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 $359 million to more than 8,143 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, granteeproduced information products and other educational materials.

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

$2,702,552 in total funding

64 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: 64 grants
- 11 Research and Education
- 9 Professional Development Program
- 29 Farmer/Rancher
- 13 Graduate Student
- 2 On Farm Research/Partnership

Total funding: $2,702,552
- $1,192,706 Research and Education
- $716,959 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

Joshua Sherman
University of Arizona
(520) 766-3603
jdsherman@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 $2,702,552 grants to support 62 projects, including but not limited to, 9 research and/or education projects, 9 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>
| 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 |
| SW01-056  | 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 |
| SW01-062  | Assessing Sustainability of Shrimp Aquaculture and Integration with a Field Crop | $68,523      | Kevin Fitzsimmons  
Univ of AZ 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 |
| SW97-025  | Sustainable Culture of the Edible Red Seaweed, Gracilaria parvispora, in Traditional Hawaiian Fishponds | $95,201      | 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>
### WPDP22-019
From the ground up: Educating Cooperative Extension and NRCS about agricultural technologies to enhance soil health

- **SARE Support:** $70,723
- **Project Leaders:**
  - Elise Gornish
  - University of Arizona

### WPDP22-016
Collaborative Training for Virtual Fencing Implementation for Sustainable Rangeland Management under Environmental Uncertainty

- **SARE Support:** $99,679
- **Project Leaders:**
  - 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

- **SARE Support:** $99,993
- **Project Leaders:**
  - George Ruyle
  - University of Arizona
  - Retta Bruegger
  - Colorado State University Extension
  - Amber Dalke
  - University of Arizona

### WPDP21-007
Natural Resource Conservation Professional Development Project

- **SARE Support:** $96,400
- **Project Leaders:**
  - Deborah Smith
  - Arizona Association of Conservation Districts

### EW17-006
Collaborative Training for Southwest Grassland Restoration under Environmental Uncertainty

- **SARE Support:** $71,503
- **Project Leaders:**
  - George Ruyle
  - University of Arizona

### EW14-002
SOLAR ENERGY TRAINING PROGRAM FOR ARIZONA EXTENSION EDUCATORS

- **SARE Support:** $65,559
- **Project Leaders:**
  - Dr. Edward Franklin
  - University of Arizona

### EW07-020
"High Tech, High Touch" Professional Development in Geospatial Applications for Invasive Species Management

- **SARE Support:** $60,560
- **Project Leaders:**
  - Barron Orr
  - University of Arizona

### EW02-010
Striking a Balance: Rangeland Evaluation and Monitoring in the 4-Corners Region

- **SARE Support:** $100,000
- **Project Leaders:**
  - Joanna Austin-Manygoats
  - Navajo Nation Department of Agriculture
  - John Blueyes
  - Navajo Nation Department of Agriculture

### EW98-007
Navajo Noxious Weed Training Program

- **SARE Support:** $52,542
- **Project Leaders:**
  - 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>
<tbody>
<tr>
<td>FW20-367</td>
<td>Developing new, space efficient, growing techniques, with water conservation, native fish preservation, and increased crop yields for small farmers.</td>
<td>$19,983</td>
<td>Rylan Morton-Starner (Forestdale Farm LLC)</td>
</tr>
<tr>
<td>FW20-359</td>
<td>Reduce water consumption in urban agriculture in arid climates</td>
<td>$20,000</td>
<td>Chaz Shelton (Merchant’s Garden AgroTech Inc)</td>
</tr>
<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 (Sand-Reckoner Vineyard)</td>
</tr>
<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 (MICHAEL OSWEILER)</td>
</tr>
<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 (Jaime de Zubeldia)</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
<td>Amount</td>
<td>Principal Investigator/Group</td>
</tr>
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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>
</tr>
<tr>
<td>FW16-032</td>
<td>Sustainable Water Management in a Passive Irrigation System</td>
<td>$19,660</td>
<td>Aaron Anderson</td>
</tr>
<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>
</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>
</tr>
<tr>
<td>FW12-068</td>
<td>On-Farm Pollinator Habitat</td>
<td>$25,000</td>
<td>Dr. Gary Nabhan</td>
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<tr>
<td>FW11-017</td>
<td>Agricultural Soil Amendment Project</td>
<td>$14,870</td>
<td>Bill Edwards</td>
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<tr>
<td>FW11-033</td>
<td>Navajo Crop Demonstration Project</td>
<td>$30,000</td>
<td>Ernesto Zamudio</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>
</tr>
<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>
</tr>
<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>
</tr>
<tr>
<td>FW04-113</td>
<td>Ganado Farm Board Agricultural Marketing Study</td>
<td>$15,000</td>
<td>Teresa Showa</td>
</tr>
<tr>
<td>FW03-002</td>
<td>EC Bar Ranch Riparian Grazing Management Project</td>
<td>$7,500</td>
<td>James Crosswhite</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>
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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>
</tr>
<tr>
<td>FW01-066</td>
<td>Fruitvale Community Garden</td>
<td>$2,768</td>
<td>Patricia Vigil</td>
</tr>
<tr>
<td>FW00-338</td>
<td>Sustainable Shrimp Farm Tours and Direct Sales Project</td>
<td>$5,800</td>
<td>Gary Wood</td>
</tr>
<tr>
<td>FW00-258</td>
<td>Gila River Farms Fresh Produce Market</td>
<td>$3,750</td>
<td>Mary Thomas</td>
</tr>
</tbody>
</table>
FW00-325  Navajo Corn Pollen, Young Ears of Corn for Knee-Down-Bread, and Neeshjizhi Marketing  $7,740  Teresa Showa

FW99-061  Carrying on Dine' Cultural/Traditional Flour Corn Farming: Roots of Dine' People  $5,000  Woodie and Maggie Jodie

FW98-031  Navajo Nation Livestock Disease Survey  $7,000  Glenda Davis

FW96-010  Moving Succession Forward in a Lahmann Lovegrass Monoculture  $3,000  Steve Getzwiller

FW96-012  Goal-Driven Intensive Management of a Riparian/Sandy Bottom Site  $4,310  Kali Holtschlag

FW96-045  Managing Biological Processes for Maximum Diversity and Productivity  $2,500  Mike Mercer

**GRADUATE STUDENT GRANTS**

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| GW22-243  | Testing the potential of seed pellets to improve the soil health in rangelands | $28,577      | Dr. Albert Barberan  
University of Arizona  
Ben Yang  
University of Arizona |
| GW20-210  | Carbon Dioxide Enrichment of Controlled Environment Plant Chambers via Specialty Mushroom Cultivation | $25,000      | Dr. Barry Pryor  
University of Arizona  
Justin Chung  
University of Arizona  
Dr. Barry Pryor  
University of Arizona  
Justin Chung  
University of Arizona |
| GW19-196  | Shrub Encroachment Early Detection System (SEEDS): a rangeland conservation tool | $24,994      | Steven Archer  
The University of Arizona  
Dr. Willem van Leeuwen  
University of Arizona, Arizona Remote Sensing Center  
William Rutherford  
University of Arizona |
| 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 |
| GW18-024  | Ecosystem Services on Shrub-Encroached Rangelands; Balancing Supply and Demand | $25,000      | Steven Archer  
The University of Arizona  
Scott Jones  
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 |
| GW10-004  | 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 |
Agriculture, Water, and Institutions: An Investigation of Water Management Policy and its Effects on Water Use by Agriculture in Arizona

John Anderies
Arizona State University
Haley Paul
Arizona State University

Characterization of Soil Fungal Communities Associated with Native and Invasive Grass Species in Southern Arizona

Dr. Barry Pryor
University of Arizona
Carol Rowand
University of Arizona Dept. of Plant Sciences

Influences of Society, Politics and Local Knowledge on Ranch Management

George Ruyle
University of Arizona
Steven Woods
University of Arizona

Contamination of non-Bt cotton fields by transgenic Bt cotton

Yves Carriere
University of Arizona
Shannon Heuberger
University of Arizona

An Environmentally-Friendly Alternative for Control of the Citrus Nematode in Arizona

Dr. Patricia Stock
Entomology-University of Arizona
Joanna Gress
University of Arizona

Growing the bees to grow the farm

Dr. Ethel Villalobos
University of Hawaii

Production, Milling and Marketing of Arid-Adapted Heritage Grains in the Desert Borderlands to Increase Food Security

Chris Schmidt
Native Seeds/SEARCH

Total funding from the USDA SARE program to Arizona

$2,702,552

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).