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, 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

$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](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](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](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>
<tbody>
<tr>
<td>SW23-947</td>
<td>Harnessing livestock and microbes to improve rangeland productivity and soil health</td>
<td>$304,450</td>
<td>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</td>
</tr>
<tr>
<td>SW19-904</td>
<td>The utility of plant traits to identify range seeding candidates that can achieve multiple management goals</td>
<td>$342,481</td>
<td>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</td>
</tr>
<tr>
<td>SW05-065</td>
<td>Increased production of inland shrimp farms</td>
<td>$98,024</td>
<td>Feng-Jyu Tang-Nelson, University of Arizona</td>
</tr>
<tr>
<td>SW01-062</td>
<td>Assessing Sustainability of Shrimp Aquaculture and Integration with a Field Crop</td>
<td>$68,523</td>
<td>Kevin Fitzsimmons, Univ of AZ Environmental Research Lab</td>
</tr>
<tr>
<td>SW01-056</td>
<td>Conservation Tillage Benefits in a Cotton Centered Crop Rotation System</td>
<td>$175,277</td>
<td>William McCloskey, University of Arizona</td>
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<tr>
<td>SW01-026</td>
<td>Development of a Sustainable Polyculture Seaweeds and Fish on Molokai</td>
<td>$95,200</td>
<td>Stephen Nelson, University of Arizona Environmental Research Lab</td>
</tr>
<tr>
<td>SW00-053</td>
<td>Improving Pollination in the Southwest: Testing the on farm feasibility of establishing and managing the carpenter bee for multiple crop farming systems</td>
<td>$32,150</td>
<td>Jim Donovan, Native Seeds SEARCH/University of Arizona</td>
</tr>
<tr>
<td>SW98-068</td>
<td>Minimum Tillage Systems for Cotton: Reduced Energy, Time, and Particulates</td>
<td>$182,850</td>
<td>Robert Roth, University of Arizona, Dr.James Walworth, University of Arizona</td>
</tr>
<tr>
<td>SW98-036</td>
<td>Indian Range Livestock Production in the West and Southwest: Entering, Enduring and Emerging from Drought Conditions</td>
<td>$103,000</td>
<td>Robert Kattnig, University of Arizona</td>
</tr>
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</table>
### PROFESSIONAL DEVELOPMENT PROGRAM GRANTS

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

### FARMER/RANCHER GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FW20-359</td>
<td>Reduce water consumption in urban agriculture in arid climates</td>
<td>$20,000</td>
<td>Chaz Shelton&lt;br&gt;Merchant's Garden AgroTech Inc</td>
<td></td>
</tr>
<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&lt;br&gt;Forestdale Farm LLC</td>
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<tr>
<td>Grant Number</td>
<td>Project Title</td>
<td>Award Amount</td>
<td>Principal Investigator(s)</td>
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<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-Seekonker Vineyard</td>
<td></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, MICHEL OSWEILER</td>
<td></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>
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<tr>
<td>FW17-017</td>
<td>Honey Bee Mating Control and Production Cost Analysis In Africanized Regions Using Instrumentation</td>
<td>$20,000</td>
<td>Jaime de Zubeldia, Jaime de Zubeldia</td>
<td></td>
</tr>
<tr>
<td>FW16-032</td>
<td>Sustainable Water Management in a Passive Irrigation System</td>
<td>$19,660</td>
<td>Aaron Anderson, Viking Agriculture LLC</td>
<td></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, Tree Fever Farm: Forestland Conservation and Development</td>
<td></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, Arevalos Farm</td>
<td></td>
</tr>
<tr>
<td>FW12-068</td>
<td>On-Farm Pollinator Habitat</td>
<td>$25,000</td>
<td>Dr. Gary Nabhan, Almuniya de los Zoplotes orchard</td>
<td></td>
</tr>
<tr>
<td>FW11-017</td>
<td>Agricultural Soil Amendment Project</td>
<td>$14,870</td>
<td>Bill Edwards, North Leupp Family Farms, Stacey Jensen, NLFF</td>
<td></td>
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<tr>
<td>FW11-033</td>
<td>Navajo Crop Demonstration Project</td>
<td>$30,000</td>
<td>Ernesto Zamudio, Principal Investigator</td>
<td></td>
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<tr>
<td>FW10-060</td>
<td>Eastern Navajo Cattle Herd Improvement</td>
<td>$29,992</td>
<td>Anthony Howard, Eastern Navajo Cattle Growers</td>
<td></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>
<td></td>
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<tr>
<td>FW07-310</td>
<td>Hopi Rangeland Management Series</td>
<td>$14,513</td>
<td>Dennis Becenti</td>
<td></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, Collins C6 Ranch</td>
<td></td>
</tr>
<tr>
<td>FW04-113</td>
<td>Ganado Farm Board Agricultural Marketing Study</td>
<td>$15,000</td>
<td>Teresa Showa, Ganado Farm Board</td>
<td></td>
</tr>
<tr>
<td>FW03-002</td>
<td>EC Bar Ranch Riparian Grazing Management Project</td>
<td>$7,500</td>
<td>James Crosswhite, EC Bar Ranch</td>
<td></td>
</tr>
<tr>
<td>FW03-104</td>
<td>Wool and Weavings Fair Traded from the Source</td>
<td>$15,000</td>
<td>Carol Halberstadt, Black Mesa Weavers for Life and Land</td>
<td></td>
</tr>
</tbody>
</table>
FW02-215  Chinle Valley Navajo Truck Farm Project  $13,500  Gwendolyn Wagner
FW01-066  Fruitvale Community Garden  $2,768  Patricia Vigil
FW00-258  Gila River Farms Fresh Produce Market  $3,750  Mary Thomas
FW00-338  Sustainable Shrimp Farm Tours and Direct Sales Project  $5,800  Gary Wood
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>
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</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 |
| GW18-024  | Ecosystem Services on Shrub-Encroached Rangelands; Balancing Supply and Demand | $25,000      | Steven Archer  
The University of Arizona  
Scott Jones  
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

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

John Anderies
Arizona State University
Haley Paul
Arizona State University

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

**Total funding from the USDA SARE program to Arizona**

$3,106,771

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).