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...

Arizona

Project Highlight: Collaborative Training for Southwest Grassland Restoration under Environmental Uncertainty

Early settlers' descriptions of southeast Arizona told of uninterrupted grassland stretching from one mountain range to another.

That’s changed. Today much of that land has been invaded by mesquite and other woody shrubs and the ecological services provided by the grassland – including water recharge into the underground aquifers – has been diminished.

One reason for the change has been fire – or more specifically the lack of it. Once viewed as natural to the landscape as rain, total fire suppression became standard practice in the early 1900s throughout the West. Without frequent fires to control their growth, the woody shrubs spread across desert southwest grasslands.

But as the importance of preserving the grasslands became more apparent, university researchers, conservationists, ranchers, government agencies and others began looking for ways to preserve these important landscapes, even in the face to today’s climate uncertainty.

Western SARE helped the effort by funding an important professional development project to bring all those experts and other interested people together for three day-long workshops looking at the history of the Southwest grasslands and management methods and options for controlling brush and woody species.

One thing that came out of the workshops was a Brush Management Matrix – a decision-support tool for ranchers and land managers to consult when considering brush-management projects. To extend the reach of the project, all of the presentations were recorded and posted on the web, and a series of six videos were produced.

For more information on this project, see sare.org/projects, and search for project number EW17-006.

SARE in Arizona

western.sare.org/sare-in-your-state/arizona

$3,106,771 in total funding

66 grant projects

(since 1988)

For a complete list of grant projects state by state, go to www.sare.org/state-summaries
SARE Grants in Arizona

Total awards: 66 grants
- 12 Research and Education
- 10 Professional Development Program
- 29 Farmer/Rancher
- 13 Graduate Student
- 2 On Farm Research/Partnership

Total funding: $3,106,771
- $1,497,156 Research and Education
- $816,728 Professional Development Program
- $398,884 Farmer/Rancher
- $295,371 Graduate Student
- $98,632 On Farm Research/Partnership

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: western.sare.org/sare-in-your-state/arizona

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 western.sare.org/state-pages/arizona to learn more.

Randy Norton
UA Cooperative Extension
(928) 428-2432
rnorton@ag.arizona.edu

Debankur Sanyal
The University of Arizona
(701) 781-9295
dsanyal@arizona.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.
Arizona has been awarded $3,106,771 grants to support 64 projects, including but not limited to, 10 research and/or education projects, 10 professional development projects and 29 producer-led projects. Arizona has also received additional SARE support through multi-state projects.

### RESEARCH AND EDUCATION GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| SW23-947   | Harnessing livestock and microbes to improve rangeland productivity and soil health | $304,450     | Dr.Caroline Havrilla  
Colorado State University  
Dr.Catherine Gehring  
Northern Arizona University  
Dr.Elise Gornish  
University of Arizona  
Dr.Seth Munson  
United States Geological Survey |
| SW19-904   | The utility of plant traits to identify range seeding candidates that can achieve multiple management goals | $342,481     | Elise Gornish  
University of Arizona  
Dr.Albert Barberan  
University of Arizona  
Dr.Jeffrey Fehmi  
University of Arizona  
Dr.Mitch McClaran  
University of Arizona  
Dr.Leslie Roche  
UC Davis  
George Ruyle  
University of Arizona |
| SW05-065   | Increased production of inland shrimp farms                                  | $98,024      | Feng-Jyu Tang-Nelson  
University of Arizona |
| SW01-062   | Assessing Sustainability of Shrimp Aquaculture and Integration with a Field Crop | $68,523      | Kevin Fitzsimmons  
Univ of AZ Environmental Research Lab |
| SW01-056   | Conservation Tillage Benefits in a Cotton Centered Crop Rotation System      | $175,277     | William McCloskey  
University of Arizona |
| SW01-026   | Development of a Sustainable Polyculture Seaweeds and Fish on Molokai        | $95,200      | Stephen Nelson  
University of Arizona Environmental Research Lab |
| SW00-053   | Improving Pollination in the Southwest: Testing the on farm feasibility of establishing and managing the carpenter bee for multiple crop farming systems | $32,150      | Jim Donovan  
Native Seeds SEARCH/University of Arizona |
| SW98-068   | Minimum Tillage Systems for Cotton: Reduced Energy, Time, and Particulates   | $182,850     | Robert Roth  
University of Arizona  
Dr.James Walworth  
University of Arizona |
| SW98-036   | Indian Range Livestock Production in the West and Southwest: Entering, Enduring and Emerging from Drought Conditions | $103,000     | Robert Kattnig  
University of Arizona |
### Sustainable Culture of the Edible Red Seaweed, Gracilaria parvispora, in Traditional Hawaiian Fishponds

**SARE Support:** $95,201  
**Project Leaders:** Edward P. Glenn  
Univ. of AZ, Dept. of Soil, Water & Env. Science

### Professional Development Program Grants

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| WPDP23-007      | Strengthening the Technology Toolbox for Sustainable Rangeland Management   | $99,769      | Ashley Lauren Hall  
University of Arizona Cooperative Extension  
Dr. Leslie Roche  
UC Davis  
Dr. Mark Thorne  
University of Hawaii at Manoa |
| WPDP22-019      | From the ground up: Educating Cooperative Extension and NRCS about agricultural technologies to enhance soil health | $70,723      | Elise Gornish  
University of Arizona |
| WPDP22-016      | Collaborative Training for Virtual Fencing Implementation for Sustainable Rangeland Management under Environmental Uncertainty | $99,679      | Dr. Aaron Lien  
University of Arizona  
Joslyn Beard, Ph.D.  
Arizona Board of Regents, University of Arizona  
Aaron Lien, Ph.D.  
Arizona Board of Regents, University of Arizona  
Andrew McGibbon  
Santa Rita Ranch LLC |
| WPDP21-026      | Increasing the Online Communication Toolbox for Sustainable Rangeland Management: A Train-the-Trainer Program | $99,993      | Amber Dalke  
University of Arizona  
Retta Bruegger  
Colorado State University Extension |
| WPDP21-007      | Natural Resource Conservation Professional Development Project               | $96,400      | Deborah Smith  
Arizona Association of Conservation Districts |
| EW17-006        | Collaborative Training for Southwest Grassland Restoration under Environmental Uncertainty | $71,503      | George Ruyle  
University of Arizona |
| EW14-002        | SOLAR ENERGY TRAINING PROGRAM FOR ARIZONA EXTENSION EDUCATORS                | $65,559      | Dr. Edward Franklin  
University of Arizona |
| EW07-020        | "High Tech, High Touch" Professional Development in Geospatial Applications for Invasive Species Management | $60,560      | Barron Orr  
University of Arizona |
| EW02-010        | Striking a Balance: Rangeland Evaluation and Monitoring in the 4-Corners Region | $100,000     | Joanna Austin-Manygoats  
Navajo Nation Department of Agriculture  
John Blueyes  
Navajo Nation Department of Agriculture |
| EW98-007        | Navajo Noxious Weed Training Program                                         | $52,542      | Wallace Tsosie  
Navajo Resource Conservation & Development, Inc. |

### Farmer/Rancher Grants

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| FW20-359        | Reduce water consumption in urban agriculture in arid climates               | $20,000      | Chaz Shelton  
Merchant's Garden AgroTech Inc |
| FW20-367        | Developing new, space efficient, growing techniques, with water conservation, native fish preservation, and increased crop yields for small farmers. | $19,983      | Rylan Morton-Starner  
Forestdale Farm LLC |
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Amount</th>
<th>Principal Investigator</th>
<th>Co-Investigator(s)</th>
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<tbody>
<tr>
<td>FW19-342</td>
<td>Wild crop relatives and landrace cover crops for arid-land vineyards</td>
<td>$19,669</td>
<td>Sarah Fox</td>
<td>Sand-Reckoner Vineyard</td>
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<tr>
<td>FNC18-1138</td>
<td>Mitigation of Potential Adverse Effects of Transgenic Crop Production for Long-Term Improvement of Soil Health</td>
<td>$7,481</td>
<td>Michael Osweiler</td>
<td>MICHAEL OSWEILER</td>
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<tr>
<td>FW17-048</td>
<td>Sustainable Alternative Livestock Feed System for Small-Scale Ranchers</td>
<td>$20,000</td>
<td>Chelise Largent</td>
<td>Chelise Largent</td>
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<tr>
<td>FW17-017</td>
<td>Honey Bee Mating Control and Production Cost Analysis In Africanized Regions Using Instrumental Insemination</td>
<td>$20,000</td>
<td>Jaime de Zubeldia</td>
<td>Jaime de Zubeldia</td>
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<tr>
<td>FW16-032</td>
<td>Sustainable Water Management in a Passive Irrigation System</td>
<td>$19,660</td>
<td>Aaron Anderson</td>
<td>Viking Agriculture LLC</td>
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<tr>
<td>FW14-007</td>
<td>Sustainable Method of Protecting Western Redcedar from Deer Browsing</td>
<td>$15,000</td>
<td>Dr. Andrej Romanovsky</td>
<td>Tree Fever Farm: Forestland Conservation and Development</td>
</tr>
<tr>
<td>FW13-142</td>
<td>Integrating Traditional Foods with Aquaponics in the Desert Southwest</td>
<td>$14,972</td>
<td>Aaron Cardona</td>
<td>Arevalos Farm</td>
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<tr>
<td>FW12-068</td>
<td>On-Farm Pollinator Habitat</td>
<td>$25,000</td>
<td>Dr. Gary Nabhan</td>
<td>Almuniya de los Zopilotes orchard</td>
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<tr>
<td>FW11-017</td>
<td>Agricultural Soil Amendment Project</td>
<td>$14,870</td>
<td>Bill Edwards</td>
<td>North Leupp Family Farms</td>
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<tr>
<td>FW11-033</td>
<td>Navajo Crop Demonstration Project</td>
<td>$30,000</td>
<td>Ernesto Zamudio</td>
<td>Principal Investigator</td>
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<tr>
<td>FW10-060</td>
<td>Eastern Navajo Cattle Herd Improvement</td>
<td>$29,992</td>
<td>Anthony Howard</td>
<td>Eastern Navajo Cattle Growers</td>
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<tr>
<td>FW09-032</td>
<td>Intensive Cultivation Through Edible Cover Cropping Integrated with Bee Keeping</td>
<td>$14,900</td>
<td>James Golo</td>
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<tr>
<td>FW07-310</td>
<td>Hopi Rangeland Management Series</td>
<td>$14,513</td>
<td>Dennis Becenti</td>
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<tr>
<td>FW05-005</td>
<td>Partnership for Monitoring Rangeland and Riparian Health in Red Rock Canyon Watershed, Santa Cruz County, Arizona</td>
<td>$19,976</td>
<td>Richard Collins</td>
<td>Collins C6 Ranch</td>
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<tr>
<td>FW04-113</td>
<td>Ganado Farm Board Agricultural Marketing Study</td>
<td>$15,000</td>
<td>Teresa Showa</td>
<td>Ganado Farm Board</td>
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<tr>
<td>FW03-002</td>
<td>EC Bar Ranch Riparian Grazing Management Project</td>
<td>$7,500</td>
<td>James Crosswhite</td>
<td>EC Bar Ranch</td>
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<tr>
<td>FW03-104</td>
<td>Wool and Weavings Fair Traded from the Source</td>
<td>$15,000</td>
<td>Carol Halberstadt</td>
<td>Black Mesa Weavers for Life and Land</td>
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<tr>
<td>Project #:</td>
<td>Project Title</td>
<td>SARE Support</td>
<td>Project Leaders</td>
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<tr>
<td>FW02-215</td>
<td>Chinle Valley Navajo Truck Farm Project</td>
<td>$13,500</td>
<td>Gwendolyn Wagner</td>
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<tr>
<td>FW01-066</td>
<td>Fruitvale Community Garden</td>
<td>$2,768</td>
<td>Patricia Vigil</td>
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<tr>
<td>FW00-258</td>
<td>Gila River Farms Fresh Produce Market</td>
<td>$3,750</td>
<td>Mary Thomas</td>
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<td>FW00-338</td>
<td>Sustainable Shrimp Farm Tours and Direct Sales Project</td>
<td>$5,800</td>
<td>Gary Wood</td>
<td></td>
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<tr>
<td>FW00-325</td>
<td>Navajo Corn Pollen, Young Ears of Corn for Knee-Down-Bread, and Neeshjizhi Marketing</td>
<td>$7,740</td>
<td>Teresa Showa</td>
<td></td>
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<tr>
<td>FW99-061</td>
<td>Carrying on Dine' Cultural/Traditional Flour Corn Farming: Roots of Dine' People</td>
<td>$5,000</td>
<td>Woodie and Maggie Jodie</td>
<td></td>
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<tr>
<td>FW98-031</td>
<td>Navajo Nation Livestock Disease Survey</td>
<td>$7,000</td>
<td>Glenda Davis</td>
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<tr>
<td>FW96-010</td>
<td>Moving Succession Forward in a Lahmann Lovegrass Monoculture</td>
<td>$3,000</td>
<td>Steve Getzwiller, Spear G Ranch</td>
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<tr>
<td>FW96-012</td>
<td>Goal-Driven Intensive Management of a Riparian/Sandy Bottom Site</td>
<td>$4,310</td>
<td>Kali Holtschlag, Adams Ranch</td>
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<tr>
<td>FW96-045</td>
<td>Managing Biological Processes for Maximum Diversity and Productivity</td>
<td>$2,500</td>
<td>Mike Mercer</td>
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<tr>
<td></td>
<td><strong>GRADUATE STUDENT GRANTS</strong></td>
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<tr>
<td>GW22-243</td>
<td>Testing the potential of seed pellets to improve the soil health in rangelands</td>
<td>$28,577</td>
<td>Dr. Albert Barberan, University of Arizona, Ben Yang, University of Arizona</td>
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<tr>
<td>GW20-210</td>
<td>Carbon Dioxide Enrichment of Controlled Environment Plant Chambers via Specialty Mushroom Cultivation</td>
<td>$25,000</td>
<td>Dr. Barry Pryor, University of Arizona, Justin Chung, University of Arizona, Dr. Barry Pryor, University of Arizona, Justin Chung, University of Arizona</td>
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<tr>
<td>GW19-196</td>
<td>Shrub Encroachment Early Detection System (SEEDS): a rangeland conservation tool</td>
<td>$24,994</td>
<td>Steven Archer, The University of Arizona, Dr. Willem van Leeuwen, University of Arizona, Arizona Remote Sensing Center, William Rutherford, University of Arizona</td>
<td></td>
</tr>
<tr>
<td>GW18-024</td>
<td>Ecosystem Services on Shrub-Encroached Rangelands; Balancing Supply and Demand</td>
<td>$25,000</td>
<td>Steven Archer, The University of Arizona, Scott Jones, University of Arizona</td>
<td></td>
</tr>
</tbody>
</table>
GW18-131 Empowering producers to effectively integrate chemical and biological controls through research and outreach on selective chemistries and impacts on natural enemies. $25,000 Isadora Bordini University of Arizona Isadora Carlos Bordini University of Arizona

GW15-006 Biocrusts, grass establishment, and restoration of working rangelands $24,934 Steven Archer The University of Arizona Cheryl McIntyre University of Arizona

GW12-064 Enhancing the Potential for Sustainability through Participatory Environmental Assessment $25,000 Barron Orr University of Arizona Anahi Ocampo Melgar University of Arizona


GW10-034 Influences of Society, Politics and Local Knowledge on Ranch Management $25,000 George Ruyle University of Arizona Steven Woods University of Arizona

GW10-030 Characterization of Soil Fungal Communities Associated with Native and Invasive Grass Species in Southern Arizona $18,329 Dr. Barry Pryor University of Arizona Carol Rowand University of Arizona Dept. of Plant Sciences

GW10-004 Assessing Direct and Indirect Interactions between Insect and Plant Pathogens and Their Impact on Insect Herbivores $24,996 Dr. Patricia Stock Entomology-University of Arizona Patricia Navarro University of Arizona Dept. of Plant Sciences

GW07-007 An Environmentally-Friendly Alternative for Control of the Citrus Nematode in Arizona $19,746 Dr. Patricia Stock Entomology-University of Arizona Joanna Gress University of Arizona

GW07-004 Contamination of non-Bt cotton fields by transgenic Bt cotton $20,000 Yves Carriere University of Arizona Shannon Heuberger University of Arizona

**ON FARM RESEARCH/PARTNERSHIP GRANTS**

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>OW20-359</td>
<td>Growing the bees to grow the farm</td>
<td>$48,682</td>
<td>Dr. Ethel Villalobos University of Hawaii</td>
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<tr>
<td>OW12-010</td>
<td>Production, Milling and Marketing of Arid-Adapted Heritage Grains in the Desert Borderlands to Increase Food Security</td>
<td>$49,950</td>
<td>Chris Schmidt Native Seeds/SEARCH</td>
</tr>
</tbody>
</table>

For further information on projects, contact Western SARE at (406) 994-4789 or wsare@montana.edu.

Sustainable Agriculture Research and Education (SARE) is funded by USDA’s National Institute of Food and Agriculture (NIFA).