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 $360 million to more than 8,174 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.

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

Montana

Project Highlight: Improving the Benefits of Applied Nitrogen

Broadcast applications of urea are a common management practice for large-acreage, no-till, dryland winter wheat producers in Montana. But when urea is applied to the soil surface, a significant amount of nitrogen can be lost when it converts to ammonia gas and enters the atmosphere in a process known as volatilization. Farmers face economic losses due to reduced yield or crop quality from inadequate nitrogen fertility, and ammonia emissions contribute to environmental pollution and nitrogen enrichment of natural ecosystems.

With SARE funding to address the problem, Montana State soil scientist Richard Engel conducted on-farm trials over four seasons to identify soil and environmental conditions under which urea applications were most susceptible to ammonia loss, and to identify management practices to reduce those losses. Based on the findings, Engel’s team recommends against surface-applying fertilizer to frozen or wet ground, particularly during the over-winter period. Applying it during the spring following thaw resulted in lower ammonia volatilization loss. By following the team’s recommendations to fertilize in the spring and incorporate the fertilizer into the soil when possible, a majority of Montana’s wheat growers are reducing air pollution and saving about $5 million a year through reduced fertilizer loss and increased yields.

For more information on this project, see sare.org/projects, and search for project number SW10-050.

SARE in Montana

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

$9,745,902 in total funding

138 grant projects

(since 1988)

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

Total awards: 138 grants
- 46 Research and Education
- 22 Professional Development Program
- 37 Farmer/Rancher
- 10 On Farm Research/Partnership
- 19 Graduate Student
- 4 Research to Grass Roots

Total funding: $9,745,902
- $6,776,722 Research and Education
- $1,325,229 Professional Development Program
- $457,198 Farmer/Rancher
- $405,603 On Farm Research/Partnership
- $463,184 Graduate Student
- $317,966 Research to Grass Roots

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/montana

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/montana to learn more.

Patrick Mangan
Montana State University Extension Service
(406) 258-4205
patrick.mangan@montana.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.
Montana has been awarded $9,745,902 grants to support 137 projects, including but not limited to, 45 research and/or education projects, 22 professional development projects and 37 producer-led projects. Montana 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>
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<td>SW22-934</td>
<td>Landowner Collaborative Strategies for Nonlethal Predator Control</td>
<td>$349,951</td>
<td>Dr. Jared Beaver</td>
<td>Montana State University</td>
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<td>Dr. Stewart Breck</td>
<td>Colorado State University</td>
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<td>Dr. Alex Few</td>
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<td>Kyran Kunkel</td>
<td>Western Landowners Alliance</td>
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<td>Dr. Julie Young</td>
<td>Utah State University</td>
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<td>SW21-929</td>
<td>Indigenous Food-Science-Ways: Integrating Indigenous knowledge with food science research and education to support value-added Native foods</td>
<td>$349,898</td>
<td>Wan-Yuan Kuo</td>
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<td>Eric Belasco</td>
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<td>Dr. Jane Boles</td>
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<td>Dr. Paul Gannon</td>
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<td>Dr. Brent Peyton</td>
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<td>Brenda Richey</td>
<td>Montana State University</td>
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<td>SW21-930</td>
<td>Intercropping chickpea with flax: An alternative sustainable way to manage Ascochyta blight of Chickpea</td>
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<td>Dr. William Franck</td>
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<td>Dr. Qasim Khan</td>
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<td>Dr. Kevin McPhee</td>
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<td>Dr. Kent McVay</td>
<td>Montana State University-SARC</td>
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</table>
Developing an integrated management decision framework for cheatgrass control in the northeastern region of the sagebrush steppe

Lisa Rew
Montana State University
Andrew and Hilary Andersen
J Bar L Ranch
Jim Berkey
The Nature Conservancy
Amber Burch
Beaverhead County Weed District
Daphne and Kevin Chester and Crowe
Double C Ranch Holdings
Kyle Cutting
US Fish, Wildlife Service
Eric and Stephanie Hansen
Hansen Livestock Company
Jeff Johnson
Johnson Ranch
Dr. Jane Mangold
Montana State University
Kara Maplethorpe
Beaverhead County Weed District
Dr. Andrea Litt
Department of Ecology, Montana State University
Megan Van Emon
Montana State University
Dr. Bok Sowell
MSU-Animal & Range Sciences
Dr. Catherine Zabinski
Montana State University

Snowbanks to Grassbanks

$349,710

Dr. Bok Sowell
MSU-Animal & Range Sciences
Dr. Andrea Litt
Department of Ecology, Montana State University
Megan Van Emon
Montana State University

Soil acidity management of long-term no-till fields in Montana to prevent crop failure

$264,016

Dr. Richard Engel
Montana State University

The Impacts of Integrating Livestock into Cropping Systems on Soil Health and Crop Production

$249,502

Devon Ragen
Montana State University

Research and Demonstration of Minimum Tillage and Optimum Water Management in Sugarbeet Production in Eastern Montana

$247,410

Dr. Chengci Chen
Montana State University

Examining, Optimizing, and Building Capacity for Montana’s Local Beef to School Supply Chain

$220,021

Dr. Carmen Byker Shanks
Montana State University

Sustainable Cropping Systems for Dual-Purpose Biennial Canola

$256,397

Dr. Darrin Boss
Montana State University
Dr. Steve Fransen, PhD
Washington State University

Evaluating Native Perennial Flower Strips for Enhancing Native Bees and Pollination Services on Farmlands

$170,951

Laura Burkle
Montana State University

Landscape Collaborative Grazing and Greater Sage Grouse Survival

$339,552

Dr. Bok Sowell
MSU-Animal & Range Sciences

Low Glycemic Potatoes, a value-added crop for Montana

$154,000

Dr. David Sands
Montana State University

Degree Day Modeling and Economic Considerations of Insects and Weeds in Sheep Grazed Alfalfa, Grain, and Range Production Systems

$206,700

Dr. Hayes Goosey
Montana State University
<table>
<thead>
<tr>
<th>Project Code</th>
<th>Description</th>
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<td>SW11-099</td>
<td>Using cover crop mixtures to improve soil health in low rainfall areas of the northern plains</td>
<td>$354,405</td>
<td>Dr. Perry Miller</td>
<td>Montana State University</td>
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<td>SW10-050</td>
<td>Enhancing Cropping System Sustainability by Minimizing Ammonia-N Losses from Biological and Chemical Inputs</td>
<td>$190,009</td>
<td>Dr. Richard Engel</td>
<td>Montana State University</td>
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<td>SW09-068</td>
<td>Integrating Biological Control with Targeted Sheep Grazing to Suppress Spotted Knapweed</td>
<td>$49,865</td>
<td>Rachel Frost</td>
<td>Montana State University</td>
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<td>Dr. Jeff Mosley</td>
<td>Montana State University</td>
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<tr>
<td>SW09-601</td>
<td>Infrastructure Support for Small Livestock Processing Facilities</td>
<td>$46,796</td>
<td>Dr. Jane Boles</td>
<td>Montana State University</td>
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<td>SW07-013</td>
<td>Evaluation of Alfalfa Weevil (Coleoptera Curculionidae) Densities, Weed Abundance, and Regrowth Characteristics of Alfalfa Grazed by Sheep.</td>
<td>$96,817</td>
<td>Dr. Hayes Goosey</td>
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<td>SW07-025</td>
<td>Grower-based selection of varieties and systems for wheat stem sawfly control</td>
<td>$125,000</td>
<td>Dr. Luther Talbert</td>
<td>Montana State University</td>
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<td>SW07-028</td>
<td>Is Sulfur Cinquefoil a Candidate for Control with Sheep and Goats?</td>
<td>$54,250</td>
<td>Dr. Jeff Mosley, Rachel Frost</td>
<td>Montana State University</td>
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<tr>
<td>SW07-603</td>
<td>Developing a free on-line excel based enterprise budget decision support program to evaluate the incorporation of sheep into farm systems as an alternative to pesticide and mechanical methods of weed and insect control</td>
<td>$10,000</td>
<td>Dr. Hayes Goosey</td>
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<td>SW06-006</td>
<td>Survey and Economic Analysis of Montana Farms Utilizing Integrated Livestock-Cereal Grain (Ley Farming) Systems</td>
<td>$91,500</td>
<td>Dr. Chengci Chen</td>
<td>Montana State University</td>
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<td>SW06-075</td>
<td>Does Timing of Defoliation Affect Spotted Knapweed Seed Viability and Germination?</td>
<td>$62,600</td>
<td>Tracy Brewer</td>
<td>Park County Extension - Montana State University</td>
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<td>Dr. Tracy Mosley</td>
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<td>SW05-038</td>
<td>Developing Distance Learning Based on Perceptions and Knowledge of Producers and Agricultural Professionals</td>
<td>$98,819</td>
<td>Fabian Menalled</td>
<td>Dept. of Land Resources and Environmental Sciences</td>
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<tr>
<td>SW04-007</td>
<td>Methane Recovery from Small Dairy Operations</td>
<td>$123,834</td>
<td>Ron Carlstrom</td>
<td>MSU Extension- Gallatin County</td>
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<tr>
<td>SW03-056</td>
<td>Ecologically Based Integrated Weed Management to Restore Plant Diversity</td>
<td>$121,750</td>
<td>James Jacobs</td>
<td>Montana State University</td>
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<td>SW03-063</td>
<td>Factors Affecting Alfalfa Stand Longevity in Montana</td>
<td>$139,397</td>
<td>Dennis Cash</td>
<td>Montana State University</td>
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<tr>
<td>SW02-005</td>
<td>Increasing Crop Water Use Efficiency in Advanced No-Till Systems</td>
<td>$22,980</td>
<td>Dr. Perry Miller</td>
<td>Montana State University</td>
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</table>
Using Crop Diversity in No-till and Organic Systems to Reduce Inputs and Increase Profits and Sustainability in the Northern Plains

Bruce Maxwell

An Alternative to Traditional Wheat Stubble Management Using Sheep to Control Pests and Improve Soil Nutrient Cycling

Patrick Hatfield
Department of Animal and Range Sciences
Sue Blodgett
Montana State University, Dept. Entomology
Dr. Hayes Goosey
Montana State University
Duane Griffith
Montana State University, Ag Econ and Ext Dept

Selecting Cattle to Prevent Grazing Distribution Problems

Derek Bailey
Montana State University

Comparison of Pest Management Interactions in Spring Wheat-Cover Crop and Spring Wheat-Fallow Cropping Systems

Andrew Lenssen
Montana State University

Sustaining Agriculture and Community: Moving the Farm Improvement Club Program Beyond the Farm Gate

Jonda Crosby
Alternative Energy Resources Organization

Sustainable Farming Quarterly

Nancy Matheson
Alternative Energy Resources Organization (AERO)

The Sustainable Farming Quarterly (SFQ) A Regional Newsletter

Al Kurki
Alternative Energy Resources Organization (AERO)

Farm Improvement Club Network for Sustainable Agriculture

Nancy Matheson
Alternative Energy Resources Organization (AERO)

Specifying and Analyzing Whole-Ranch Systems for Sustainable Range Livestock Production in Environmentally Sensitive Areas

Jack Riesselman
Montana State University

Practical Education in Sustainable Production Systems

Wade Crouch
Montana State University

Regional Farm and Research Center Matching System-FARMS

J. Jacobsen
Montana State University


Nancy Matheson
Alternative Energy Resources Organization (AERO)

Low-Input Legume/Cereal Rotations for the Northern Great Plains/Intermountain Region

James Sims
Montana State University

Bio-Priming for the Control of Pythium Reemergence Damping-Off in Vegetable Crops

Nancy Callan
Montana State University

Livestock Health and Nutrition Alternatives: A Western States Conference

Al Kurki
Alternative Energy Resources Organization (AERO)
### RESEARCH TO GRASS ROOTS GRANTS

<table>
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<tr>
<th>Project #</th>
<th>Project Title</th>
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<tr>
<td>WRGR22-001</td>
<td>Montana Food Economy Initiative</td>
<td>$96,984</td>
<td>Erin Austin&lt;br&gt;Alternative Energy Resources Organization (AERO)&lt;br&gt;Erin Austin&lt;br&gt;AERO&lt;br&gt;Michal DeChellis&lt;br&gt;AERO and Cultivating Minds, LLC&lt;br&gt;Kim Lloyd&lt;br&gt;St. Peter's Health&lt;br&gt;Michele Schahczenski&lt;br&gt;Yellowstone Valley Food Hub&lt;br&gt;Randi Wing&lt;br&gt;AERO and FBCEDC</td>
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<td>WRGR21-001</td>
<td>Montana's Soil Health Network: Deepening the Roots in Four Regions</td>
<td>$51,223</td>
<td>Maggie Gordon&lt;br&gt;Northern Plains Resource Council&lt;br&gt;Caroline Canarios&lt;br&gt;Northern Plains Resource Council&lt;br&gt;Charlie French&lt;br&gt;NRCS&lt;br&gt;Stephen Charter&lt;br&gt;Charter Beef</td>
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<td>WRGR21-006</td>
<td>Participatory Training in Small-scale Anaerobic Digestion of Agricultural Residues</td>
<td>$95,000</td>
<td>Dr. Roland Ebel&lt;br&gt;Montana State University&lt;br&gt;Selena Ahmed&lt;br&gt;Montana State University&lt;br&gt;Mac Burgess&lt;br&gt;Montana State University&lt;br&gt;Dr. Jed Eberly&lt;br&gt;Montana State University&lt;br&gt;Timothy Seipel&lt;br&gt;Department of Land Resources and Environmental Sciences, Montana State University</td>
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<td>RGR20-009</td>
<td>Montana Food Economy Initiative</td>
<td>$74,759</td>
<td>Lindsay Ganong&lt;br&gt;AERO</td>
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### PROFESSIONAL DEVELOPMENT PROGRAM GRANTS

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<td>WPDP22-021</td>
<td>Montana Agritourism Fellows Program: Developing Leaders to Advance Sustainable AgriTourism</td>
<td>$99,965</td>
<td>Dr. Shannon Arnold&lt;br&gt;Montana State University&lt;br&gt;Dr. Dustin Perry&lt;br&gt;Montana State University&lt;br&gt;Dr. Beth Shirley&lt;br&gt;Montana State University</td>
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<td>PDP20-020</td>
<td>Building Internal and Community Capacity for the Blackfeet Nation Through Agriculture</td>
<td>$73,795</td>
<td>Will Seeley&lt;br&gt;Blackfeet Tribe: Agriculture Resource Management Plan</td>
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<td>WPDP19-15</td>
<td>Sustainable Beef Cattle Production: Ranch to Ribeye</td>
<td>$57,310</td>
<td>Megan Van Emon&lt;br&gt;Montana State University&lt;br&gt;Colleen Buck&lt;br&gt;Montana State University&lt;br&gt;Callie Cooley&lt;br&gt;Montana State University&lt;br&gt;Molly Hammond&lt;br&gt;Montana State University&lt;br&gt;Elin Kittelmann&lt;br&gt;Montana State University&lt;br&gt;Kari Lewis&lt;br&gt;Montana State University</td>
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<td>EW18-027</td>
<td>Building Internal Capacity for the Blackfeet Tribe Agricultural Resource Management Plan (ARMP)</td>
<td>$52,155</td>
<td>Loren Bird Rattler&lt;br&gt;Blackfeet Tribe</td>
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<td>EW18-011</td>
<td>Pheromones as Tools for Monitoring the Insect Pests in the Northern Plains - Instructive Tools for Agricultural Professionals</td>
<td>$73,510</td>
<td>Dr. Michael Ivie&lt;br&gt;Montana State University-Bozeman</td>
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<td>EW17-011</td>
<td>Integrated Parasite Management: Train the Trainer</td>
<td>$74,189</td>
<td>David Scott&lt;br&gt;National Center for Appropriate Technology</td>
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<td>EW16-029</td>
<td>Best Management Practices (BMPs) for Mitigating Herbicide Resistance in the Northern Great Plains - Educational Tools for Agricultural Professionals</td>
<td>$68,871</td>
<td>Dr. Prashant Jha&lt;br&gt;Montana State University, Southern Agricultural Research Center, Huntley, MT</td>
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<td>EW16-036</td>
<td>Catalyzing Increased Agricultural Sales through a Common Understanding of Montana’s New Food Modernization Law</td>
<td>$22,332</td>
<td>Jennifer Hill-Hart&lt;br&gt;AERO</td>
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<td>EW15-009</td>
<td>Conservation and Augmentative Biological Control in the Northern Plains - Providing Tools for Agriculture Professionals</td>
<td>$68,182</td>
<td>Dr. Michael Ivie&lt;br&gt;Montana State University-Bozeman</td>
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<td>EW13-014</td>
<td>Enhancing the Exploring Energy Efficiency &amp; Alternatives (E3A) Curriculum</td>
<td>$42,277</td>
<td>Milton Geiger&lt;br&gt;University of Wyoming Extension&lt;br&gt;Dr. Glen Whipple&lt;br&gt;University of Wyoming Extension</td>
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<td>EW12-004</td>
<td>Tour of sustainable Small Grain Production in Eastern Washington</td>
<td>$7,350</td>
<td>Dan Picard&lt;br&gt;MSU Extension-Pondera County&lt;br&gt;Jesse Fulbright&lt;br&gt;Montana State University</td>
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<td>EW12-006</td>
<td>Montana State University Extension Range Management Institute</td>
<td>$60,000</td>
<td>Dr. Tracy Mosley&lt;br&gt;Montana State University Extension</td>
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<td>EW11-012</td>
<td>Wildlife Damage Control for Traditional and Organic Farmers</td>
<td>$96,053</td>
<td>Dr. Jim Knight&lt;br&gt;Extension Wildlife Specialist</td>
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<td>EW01-007</td>
<td>Training Tour 2002-03-04</td>
<td>$30,024</td>
<td>Jonda Crosby&lt;br&gt;Alternative Energy Resources Organization</td>
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<td>EW01-016</td>
<td>Growing Our Own: Communities That Sustain Entrepreneurs</td>
<td>$52,483</td>
<td>Richard Williams&lt;br&gt;Montana State University Extension Service</td>
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<td>EW99-008</td>
<td>Developing a Sustainable and Organic Master Gardener Horticulture Production Manual</td>
<td>$22,483</td>
<td>Helen Atthowe&lt;br&gt;Missoula County Extension Service</td>
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<td>EW99-015</td>
<td>Harvesting the Wealth: of AERO’s Farm and Ranch Improvement Clubs</td>
<td>$60,000</td>
<td>Jonda Crosby&lt;br&gt;Alternative Energy Resources Organization</td>
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### Sustainable Agriculture Youth Education: Professional Dev. for Youth Program Leaders and Educators
- **Project #:** EW97-007
- **Support:** $100,000
- **Project Leader:** Jonda Crosby
- **Affiliation:** Alternative Energy Resources Organization (AERO)

### Sustainable Noxious Weed Management on Northwestern Rangelands
- **Project #:** EW95-002
- **Support:** $43,800
- **Project Leader:** Roger Sheley
- **Affiliation:** Montana State University

### Agency Personnel Training in Riparian Monitoring and Management of Wildlife and Livestock in the Intermountain West
- **Project #:** EW95-003
- **Support:** $98,000
- **Project Leader:** Dr. Jim Knight
- **Affiliation:** Extension Wildlife Specialist

### Sustainable Agriculture Training Project | A Model of Collaborative Learning
- **Project #:** EW95-012
- **Support:** $31,450
- **Project Leader:** Nancy Matheson
- **Affiliation:** Alternative Energy Resources Organization (AERO)

### Sustainable Agriculture Training Project | A Model of Collaborative Learning
- **Project #:** EW94-006
- **Support:** $91,000
- **Project Leader:** Nancy Matheson
- **Affiliation:** Alternative Energy Resources Organization (AERO)

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<td>FW22-390</td>
<td>Could sainfoin be the first dual-purpose perennial pulse crop for the western US?</td>
<td>$24,864</td>
<td>Shawn Wentzel, Alaska Ranch</td>
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<td>FW22-398</td>
<td>Establishing a Cool Season Legume Grass Finishing Pasture</td>
<td>$8,992</td>
<td>Ronald Wade, Browns Meadow Farm</td>
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<td>FW22-396</td>
<td>Livestock as a Tool for Pasture Management: Shifting Species Composition</td>
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<td>Doug Lair, DBA Lair Ranch</td>
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<td>FW21-372</td>
<td>Collaborative monitoring for ranch resilience and social-ecological sustainability in central Montana</td>
<td>$29,000</td>
<td>Bill Milton, Milton Ranch</td>
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<td>FW19-340</td>
<td>Improving Winter Greens Production and Storage for Cold Climate Farmers</td>
<td>$19,990</td>
<td>Katelyn Madden, MGVC</td>
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<td>FW15-039</td>
<td>Making the Most of Fine Fleece: Environmental, Economic, and Social Costs and Benefits of Alternative Strategies for Marketing Sheep Wool</td>
<td>$10,646</td>
<td>Linda Poole, Prairie Shepherd</td>
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<td>FW11-024</td>
<td>Organic Control of Perennial Weeds with Vinegar and Biologicals</td>
<td>$20,790</td>
<td>Jess Alger, Organic control of Perennial Weeds</td>
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<td>FW10-042</td>
<td>Marketing J Bar L Ranch Grassfed Beef to Members of Conservation Organizations</td>
<td>$13,000</td>
<td>Bryan Ulring, J Bar L Ranches, LLC</td>
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<td>FW09-305</td>
<td>Composting Recommendations and Marketing Evaluation for Livestock Operations in Cold Semi-Arid Environments</td>
<td>$49,315</td>
<td>Thomas Bass, Montana State University</td>
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<td>FW08-016</td>
<td>Can Producers in Five Montana Counties Successfully Use No-Till Methods for Renovation of Irrigated and Dryland Pastures?</td>
<td>$29,999</td>
<td>Ron Carlstrom, MSU Extension- Gallatin County George Reich</td>
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<td>FW08-023</td>
<td>Pasture-Raised Heritage Turkeys in a Dryland Farming System</td>
<td>$6,413</td>
<td>Jacob Cowgill</td>
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<td>FW08-034</td>
<td>High-Nutrition Drought-Tolerant Corn</td>
<td>$30,000</td>
<td>Dave Christensen</td>
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<td>FW08-317</td>
<td>Sustainable Food and Bioenergy Systems: Student Internships Development Plan</td>
<td>$29,983</td>
<td>Dr. William Dyer Montana State University</td>
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<td>FW06-025</td>
<td>Agroecosystem Approach to Managing Imported Cabbage Worm (Peris rapae)</td>
<td>$6,356</td>
<td>Helen Atthowe Montana State University Extension Service</td>
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<td>FW05-012</td>
<td>Forage Winter Wheat Production for Grazing or Hay Production in Eight Montana Counties</td>
<td>$19,795</td>
<td>George Reich</td>
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<td>FW05-301</td>
<td>Protecting High Quality Rangelands in Garfield County from Invasive Weed Spread</td>
<td>$20,000</td>
<td>Eric Miller Montana State University</td>
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<td>FW05-305</td>
<td>Demonstration of Leafy Spurge Management Using Sheep Grazing in a Leafy Spurge Barrier Zone</td>
<td>$9,960</td>
<td>Sharla Sackman Montana State University Extension Service</td>
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<td>FW04-018</td>
<td>Forage Winter Wheat Production for Hay or Grain in Gallatin County, Montana</td>
<td>$5,370</td>
<td>George Reich</td>
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<td>FW02-036</td>
<td>Sheep and Cattle Grazing Complementarity Project</td>
<td>$5,055</td>
<td>Randall Tunby</td>
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<td>FW01-032</td>
<td>Biological Weed Control: Education and Implementation</td>
<td>$7,500</td>
<td>Noah Poritz</td>
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<td>FW01-085</td>
<td>Biological and Mechanical Control of Perennial Weeds in North-Central Montana</td>
<td>$6,387</td>
<td>Robert Quinn Montana State University</td>
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<td>FW00-017</td>
<td>Establishing a Sustainable Program for Recycling and Propagation of Quality Flower Bulbs in a Wholesale Flower Production Operation</td>
<td>$2,197</td>
<td>Laura Smith</td>
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<td>FW00-260</td>
<td>Test Marketing Campaign to Conduct In-Store Lamb Cooking and Recipe Demonstration for Montana Natural Lamb Cooperative in the Billings, Montana Market Area</td>
<td>$9,300</td>
<td>Gayle Ott</td>
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<td>FW00-282</td>
<td>Better Board of Trade.Com</td>
<td>$8,054</td>
<td>David Oien</td>
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<td>FW00-288</td>
<td>TEAM-Team Effort in Agricultural Marketing for the McAlpine Ranch</td>
<td>$9,705</td>
<td>Clay McAlpine</td>
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<td>FW00-314</td>
<td>Montana Arnica Web Page</td>
<td>$870</td>
<td>Rod Daniel</td>
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<td>FW99-102</td>
<td>Range Monitoring in the Badlands Grazing District</td>
<td>$10,000</td>
<td>Jack McCuin</td>
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<td>FW98-035</td>
<td>Annual Forages for Dryland Rotations</td>
<td>$1,540</td>
<td>Vern Pluhar</td>
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FW98-093  Cull Potato Composting $7,500  Steve McCullough

FW96-007  Green Manure/Covercrop Combination Experiment $1,923  Rod Daniel

FW96-008  Legume Grazing in Rotation with Small Grains $4,000  Jess Alger  Organic control of Perennial Weeds

FW96-073  Evaluation of Grass Species for Improved Pasture Management $4,800  Robert Lee

FW96-083  Vegetative Changes through Alternative Water Sources $2,500  Dale Veseth

FW95-026  Carter-Fallon Forage Committee Range/Livestock Project $4,943  Randy Tunby  Carter-Fallon Forage Committee

FW95-078  Managing a Living Mulch System in an Intensive Organic Vegetable Cropping Operation to Enhance Weed, Nutrient, and Pest Management $5,000  Helen Atthowe  Biodesign Farm

FW95-093  Influencing Elk and Livestock Riparian Use $4,750  Allen Carter

GRADUATE STUDENT GRANTS

<table>
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<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
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<tbody>
<tr>
<td>GW22-235</td>
<td>Carrots as a Model for Defining Critical Period of Weed Management, Biofertilization, and Market Opportunities for Great Plains Vegetables Producers $29,997  Fabian Menalled  Dept. of Land Resources and Environmental Sciences  Mac Burgess  Montana State University  Dr. Roland Ebel  Montana State University  Emma Kubinski  Montana State University</td>
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<td>GW22-237</td>
<td>Integrated Weed Management of non-native annual grass, Ventenata dubia, in Montana rangelands $29,722  Lisa Rew  Montana State University  Dr. Jane Mangold  Montana State University  Dr. Lisa Rew  Montana State University  Lilly Sencenbaugh  Montana State University</td>
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<td>GW22-240</td>
<td>Managing Crop Residues for Soil Health $29,698  Dr. Catherine Zabinski  Montana State University  Zane Ashford  Montana State University</td>
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<td>GW21-218</td>
<td>Integrating thistle rust into weed management of Canada thistle $30,000  Timothy Seipel  Department of Land Resources and Environmental Sciences, Montana State University  Dr. Jed Eberly  Montana State University  Fabian Menalled  Dept. of Land Resources and Environmental Sciences  Daniel Chichinsky  Montana State University</td>
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GW20-204  Restoring Disturbed Rangelands With Site-Specific Seeding  $25,000  Lisa Rew  Montana State University  Colter Mumford  Montana State University

GW20-205  Measuring intra-field variability in pea protein to understand influencing factors in Montana cropping systems  $25,000  Dr.Clain Jones  Montana State University  Dr.Perry Miller  Montana State University  Samuel Koeshall  Montana State University

GW19-190  Nitrogen Fertilizer Management Based on Site-Specific Maximized Profit and Minimized Pollution  $24,992  Dr.Stephanie Ewing  Montana State University  Bruce Maxwell  MSU  Paul Hegedus  Montana State University

GW19-197  Fostering resilient plant-soil interactions on working ranches in semi-arid steppe ecosystems of north-central and eastern Montana.  $24,988  Dr.Craig Carr  Montana State University  Dr.Stephanie Ewing  Montana State University  Dr.Christine Gobrogge  Montana State University Environmental Analytical Laboratory  Seth Newton  Bear Gulch Ranch  Jay "Butch" Ortner  Ortner Ranch  Danny Pratt  Natural Resources Conservation Services  Tiffany Salveson  Natural Resources Conservation Service  Timothy Seipel  Department of Land Resources and Environmental Sciences, Montana State University  Joseph Capella  Montana State University

GW19-198  Precision Agriculture Applied to Organic Systems  $22,500  Bruce Maxwell  MSU  Royden Loewen  Montana State University

GW19-199  Effects of Habitat Heterogeneity on Crop Yield and Biodiversity  $24,972  Bruce Maxwell  MSU  Hannah Duff  1992

GW18-050  Montana Hardy Fruit Nutraceutical Quality  $17,765  Mac Burgess  Montana State University  Durc Setzer  Montana State University

GW18-179  Predicting overwinter nitrate-N changes at the subfield scale in leaching-susceptible, agricultural soils  $25,000  Dr.Clain Jones  Montana State University  Dr.Patrick Carr  Montana State University  Simon Fordyce  Montana State University Central Agricultural Research Center

GW18-151  Advancing Cover Crop Knowledge: Assessing the Role of Plant Diversity on Soil Change  $25,000  Dr.Perry Miller  Montana State University  Kristen Dagati  Montana State University

GW17-040  Sustainability of dormant season grazing: Does protein supplementation impact beef cattle performance, soil organic matter, vegetation, and residual cover for wildlife?  $24,970  Dr Janice Bowman  Montana State University  Dr.Lance McNew  Montana State University  Samuel Wyffels  Montana State University
<table>
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<tr>
<th>Project #</th>
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<th>Project Leaders</th>
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| GW16-053     | Cover Crop Grazing: Optimal Seasonality for Soil and Livestock Benefit        | $25,000      | Dr. Perry Miller  
Montana State University  
Robert Walker  
MSU LRES |
| GW12-004     | Multiple Forms of Uncertainty as a Barrier to the Adoption of Sustainable Farming Practices | $24,830      | Patrick Lawrence  
Montana State University |
| GW10-032     | Investigating the Legume Green Fallow Alternative on North-Central Montana No-Till Operations | $24,250      | Dr. Perry Miller  
Montana State University  
Justin O’Dea  
Washington State University |
Dept. of Land Resources and Environmental Sciences  
Ilai Keren  
Montana State University |
| GW06-026     | Effects of Weed Communities in Conventional and Organic Agricultural Systems. | $7,536       | Bruce Maxwell  
MSU  
Fabian Menalled  
Dept. of Land Resources and Environmental Sciences  
Fred Pollnac  
Montana State University |

**ON FARM RESEARCH/PARTNERSHIP GRANTS**

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
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<th>Project Leaders</th>
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| OW22-372     | The Buzz on the Range: Promoting healthy soils and pollinators on Montana rangeland | $55,990      | Michael DeChellis  
We Are For The Land Foundation, Inc.  
OpenTeam And We Are For the Land Board Member  
Michal DeChellis  
Cultivating Minds LLC and We Are For the Land Foundation |
| OW17-009     | Soil Moisture Network and Tools - MT and WY collaborative                      | $49,995      | Lee Schmelzer  
Montana State University |
| OW17-026     | Montana Food Economy Initiative                                                | $50,000      | Lindsay Ganong  
AERO |
| OW17-021     | Evaluating Nitrates and Forage Quality in Fall Regrowth of Annual Cereal Forages | $19,972      | Dr. Tracy Mosley  
Montana State University Extension |
| OW15-026     | Are Feedlot-based Performance Cattle Limiting Ecological Services for Rangeland Ecosystems in Northern Mixed-grass prairies? | $49,961      | Dr. Emily Meccage  
Montana State University |
| OW13-017     | Reference strips and precision sensors for increased nitrogen use efficiency in wheat production | $49,907      | Dr. Olga Walsh  
Montana State University |
| OW13-144     | Effects of Late-Season Water Lease on Forage Crops                           | $24,950      | Jodi Pauley  
Montana State University |
| OW12-044     | Best Management Practices for Livestock Protection Dogs                        | $49,998      | Dr. Jeff Mosley  
Montana State University |
| OW11-326     | Developing Community Based Oilseed Industry in Montana                         | $49,830      | Taylor Lyon  
Bio-Energy Center  
Dr. Nestor Soriano, Jr.  
Lead Research Scientist |
Total funding from the USDA SARE program to Montana
$9,745,902

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).