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 $332 million to more than 7,748 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

$9,023,616 in total funding

130 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: 130 grants
- 45 Research and Education
- 21 Professional Development Program
- 36 Farmer/Rancher
- 9 On Farm Research/Partnership
- 16 Graduate Student
- 3 Research to Grass Roots

Total funding: $9,023,616
- $6,426,771 Research and Education
- $1,225,264 Professional Development Program
- $427,219 Farmer/Rancher
- $349,613 On Farm Research/Partnership
- $373,767 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

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 $9,023,616 grants to support 129 projects, including but not limited to, 44 research and/or education projects, 21 professional development projects and 36 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>
</thead>
</table>
| SW21-929  | Indigenous Food-Science-Ways: Integrating Indigenous knowledge with food science research and education to support value-added Native foods | $349,898 | Wan-Yuan Kuo  
Montana State University  
Rachel Andrews-Gould  
Salish and Kootenai College  
Eric Belasco  
Dr.Jane Boles  
Montana State University  
Dr.Paul Gannon  
Montana State University  
Dr.Paul Lachapelle  
Montana State University  
Dr.Brent Peyton  
Montana State University  
Brenda Richey  
Montana State University |
| SW21-930  | Intercropping chickpea with flax: An alternative sustainable way to manage Ascochyta blight of Chickpea | $347,557 | Dr.Chengci Chen  
Montana State University  
Dr.Frankie crutcher  
Montana State University-EARC  
Dr.William Franck  
Montana State University-EARC  
Dr.Qasim Khan  
Montana State University-SARC  
Dr.Kevin McPhee  
Montana State University-EARC  
Dr.Kent McVay  
Montana State University-SARC |
<table>
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<tr>
<th>Project Code</th>
<th>Description</th>
<th>Funding</th>
<th>Principal Investigator(s)</th>
</tr>
</thead>
</table>
| SW20-915     | Developing an integrated management decision framework for cheatgrass control in the northeastern region of the sagebrush steppe | $349,315 | 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 |
| SW19-907     | 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 |
| SW17-016     | Soil acidity management of long-term no-till fields in Montana to prevent crop failure | $264,016 | Dr. Richard Engel  
Montana State University |
| SW17-080     | The Impacts of Integrating Livestock into Cropping Systems on Soil Health and Crop Production | $249,502 | Devon Ragen  
Montana State University |
| SW16-051     | Research and Demonstration of Minimum Tillage and Optimum Water Management in Sugarbeet Production in Eastern Montana | $247,410 | Dr. Chengci Chen  
Montana State University |
| SW15-028     | Examining, Optimizing, and Building Capacity for Montana’s Local Beef to School Supply Chain | $220,021 | Dr. Carmen Byker Shanks  
Montana State University |
| SW14-014     | Sustainable Cropping Systems for Dual-Purpose Biennial Canola | $256,397 | Dr. Darrin Boss  
Montana State University  
Dr. Steve Fransen, PhD  
Washington State University |
| SW13-043     | Evaluating Native Perennial Flower Strips for Enhancing Native Bees and Pollination Services on Farmlands | $170,951 | Laura Burkle  
Montana State University |
| SW13-056     | Landscape Collaborative Grazing and Greater Sage Grouse Survival | $339,552 | Dr. Bok Sowell  
MSU-Animal & Range Sciences |
| SW12-108     | Low Glycemic Potatoes, a value-added crop for Montana | $154,000 | Dr. David Sands  
Montana State University |
| SW11-086     | 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 ID</th>
<th>Title</th>
<th>Funding</th>
<th>PI(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 preestate 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

Alternative Energy Resources Organization

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

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
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<tbody>
<tr>
<td>WRGR21-006</td>
<td>Participatory Training in Small-scale Anaerobic Digestion of Agricultural Residues</td>
<td>$95,000</td>
<td>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</td>
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<tr>
<td>RGR20-009</td>
<td>Montana Food Economy Initiative</td>
<td>$74,759</td>
<td>Lindsay Ganong, AERO</td>
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### PROFESSIONAL DEVELOPMENT PROGRAM GRANTS

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<th>Project #</th>
<th>Project Title</th>
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<tr>
<td>WPDP19-15</td>
<td>Sustainable Beef Cattle Production: Ranch to Ribeye</td>
<td>$57,310</td>
<td>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</td>
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<tr>
<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, Blackfeet Tribe</td>
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<tr>
<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, Montana State University-Bozeman</td>
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<tr>
<td>EW17-011</td>
<td>Integrated Parasite Management: Train the Trainer</td>
<td>$74,189</td>
<td>David Scott, National Center for Appropriate Technology</td>
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<tr>
<td>Project #</td>
<td>Project Title</td>
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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 Fullbright 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 ID</th>
<th>Title</th>
<th>Amount</th>
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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>FW21-388</td>
<td>TEST</td>
<td>$1,000</td>
<td>Dr. Western SARE Western SARE</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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<tr>
<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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<tr>
<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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<tr>
<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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<tr>
<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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<tr>
<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>Project Code</td>
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<td>Budget</td>
<td>Principal Investigator</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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<td>FW98-093</td>
<td>Cull Potato Composting</td>
<td>$7,500</td>
<td>Steve McCullough</td>
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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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<td>FW96-008</td>
<td>Legume Grazing in Rotation with Small Grains</td>
<td>$4,000</td>
<td>Jess Alger, Organic control of Perennial Weeds</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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### GRADUATE STUDENT GRANTS

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<th>Project Leaders</th>
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<tr>
<td>GW21-218</td>
<td>Integrating thistle rust into weed management of Canada thistle</td>
<td>$30,000</td>
<td>Timothy Seipel, Dr. Jed Eberly, Montana State University, Fabian Menalled, Dept. of Land Resources and Environmental Sciences, Montana State University, Daniel Chichinsky, Montana State University</td>
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<tr>
<td>GW20-204</td>
<td>Restoring Disturbed Rangelands With Site-Specific Seeding</td>
<td>$25,000</td>
<td>Lisa Rew, Colter Mumford, Montana State University</td>
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<tr>
<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, Montana State University, Dr. Perry Miller, Montana State University, Samuel Koeshall, 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, Bruce Maxwell, Montana State University, Paul Hegedus, MSU</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, Montana State University, Dr. Stephanie Ewing, Montana State University, Dr. Christine Gobrogge, Montana State University Environmental Analytical Laboratory, Seth Newton, Bear Gulch Ranch, Jay &quot;Butch&quot; 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</td>
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<td>GW19-198</td>
<td>Precision Agriculture Applied to Organic Systems</td>
<td>$22,500</td>
<td>Bruce Maxwell, MSU, Royden Loewen, Montana State University</td>
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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  
Durt 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  
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

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>
<th>SARE Support</th>
<th>Project Leaders</th>
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</table>
| 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 |
<table>
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<tr>
<th>Project Code</th>
<th>Project Description</th>
<th>Funding</th>
<th>Investigator(s)</th>
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| 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 | 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 |
| FW04-313     | Preserving Farms and Ranches                                                         | $5,000  | Robert "Rob" Johnson  
Montana State University |

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

$9,023,616

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

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