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

Grants awarded
2019–2024

Total awards: **16 grants**
- 3 Farmer/Rancher
- 2 Research and Education
- 7 Professional Development Program
- 1 On Farm Research/Partnership
- 3 Graduate Student

Total funding: **$1,498,225**
- $59,652 Farmer/Rancher
- $646,931 Research and Education
- $664,389 Professional Development Program
- $48,682 On Farm Research/Partnership
- $78,571 Graduate Student

Find a complete list of projects on page 3.

Farmer and rancher impacts
2019–2024

SARE grantees have reported the following impacts from their projects:

- **1,586 farmers participated in a SARE-funded project**
- **268 farmers reported a change in knowledge, awareness, skills or attitude**
- **28 farmers changed a practice**

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-profiles/arizona/ to learn more.

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

Debankur Sanyal  
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 $3,304,596 grants to support 66 projects, including but not limited to, 10 research and/or education projects, 12 professional development projects and 29 producer-led projects. Arizona has also received additional SARE support through multi-state projects.

<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>SW01-026</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>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>
</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>
</tbody>
</table>
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

Minimum Tillage Systems for Cotton: Reduced Energy, Time, and Particulates

$182,850

Robert Roth
University of Arizona
Dr.James Walworth
University of Arizona

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

$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>
| WPDP24-001  | PRECISION DRONE TECHNOLOGY TRAINING FOR ARIZONA FRTEP AGENTS                  | $97,871      | Dr.Edward Franklin
University of Arizona |
| WPDP24-008  | Sharing Our Way - SOW Seeds Conference and Guidebook                          | $99,954      | Dr.Andrea Carter
Native Seeds/SEARCH |
| 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 |
| WPDP22-016  | 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 |
| 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 |
**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  
Deborrah 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 |
| FW19-342  | Wild crop relatives and landrace cover crops for arid-land vineyards         | $19,669      | Sarah Fox  
Sand-Reckoner Vineyard |
| FNC18-1138| Mitigation of Potential Adverse Effects of Transgenic Crop Production for Long-Term Improvement of Soil Health | $7,481       | Michael Osweiler  
MICHAEL OSWEILER |
<table>
<thead>
<tr>
<th>Proposal Number</th>
<th>Project Title</th>
<th>Funding</th>
<th>Principal Investigator(s)</th>
</tr>
</thead>
<tbody>
<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 Instrumental Insemination</td>
<td>$20,000</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>
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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>
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<tr>
<td>FW13-142</td>
<td>Integrating Traditional Foods with Aquaponics in the Desert Southwest</td>
<td>$14,972</td>
<td>Aaron Cardona</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>
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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>
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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>
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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>
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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>
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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>FW03-104</td>
<td>Wool and Weaving Fair Traded from the Source</td>
<td>$15,000</td>
<td>Carol Halberstadt Black Mesa Weavers for Life and Land</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>
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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>
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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>
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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>
</tr>
<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>
</tr>
<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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</table>

**GRADUATE STUDENT GRANTS**

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<tbody>
<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>
</tr>
<tr>
<td>Proposal Number</td>
<td>Project Title</td>
<td>Funding</td>
<td>Principal Investigators</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</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>
</tr>
<tr>
<td>GW18-131</td>
<td>Empowering producers to effectively integrate chemical and biological controls through research and outreach on selective chemistries and impacts on natural enemies.</td>
<td>$25,000</td>
<td>Dr. Peter Ellsworth, University of Arizona, Isadora Carlos Bordini, University of Arizona</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>
</tr>
<tr>
<td>GW15-006</td>
<td>Biocrusts, grass establishment, and restoration of working rangelands</td>
<td>$24,934</td>
<td>Steven Archer, The University of Arizona, Cheryl McIntyre, University of Arizona</td>
</tr>
<tr>
<td>GW12-064</td>
<td>Enhancing the Potential for Sustainability through Participatory Environmental Assessment</td>
<td>$25,000</td>
<td>Barron Orr, University of Arizona, Anahi Ocampo Melgar, University of Arizona</td>
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<tr>
<td>GW10-034</td>
<td>Influences of Society, Politics and Local Knowledge on Ranch Management</td>
<td>$25,000</td>
<td>George Ruyle, University of Arizona, Steven Woods, University of Arizona</td>
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<tr>
<td>GW10-030</td>
<td>Characterization of Soil Fungal Communities Associated with Native and Invasive Grass Species in Southern Arizona</td>
<td>$18,329</td>
<td>Dr. Barry Pryor, University of Arizona, Carol Rowand, University of Arizona Dept. of Plant Sciences</td>
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</tbody>
</table>
### ON FARM RESEARCH/PARTNERSHIP GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
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<th>SARE Support</th>
<th>Project Leaders</th>
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</thead>
</table>
| 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  
Arizona State University |
| 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 |

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

$3,304,596

For further information on projects, contact Western SARE at (406) 994-4785 or wsare@montana.edu. Sustainable Agriculture Research and Education (SARE) is funded by USDA’s National Institute of Food and Agriculture (NIFA).