNE93-032	Managing Crowded Woodlots though Shiitake Mushroom Production	\$3,000	Pam Talley

GRADUATE STUDENT GRANTS

Project #	Project Title	SARE Support	Project Leaders
GNE22-279	Improving immune competence and disease resistance in sheep by selecting for parasite resistance.	\$15,000	Dr.Scott Bowdridge West Virginia University Kelsey Bentley West Virginia University - Doctoral Student

GN21-252	Characterization of agouti-signaling protein during oocyte maturation and early embryonic development to improve in vitro embryo production in cattle	\$14,926	Jianbo Yao West Virginia University Heather Chaney West Virginia University
GN19-196	Characterization of Novel Long Non-coding RNAs and Their Roles as Indicators of Oocyte Quality in Cattle	\$14,884	Jianbo Yao West Virginia University Jaelyn Current West Virginia University
GN14-079	The Effects of Poultry Litter Biochar as a Viable Feed Ingredient in Poultry Diets	\$14,989	Dr. Joseph Moritz West Virginia University Ashley Evans West Virginia University
GN13-067	Novel blood metabolites as pre-onset predictors of postpartum metabolic disease in overconditioned transition dairy cows	\$14,995	Dr. Joseph McFadden Cornell University Jorge Eduardo Rico Navarrete West Virginia University
GN12-041	Meeting demand for local food in West Virginia: Do regional factors limit or enable farmer supply response?	\$14,877	Cheryl Brown West Virginia University Ruth Oldham West Virginia University
GN11-015	Increasing Adoption of Out-of-Season Breeding to Enhance Profitability of Sheep Producers in West Virginia	\$14,999	Marlon Knights West Virginia University Kellie D'Souza WVU
GN11-029	Effect of Continuous Suckling/"Ewe-rearing" on Growth and Level of Parasitism of Lambs and on Productivity and Profitability of Lamb Operations	\$14,741	Marlon Knights West Virginia University Dr. Doolarie Singh-Knights, Ph.D. West Virginia University Stephanie Simpson WVU

ON FARM RESEARCH/PARTNERSHIP GRANTS

Project #	Project Title	SARE Support	Project Leaders
ONE21-388	Evaluation of Pelletized Poultry Litter to Improve Specialty Crop Production in West Virginia	\$29,944	Candace DeLong West Virginia University
ONE21-393	Production and Value-Added Processing of Cultivated and Wild-Harvested Elderberries in West Virginia	\$29,700	Dr. Lewis Jett West Virginia University
ONE21-400	Hopping on Hops: Technical Assistance and Peer-to-Peer Mentorship to Support West Virginia Hops Growers	\$29,999	Spencer Moss West Virginia Food & Farm Coalition
ONE21-383	Increasing the Product Supply of Ramps via Enhanced Plantings and Educational Farm Programming	\$29,876	Dr. David McGill WVU Appalachian Hardwood Center
ONE21-403	Training Small Farmers for Commercial Seed Production while Exploring Profitability of Annual Vegetable Seed Crops in West Virginia	\$16,996	Dr. Mehmet Oztan West Virginia University
ONE21-404	Sycamore Syrup: Generating Farm Income and Protecting Riparian Zones in West Virginia	\$29,996	Dr. Michael Rechlin Future Generations University
ONE21-405	Is Copper Deficiency Killing Our Sheep? Micronutrient Availability and Their Effects on Sheep Health and Production.	\$29,955	Alexandria Smith WVU Extension

ONE20-377	Management of Powdery Mildew in Greenhouse and High Tunnel Tomatoes by Using Ultraviolet C Light	\$29,171	Dr.Mahfuz Rahman West Virginia University
ONE19-338	Preserving the Past for the Future: Evaluating Production, Processing and Marketing of Appalachian Heritage Beans	\$29,356	Lisa Jones West Virginia University
ONE19-342	Implementing Beginning Farmer Training in Geographic Areas via WV Collaborative Regional Alliance for Farmer Training	\$29,067	Spencer Moss West Virginia Food & Farm Coalition
ONE19-347	Advancing Walnut Syrup Production for Increased Profitability and Farm Income Diversification	\$26,685	Dr.Michael Rechlin Future Generations University
ONE16-264	Developing farm-to-institution grower capacity for leafy green vegetables in the Eastern Panhandle Region of West Virginia	\$14,965	Dr.Lewis Jett West Virginia University
ONE16-273	Exploring equipment sharing models in the rural Appalachian landscape of southern West Virginia	\$14,998	Anne Stroud Downstream Strategies
ONE16-289c	West Virginia 2016 cover crop initiative for promoting soil health	\$11,107	Thomas Basden West Virginia University Extension Service
ONE15-245	Management of soilborne diseases in small farms with eco-friendly treatment options	\$14,792	Dr.Mahfuz Rahman West Virginia University
ONE14-211	The Farm Micro-Enterprise Development Program in the mid-Ohio Valley: Can extended season high tunnel production increase agricultural self-employment?	\$14,996	Lauren Kemp Unlimited Future Inc
ONE14-223	Enhancing productivity of sheep through greater access and use of genetically evaluated	\$12,156	Dr.Doolarie Singh-Knights, Ph.D. West Virginia University
ONE12-168	Empowering small farms to make big decisions: Examining profitability of local markets in West Virginia	\$14,959	Sigrid Teets WesMonTy RC&D
ONE12-170	Cooperative farm-to-school pilot program	\$4,697	Jennifer Poling West Virginia University Extension
ONE09-105	The Utility of Crotalaria juncea as a Cover Crop in a Temperate Climate	\$9,644	Dr.Gerald Leather West Virginia University
ONE09-111	Evaluating the Use and Seed Production of Forage Radishes in Field and Forage Crop Fields to Control Compaction, Concentrate Nutrients, Suppress Weeds and provide a local seed source in Limestone Soil of the Northern Shenandoah Valley	\$9,485	Craig Yohn West Virginia University Extension Service
ONE05-049	Evaluating hornfaced bees (Osmia cornifrons Radoszkowski) as pollinators of highbush blueberry	\$9,933	Dr.Todd West West Virginia University
ONE04-023	Use of a Baited Trap Crop for Stink Bug Management in Peaches	\$9,180	Henry Hogmire West Virginia University

SUSTAINABLE COMMUNITY INNOVATION GRANTS

Project #	Project Title	SARE Support	Project Leaders
CNE11-087	Pocahontas County Marketing Coordinator	\$14,175	Jill Young Greenbrier Valley Economic Development Corp
CNE08-038	Farmers harness the web to market their products	\$10,000	Allen Arnold Collaborative for the 21st Century Appalachia
CNE07-032	Adding value to the sustainable farm	\$25,000	Allen Arnold Collaborative for the 21st Century Appalachia
CNE07-037	Development of an outreach program to promote wood residue utilization for bioenergy in West Virginia	\$24,962	Dr. Jingxin Wang West Virginia University
CNE06-001	Farm Fresh - Buying Local	\$9,582	Allen Arnold Collaborative for the 21st Century Appalachia

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West Virginia
\$4,807,369**



For further information on projects, contact 802-651-8335 or nesare@uvm.edu. Sustainable Agriculture Research and Education (SARE) is funded by USDA's National Institute of Food and Agriculture (NIFA).