**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 $327 million to more than 7,665 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.

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**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

$8,992,616 in total funding

128 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: 128 grants
- 45 Research and Education
- 21 Professional Development Program
- 35 Farmer/Rancher
- 9 On Farm Research/Partnership
- 15 Graduate Student
- 3 Research to Grass Roots

Total funding: $8,992,616
- $6,426,771 Research and Education
- $1,225,264 Professional Development Program
- $426,219 Farmer/Rancher
- $349,613 On Farm Research/Partnership
- $343,767 Graduate Student
- $220,982 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
MSU Extension
(406) 375-6611
patrick.mangan@montana.edu

USDA Sustainable Agriculture Research & Education

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 $8,992,616 grants to support 127 projects, including but not limited to, 44 research and/or education projects, 21 professional development projects and 35 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>
<th>Project Leaders</th>
</tr>
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<tbody>
<tr>
<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 Montana State University&lt;br&gt;Rachel Andrews-Gould&lt;br&gt;Salish and Kootenai College&lt;br&gt;Eric Belasco&lt;br&gt;Dr. Jane Boles&lt;br&gt;Montana State University&lt;br&gt;Dr. Paul Gannon&lt;br&gt;Montana State University&lt;br&gt;Dr. Paul Lachapelle&lt;br&gt;Montana State University&lt;br&gt;Dr. Brent Peyton&lt;br&gt;Montana State University&lt;br&gt;Brenda Richey&lt;br&gt;Montana State University</td>
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<tr>
<td>SW21-930</td>
<td>Intercropping chickpea with flax: An alternative sustainable way to manage Ascochyta blight of Chickpea</td>
<td>$347,557</td>
<td>Dr. Chengci Chen Montana State University&lt;br&gt;Dr. Frankie crutcher&lt;br&gt;Montana State University-EARC&lt;br&gt;Dr. William Franck&lt;br&gt;Montana State University-EARC&lt;br&gt;Dr. Qasim Khan&lt;br&gt;Montana State University-SARC&lt;br&gt;Dr. Kevin McPhee&lt;br&gt;Montana State University-EARC&lt;br&gt;Dr. Kent McVay&lt;br&gt;Montana State University-SARC</td>
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</tbody>
</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  
Allen and Yvonne Martinell  
Lee Martinell Ranch  
Dr. Bok Sowell  
MSU - Animal & Range Sciences  
Dr. Cathy Zabinski  
Montana State University  

$349,315

Snowbanks to Grassbanks

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

$349,710

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

Dr. Richard Engel  
Montana State University  

$264,016

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

Devon Ragen  
Montana State University  

$249,502

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

Dr. Chengci Chen  
Montana State University  

$247,410

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

Dr. Carmen Byker Shanks  
Montana State University  

$220,021

Sustainable Cropping Systems for Dual-Purpose Biennial Canola

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

$256,397

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

Laura Burkle  
Montana State University  

$170,951

Landscape Collaborative Grazing and Greater Sage Grouse Survival

Dr. Bok Sowell  
MSU - Animal & Range Sciences  

$339,552

Low Glycemic Potatoes, a value-added crop for Montana

Dr. David Sands  
Montana State University  

$154,000

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

Dr. Hayes Goosey  
Montana State University  

$206,700
<table>
<thead>
<tr>
<th>Project Code</th>
<th>Project Title</th>
<th>Funding</th>
<th>Investigator(s)</th>
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</thead>
</table>
| SW11-099     | Using cover crop mixtures to improve soil health in low rainfall areas of the northern plains | $354,405 | Dr. Perry Miller  
Montana State University |
| SW10-050     | Enhancing Cropping System Sustainability by Minimizing Ammonia-N Losses from Biological and Chemical Inputs | $190,009 | Dr. Richard Engel  
Montana State University |
| SW09-068     | Integrating Biological Control with Targeted Sheep Grazing to Suppress Spotted Knapweed | $49,865 | Rachel Frost  
Montana State University  
Jeff Mosley  
Montana State University |
| SW09-601     | Infrastructure Support for Small Livestock Processing Facilities              | $46,796 | Dr. Jane Boles  
Montana State University |
| SW07-013     | Evaluation of Alfalfa Weevil (Coleoptera Curculionidae) Densities, Weed Abundance, and Regrowth Characteristics of Alfalfa Grazed by Sheep. | $96,817 | Dr. Hayes Goosey  
Montana State University |
| SW07-025     | Grower-based selection of varieties and systems for wheat stem sawfly control | $125,000 | Dr. Luther Talbert  
Montana State University |
| SW07-028     | Is Sulfur Cinquefoil a Candidate for Control with Sheep and Goats?             | $54,250 | Jeff Mosley  
Montana State University  
Rachel Frost  
Montana State University |
| SW07-603     | 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 | $10,000 | Dr. Hayes Goosey  
Montana State University |
| SW06-006     | Survey and Economic Analysis of Montana Farms Utilizing Integrated Livestock-Cereal Grain (Ley Farming) Systems | $91,500 | Dr. Chengci Chen  
Montana State University |
| SW06-075     | Does Timing of Defoliation Affect Spotted Knapweed Seed Viability and Germination? | $62,600 | Tracy Brewer  
Park County Extension - Montana State University  
Dr. Tracy Mosley  
Montana State University Extension |
| SW05-038     | Developing Distance Learning Based on Perceptions and Knowledge of Producers and Agricultural Professionals | $98,819 | Fabian Menalled  
Dept. of Land Resources and Environmental Sciences |
| SW04-007     | Methane Recovery from Small Dairy Operations                                   | $123,834 | Ron Carlstrom  
MSU Extension- Gallatin County |
| SW03-056     | Ecologically Based Integrated Weed Management to Restore Plant Diversity       | $121,750 | James Jacobs  
Montana State University |
| SW03-063     | Factors Affecting Alfalfa Stand Longevity in Montana                           | $139,397 | Dennis Cash  
Montana State University |
| SW02-005     | Increasing Crop Water Use Efficiency in Advanced No-Till Systems               | $22,980 | Dr. Perry Miller  
Montana State University |
Using Crop Diversity in No-till and Organic Systems to Reduce Inputs and Increase Profits and Sustainability in the Northern Plains

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

Selecting Cattle to Prevent Grazing Distribution Problems

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

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

Sustainable Farming Quarterly

The Sustainable Farming Quarterly (SFQ) A Regional Newsletter

Farm Improvement Club Network for Sustainable Agriculture

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

Practical Education in Sustainable Production Systems

Regional Farm and Research Center Matching System-FARMS


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

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

Livestock Health and Nutrition Alternatives: A Western States Conference
## RESEARCH TO GRASS ROOTS GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
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</table>
| WRGR21-001 | Montana’s Soil Health Network: Deepening the Roots in Four Regions            | $51,223      | Maggie Gordon  
                 Northern Plains Resource Council  
                 Caroline Canarios  
                 Northern Plains Resource Council  
                 Charlie French  
                 NRCS  
                 Stephen Charter  
                 Charter Beef |
| WRGR21-006 | Participatory Training in Small-scale Anaerobic Digestion of Agricultural Residues | $95,000      | Dr. Roland Ebel  
                 Montana State University  
                 Selena Ahmed  
                 Montana State University  
                 Mac Burgess  
                 Montana State University  
                 Dr. Jed Eberly  
                 Montana State University  
                 Timothy Seipel  
                 Department of Land Resources and Environmental Sciences, Montana State University |
| RGR20-009  | Montana Food Economy Initiative                                               | $74,759      | Lindsay Ganong  
                 AERO |

## PROFESSIONAL DEVELOPMENT PROGRAM GRANTS

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<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| PDP20-020  | Building Internal and Community Capacity for the Blackfeet Nation Through Agriculture | $73,795      | Will Seeley  
                 Blackfeet Tribe: Agriculture Resource Management Plan  
                 Loren Bird Rattler  
                 Blackfeet Agriculture Resource Management Plan |
| WPDP19-15  | Sustainable Beef Cattle Production: Ranch to Ribeye                            | $57,310      | Megan Van Emon  
                 Montana State University  
                 Colleen Buck  
                 Montana State University  
                 Callie Cooley  
                 Montana State University  
                 Molly Hammond  
                 Montana State University  
                 Elin Kittelmann  
                 Montana State University  
                 Kari Lewis  
                 Montana State University |
| EW18-027   | Building Internal Capacity for the Blackfeet Tribe Agricultural Resource Management Plan (ARMP) | $52,155      | Loren Bird Rattler  
                 Blackfeet Tribe |
| EW18-011   | Pheromones As Tools for Monitoring the Insect Pests in the Northern Plains - Instructive Tools for Agricultural Professionals | $73,510      | Dr. Michael Ivie  
                 Montana State University-Bozeman |
| EW17-011   | Integrated Parasite Management: Train the Trainer                             | $74,189      | David Scott  
                 National Center for Appropriate Technology |
<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
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<tr>
<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 Montana State University, Southern Agricultural Research Center, Huntley, MT</td>
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<tr>
<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 AERO</td>
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<tr>
<td>EW15-009</td>
<td>Conservation and Augmentative Biological Control in the Northern Plains - Providing Tools for Agricultural Professionals</td>
<td>$68,182</td>
<td>Dr. Michael Ivie Montana State University-Bozeman</td>
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<tr>
<td>EW13-014</td>
<td>Enhancing the Exploring Energy Efficiency &amp; Alternatives (E3A) Curriculum</td>
<td>$42,277</td>
<td>Milton Geiger University of Wyoming Extension Dr. Glen Whipple University of Wyoming Extension</td>
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<tr>
<td>EW12-004</td>
<td>Tour of sustainable Small Grain Production in Eastern Washington</td>
<td>$7,350</td>
<td>Dan Picard MSU Extension-Pondera County Jesse Fulbright Montana State University</td>
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<tr>
<td>EW12-006</td>
<td>Montana State University Extension Range Management Institute</td>
<td>$60,000</td>
<td>Dr. Tracy Mosley Montana State University Extension</td>
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<tr>
<td>EW11-012</td>
<td>Wildlife Damage Control for Traditional and Organic Farmers</td>
<td>$96,053</td>
<td>Dr. Jim Knight Extension Wildlife Specialist</td>
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<tr>
<td>EW01-007</td>
<td>Training Tour 2002-03-04</td>
<td>$30,024</td>
<td>Jonda Crosby Alternative Energy Resources Organization</td>
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<tr>
<td>EW01-016</td>
<td>Growing Our Own: Communities That Sustain Entrepreneurs</td>
<td>$52,483</td>
<td>Richard Williams Montana State University Extension Service</td>
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<tr>
<td>EW99-008</td>
<td>Developing a Sustainable and Organic Master Gardener Horticulture Production Manual</td>
<td>$22,483</td>
<td>Helen Atthowe Missoula County Extension Service</td>
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<tr>
<td>EW99-015</td>
<td>Harvesting the Wealth: of AERO’s Farm and Ranch Improvement Clubs</td>
<td>$60,000</td>
<td>Jonda Crosby Alternative Energy Resources Organization</td>
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<tr>
<td>EW97-007</td>
<td>Sustainable Agriculture Youth Education: Professional Dev. for Youth Program Leaders and Educators</td>
<td>$100,000</td>
<td>Jonda Crosby Alternative Energy Resources Organization</td>
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<tr>
<td>EW95-002</td>
<td>Sustainable Noxious Weed Management on Northwestern Rangelands</td>
<td>$43,800</td>
<td>Roger Sheley Montana State University</td>
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<tr>
<td>EW95-003</td>
<td>Agency Personnel Training in Riparian Monitoring and Management of Wildlife and Livestock in the Intermountain West</td>
<td>$98,000</td>
<td>Dr. Jim Knight Extension Wildlife Specialist</td>
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<tr>
<td>EW95-012</td>
<td>Sustainable Agriculture Training Project A Model of Collaborative Learning</td>
<td>$31,450</td>
<td>Nancy Matheson Alternative Energy Resources Organization (AERO)</td>
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<tr>
<td>EW94-006</td>
<td>Sustainable Agriculture Training Project: A Model of Collaborative Learning</td>
<td>$91,000</td>
<td>Nancy Matheson Alternative Energy Resources Organization (AERO)</td>
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**FARMER/RANCHER GRANTS**

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<th>Project #</th>
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<tr>
<td>Project Code</td>
<td>Title</td>
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<tr>
<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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<tr>
<td>FW21-382</td>
<td>Evaluating Clamp Storage to Help Montana Farmers Adjust to Climate Change-Induced Shortened Harvest Windows</td>
<td>$25,000</td>
<td>Chris Nedens, Peritsa Creek Farms Inc.</td>
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<tr>
<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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<tr>
<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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<tr>
<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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<tr>
<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, Biodesign Farm</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 Jay 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>FW99-069</td>
<td>No-Till Wheat into Medic vs. Conventional Wheat</td>
<td>$4,578</td>
<td>Jess Alger Montana Natural Lamb Cooperative</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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<td>FW98-093</td>
<td>Cull Potato Composting</td>
<td>$7,500</td>
<td>Steve McCullough</td>
</tr>
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<td>FW96-007</td>
<td>Green Manure/Covercrop Combination Experiment</td>
<td>$1,923</td>
<td>Rod Daniel</td>
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<tr>
<td>FW96-008</td>
<td>Legume Grazing in Rotation with Small Grains</td>
<td>$4,000</td>
<td>Jess Alger Montana Natural Lamb Cooperative</td>
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<td>FW96-073</td>
<td>Evaluation of Grass Species for Improved Pasture Management</td>
<td>$4,800</td>
<td>Robert Lee</td>
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<td>FW96-083</td>
<td>Vegetative Changes through Alternative Water Sources</td>
<td>$2,500</td>
<td>Dale Veseth</td>
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<td>FW95-026</td>
<td>Carter-Fallon Forage Committee Range/Livestock Project</td>
<td>$4,943</td>
<td>Randy Tunby Carter-Fallon Forage Committee</td>
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<td>FW95-078</td>
<td>Managing a Living Mulch System in an Intensive Organic Vegetable Cropping Operation to Enhance Weed, Nutrient, and Pest Management</td>
<td>$5,000</td>
<td>Helen Atthowe Biodesign Farm</td>
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</table>
Influencing Elk and Livestock Riparian Use

### GRADUATE STUDENT GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
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</thead>
<tbody>
<tr>
<td>GW20-204</td>
<td>Restoring Disturbed Rangelands With Site-Specific Seeding</td>
<td>$25,000</td>
<td>Lisa Rew&lt;br&gt;Montana State University&lt;br&gt;Colter Mumford&lt;br&gt;Montana State University</td>
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<td>GW20-205</td>
<td>Measuring intra-field variability in pea protein to understand influencing factors in Montana cropping systems</td>
<td>$25,000</td>
<td>Dr. Clain Jones&lt;br&gt;Montana State University&lt;br&gt;Dr. Perry Miller&lt;br&gt;Montana State University&lt;br&gt;Samuel Koeshall&lt;br&gt;Montana State University</td>
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<td>GW19-190</td>
<td>Nitrogen Fertilizer Management Based on Site-Specific Maximized Profit and Minimized Pollution</td>
<td>$24,992</td>
<td>Dr. Stephanie Ewing&lt;br&gt;Montana State University&lt;br&gt;Bruce Maxwell&lt;br&gt;MSU&lt;br&gt;Paul Hagedus&lt;br&gt;Montana State University</td>
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<td>GW19-197</td>
<td>Fostering resilient plant-soil interactions on working ranches in semi-arid steppe ecosystems of north-central and eastern Montana.</td>
<td>$24,988</td>
<td>Dr. Craig Carr&lt;br&gt;Montana State University&lt;br&gt;Dr. Stephanie Ewing&lt;br&gt;Montana State University&lt;br&gt;Dr. Christine Gobrogge&lt;br&gt;Montana State University Environmental Analytical Laboratory&lt;br&gt;Seth Newton&lt;br&gt;Bear Gulch Ranch&lt;br&gt;Jay “Butch” Ortner&lt;br&gt;Ortner Ranch&lt;br&gt;Danny Pratt&lt;br&gt;Natural Resources Conservation Services&lt;br&gt;Tiffany Salveson&lt;br&gt;Natural Resources Conservation Service&lt;br&gt;Timothy Seipel&lt;br&gt;Department of Land Resources and Environmental Sciences, Montana State University&lt;br&gt;Joseph Capella&lt;br&gt;Montana State University</td>
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<td>GW19-198</td>
<td>Precision Agriculture Applied to Organic Systems</td>
<td>$22,500</td>
<td>Bruce Maxwell&lt;br&gt;MSU&lt;br&gt;Royden Loewen&lt;br&gt;Montana State University</td>
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<td>GW19-199</td>
<td>Effects of Habitat Heterogeneity on Crop Yield and Biodiversity</td>
<td>$24,972</td>
<td>Bruce Maxwell&lt;br&gt;MSU&lt;br&gt;Hannah Duff&lt;br&gt;1992</td>
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<td>GW18-050</td>
<td>Montana Hardy Fruit Nutraceutical Quality</td>
<td>$17,765</td>
<td>Mac Burgess&lt;br&gt;Montana State University&lt;br&gt;Durc Setzer&lt;br&gt;Montana State University</td>
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<td>GW18-179</td>
<td>Predicting overwinter nitrate-N changes at the subfield scale in leaching-susceptible, agricultural soils</td>
<td>$25,000</td>
<td>Dr. Clain Jones&lt;br&gt;Montana State University&lt;br&gt;Dr. Patrick Carr&lt;br&gt;Montana State University&lt;br&gt;Simon Fordyce&lt;br&gt;Central Agricultural Research Center</td>
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<td>GW18-151</td>
<td>Advancing Cover Crop Knowledge: Assessing the Role of Plant Diversity on Soil Change</td>
<td>$25,000</td>
<td>Dr. Perry Miller&lt;br&gt;Montana State University&lt;br&gt;Kristen Dagati&lt;br&gt;Montana State University</td>
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</table>
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

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


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**

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<tr>
<td>OW17-009</td>
<td>Soil Moisture Network and Tools - MT and WY collaborative</td>
<td>$49,995</td>
<td>Lee Schmelzer  Montana State University</td>
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<td>OW17-026</td>
<td>Montana Food Economy Initiative</td>
<td>$50,000</td>
<td>Lindsay Ganong  AERO</td>
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<td>OW17-021</td>
<td>Evaluating Nitrates and Forage Quality in Fall Regrowth of Annual Cereal Forages</td>
<td>$19,972</td>
<td>Dr. Tracy Mosley  Montana State University Extension</td>
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<td>OW15-026</td>
<td>Are Feedlot-based Performance Cattle Limiting Ecological Services for Rangeland Ecosystems in Northern Mixed-grass prairies?</td>
<td>$49,961</td>
<td>Dr. Emily Meccage  Montana State University</td>
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<td>OW13-017</td>
<td>Reference strips and precision sensors for increased nitrogen use efficiency in wheat production</td>
<td>$49,907</td>
<td>Dr. Olga Walsh  Montana State University</td>
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<td>OW13-144</td>
<td>Effects of Late-Season Water Lease on Forage Crops</td>
<td>$24,950</td>
<td>Jodi Pauley  Montana State University</td>
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<td>OW12-044</td>
<td>Best Management Practices for Livestock Protection Dogs</td>
<td>$49,998</td>
<td>Jeff Mosley  Montana State University</td>
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<td>OW11-326</td>
<td>Developing Community Based Oilseed Industry in Montana</td>
<td>$49,830</td>
<td>Taylor Lyon  Bio-Energy Center  Dr. Nestor Soriano, Jr.  Lead Research Scientist</td>
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<td>FW04-313</td>
<td>Preserving Farms and Ranches</td>
<td>$5,000</td>
<td>Robert “Rob” Johnson  Montana State University</td>
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</table>
Total funding from the USDA SARE program to Montana
$8,992,616

For further information on projects, contact Western SARE at (435) 797-2257 or wsare@usu.edu.
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