What is SARE?

Since 1988, the Sustainable Agriculture Research & Education (SARE) program has been the go-to USDA grants and outreach program for farmers, ranchers, researchers and educators who want to develop innovations that improve farm profitability, protect water and land, and revitalize communities. To date, SARE has awarded over $389 million to more than 8,542 initiatives.

SARE is grassroots with far-reaching impact

Four regional councils of expert practitioners set priorities and make grants in every state and island protectorate.

SARE communicates results

SARE shares project results by requiring grantees to conduct outreach and grower engagement; and by maintaining an online library of practical publications, 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

$9,853,640
in total funding

139 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: 139 grants
- 46 Research and Education
- 23 Professional Development Program
- 36 Farmer/Rancher
- 10 On Farm Research/Partnership
- 20 Graduate Student
- 4 Research to Grass Roots

Total funding: $9,853,640
- $6,776,722 Research and Education
- $1,425,090 Professional Development Program
- $435,075 Farmer/Rancher
- $405,603 On Farm Research/Partnership
- $493,184 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
MSU Extension FRTEP- Flathead Reservation
(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 $9,853,640 grants to support 138 projects, including but not limited to, 45 research and/or education projects, 23 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>
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<tbody>
<tr>
<td>SW22-934</td>
<td>Landowner Collaborative Strategies for Nonlethal Predator Control</td>
<td>$349,951</td>
<td>Dr. Jared Beaver, Montana State University, Dr. Stewart Breck, Colorado State University, Dr. Alex Few, Western Landowners Alliance, Kyran Kunkel, Western Landowners Alliance, Dr. Juliet Young, 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, Montana State University, Eric Belasco, Montana State University, 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, Mattie Griswold, Montana State University, Rebecca Richter, 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>
<td>$347,557</td>
<td>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</td>
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<td>Project Number</td>
<td>Title</td>
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<td>SW20-915</td>
<td>Developing an integrated management decision framework for cheatgrass control in the northeastern region of the sagebrush steppe</td>
<td>$349,315</td>
<td>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 &amp; Range Sciences, Dr. Catherine Zabinski, Montana State University</td>
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<tr>
<td>SW19-907</td>
<td>Snowbanks to Grassbanks</td>
<td>$349,710</td>
<td>Dr. Bok Sowell, MSU-Animal &amp; Range Sciences, Dr. Andrea Litt, Department of Ecology, Montana State University, Megan Van Emon, Montana State University</td>
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<td>SW17-016</td>
<td>Soil acidity management of long-term no-till fields in Montana to prevent crop failure</td>
<td>$264,016</td>
<td>Dr. Richard Engel, Montana State University</td>
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<td>SW17-080</td>
<td>The Impacts of Integrating Livestock into Cropping Systems on Soil Health and Crop Production</td>
<td>$249,502</td>
<td>Devon Ragen, Montana State University</td>
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<td>SW16-051</td>
<td>Research and Demonstration of Minimum Tillage and Optimum Water Management in Sugarbeet Production in Eastern Montana</td>
<td>$247,410</td>
<td>Dr. Chengci Chen, Montana State University</td>
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<td>SW15-028</td>
<td>Examining, Optimizing, and Building Capacity for Montana’s Local Beef to School Supply Chain</td>
<td>$220,021</td>
<td>Dr. Carmen Byker Shanks, Montana State University</td>
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<td>SW14-014</td>
<td>Sustainable Cropping Systems for Dual-Purpose Biennial Canola</td>
<td>$256,397</td>
<td>Dr. Darrin Boss, Montana State University, Dr. Steve Fransen, PhD, Washington State University</td>
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<tr>
<td>SW13-043</td>
<td>Evaluating Native Perennial Flower Strips for Enhancing Native Bees and Pollination Services on Farmlands</td>
<td>$170,951</td>
<td>Laura Burkle, Montana State University</td>
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<tr>
<td>SW13-056</td>
<td>Landscape Collaborative Grazing and Greater Sage Grouse Survival</td>
<td>$339,552</td>
<td>Dr. Bok Sowell, MSU-Animal &amp; Range Sciences</td>
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<td>SW12-108</td>
<td>Low Glycemic Potatoes, a value-added crop for Montana</td>
<td>$154,000</td>
<td>Dr. David Sands, Montana State Univ</td>
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<tr>
<td>SW11-086</td>
<td>Degree Day Modeling and Economic Considerations of Insects and Weeds in Sheep Grazed Alfalfa, Grain, and Range Production Systems</td>
<td>$206,700</td>
<td>Dr. Hayes Goosey, Montana State University</td>
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<tr>
<td>Code</td>
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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 Montana State University</td>
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<tr>
<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 Montana State University</td>
</tr>
<tr>
<td>SW09-068</td>
<td>Integrating Biological Control with Targeted Sheep Grazing to Suppress Spotted Knapweed</td>
<td>$49,865</td>
<td>Rachel Frost Montana State University Dr. Jeff Mosley Montana State University</td>
</tr>
<tr>
<td>SW09-601</td>
<td>Infrastructure Support for Small Livestock Processing Facilities</td>
<td>$46,796</td>
<td>Dr. Jane Boles Montana State University</td>
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<tr>
<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 Montana State University</td>
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<tr>
<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 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 Montana State University Rachel Frost 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 Montana State University</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 Montana State University</td>
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<tr>
<td>SW06-075</td>
<td>Does Timing of Defoliation Affect Spotted Knapweed Seed Viability and Germination?</td>
<td>$62,600</td>
<td>Tracy Brewer Park County Extension - Montana State University Dr. Tracy Mosley Montana State University Extension</td>
</tr>
<tr>
<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 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 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 Montana State University</td>
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<tr>
<td>SW03-063</td>
<td>Factors Affecting Alfalfa Stand Longevity in Montana</td>
<td>$139,397</td>
<td>Dennis Cash 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 Montana State University</td>
</tr>
<tr>
<td>Project Code</td>
<td>Project Title</td>
<td>Funding</td>
<td>Principal Investigator(s)</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------------------------------------</td>
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</tr>
</tbody>
</table>
| SW01-048    | Using Crop Diversity in No-till and Organic Systems to Reduce Inputs and Increase Profits and Sustainability in the Northern Plains | $157,888 | Bruce Maxwell  
MSU                                                                                                                                         |
| SW00-015    | An Alternative to Traditional Wheat Stubble Management Using Sheep to Control Pests and Improve Soil Nutrient Cycling | $166,147 | Dr. 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 |
| SW98-064    | Selecting Cattle to Prevent Grazing Distribution Problems                      | $115,598 | Derek Bailey  
Montana State University                                                                                                                         |
| SW97-056    | Comparison of Pest Management Interactions in Spring Wheat-Cover Crop and Spring Wheat-Fallow Cropping Systems | $150,964 | Andrew Lenssen  
Montana State University                                                                                                                         |
| SW96-019    | Sustaining Agriculture and Community: Moving the Farm Improvement Club Program Beyond the Farm Gate | $124,425 | Jonda Crosby  
Alternative Energy Resources Organization                                                                                                       |
| LW92-004    | Sustainable Farming Quarterly                                                   | $17,500  | Nancy Matheson  
Alternative Energy Resources Organization (AERO)                                                                                               |
| LWD92-004   | The Sustainable Farming Quarterly (SFQ) A Regional Newsletter                  | $17,500  | Al Kurki  
Alternative Energy Resources Organization (AERO)                                                                                            |
| LW91-023    | Farm Improvement Club Network for Sustainable Agriculture                      | $69,000  | Nancy Matheson  
Alternative Energy Resources Organization (AERO)                                                                                               |
| LW91-024    | Specifying and Analyzing Whole-Ranch Systems for Sustainable Range Livestock Production in Environmentally Sensitive Areas | $290,000 | Jack Riesselman  
Montana State University                                                                                                                         |
| LW91-025    | Practical Education in Sustainable Production Systems                           | $14,250  | Wade Crouch  
Montana State University                                                                                                                         |
| LW91-003    | Regional Farm and Research Center Matching System-FARMS                       | $3,000   | J. Jacobsen  
Montana State University                                                                                                                         |
Alternative Energy Resources Organization (AERO)                                                                                               |
| LW89-014    | Low-Input Legume/Cereal Rotations for the Northern Great Plains/Intermountain Region | $162,000 | James Sims  
Montana State University                                                                                                                         |
| LW89-016    | Bio-Priming for the Control of Pythium Reemergence Damping-Off in Vegetable Crops | $14,984  | Nancy Callan  
Montana State University                                                                                                                         |
| LW89-019    | Livestock Health and Nutrition Alternatives: A Western States Conference         | $5,000   | Al Kurki  
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>
</tr>
</thead>
</table>
| WRGR22-001 | Montana Food Economy Initiative                                                | $96,984      | Erin Austin  
Alternative Energy Resources Organization (AERO)  
Erin Austin  
AERO  
Michal DeChellis  
AERO and Cultivating Minds, LLC  
Kim Lloyd  
St. Peter's Health  
Michele Schahczenski  
Yellowstone Valley Food Hub  
Randi Wing  
AERO and FBCEDC |
| 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

<table>
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<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| WPDP23-015 | Skills and Tools for Complex Adaptive Thinking to Equip Leaders in Change Initiatives | $99,861      | Nicole Masters  
Integrity Soils  
Nicole Masters  
Integrity Soils |
| WPDP22-021 | Montana Agritourism Fellows Program: Developing Leaders to Advance Sustainable AgriTourism | $99,965      | Dr. Shannon Arnold  
Montana State University  
Dr. Dustin Perry  
Montana State University  
Dr. Beth Shirley  
Montana State University |
| PDP20-020  | Building Internal and Community Capacity for the Blackfeet Nation Through Agriculture | $73,795      | Will Seeley  
Blackfeet Tribe: Agriculture Resource Management Plan  
Gerald Lunak  
Joe Gervais  
K Webb Galbreath |
**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

**EW16-029**  
Best Management Practices (BMPs) for Mitigating Herbicide Resistance in the Northern Great Plains - Educational Tools for Agricultural Professionals  
$68,871  
Dr. Prashant Jha  
Montana State University, Southern Agricultural Research Center, Huntley, MT

**EW16-036**  
Catalyzing Increased Agricultural Sales through a Common Understanding of Montana’s New Food Modernization Law  
$22,332  
Jennifer Hill-Hart  
AERO

**EW15-009**  
Conservation and Augmentative Biological Control in the Northern Plains - Providing Tools for Agriculture Professionals  
$68,182  
Dr. Michael Ivie  
Montana State University-Bozeman

**EW13-014**  
Enhancing the Exploring Energy Efficiency & Alternatives (E3A) Curriculum  
$42,277  
Milton Geiger  
University of Wyoming Extension  
Dr. Glen Whipple  
University of Wyoming Extension

**EW12-004**  
Tour of sustainable Small Grain Production in Eastern Washington  
$7,350  
Dan Picard  
MSU Extension-Pondera County  
Jesse Fulbright  
Montana State University

**EW12-006**  
Montana State University Extension Range Management Institute  
$60,000  
Dr. Tracy Mosley  
Montana State University Extension

**EW11-012**  
Wildlife Damage Control for Traditional and Organic Farmers  
$96,053  
Dr. Jim Knight  
Extension Wildlife Specialist

**EW01-007**  
Training Tour 2002-03-04  
$30,024  
Jonda Crosby  
Alternative Energy Resources Organization

**EW01-016**  
Growing Our Own: Communities That Sustain Entrepreneurs  
$52,483  
Richard Williams  
Montana State University Extension Service

**EW99-008**  
Developing a Sustainable and Organic Master Gardener Horticulture Production Manual  
$22,483  
Helen Atthowe  
Missoula County Extension Service

**EW99-015**  
Harvesting the Wealth: of AERO’s Farm and Ranch Improvement Clubs  
$60,000  
Jonda Crosby  
Alternative Energy Resources Organization
FARMER/RANCHER GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
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</thead>
<tbody>
<tr>
<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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<tr>
<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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<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>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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<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 (Montana State University)</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</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</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</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</td>
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<tr>
<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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<tr>
<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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<tr>
<td>FW01-085</td>
<td>Biological and Mechanical Control of Perennial Weeds in North-Central Montana</td>
<td>$6,387</td>
<td>Robert Quinn</td>
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<tr>
<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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<tr>
<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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<tr>
<td>Project #</td>
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<td>SARE Support</td>
<td>Project Leaders</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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<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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<td>FW95-093</td>
<td>Influencing Elk and Livestock Riparian Use</td>
<td>$4,750</td>
<td>Allen Carter</td>
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**GRADUATE STUDENT GRANTS**

<table>
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<tr>
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<tbody>
<tr>
<td>GW23-255</td>
<td>Understanding Soil Water Capture and Use in Very Tall Stubble</td>
<td>$30,000</td>
<td>Dr. Perry Miller, Montana State University, Ryan Barnes, Montana State University</td>
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<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</td>
<td>$29,997</td>
<td>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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<tr>
<td>GW22-237</td>
<td>Integrated Weed Management of non-native annual grass, Ventenata dubia, in Montana rangelands</td>
<td>$29,722</td>
<td>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</td>
<td>$29,698</td>
<td>Dr. Catherine Zabinski, Montana State University, Zane Ashford, Montana State University</td>
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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, 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
### Cover Crop Grazing: Optimal Seasonality for Soil and Livestock Benefit

- **Project #:** GW16-053
- **Title:** Cover Crop Grazing: Optimal Seasonality for Soil and Livestock Benefit
- **SARE Support:** $25,000
- **Project Leaders:**
  - Dr. Perry Miller
  - Montana State University
  - Robert Walker
  - MSU LRES

### Multiple Forms of Uncertainty as a Barrier to the Adoption of Sustainable Farming Practices

- **Project #:** GW12-004
- **Title:** Multiple Forms of Uncertainty as a Barrier to the Adoption of Sustainable Farming Practices
- **SARE Support:** $24,830
- **Project Leaders:**
  - Patrick Lawrence
  - Montana State University

### Investigating the Legume Green Fallow Alternative on North-Central Montana No-Till Operations

- **Project #:** GW10-032
- **Title:** Investigating the Legume Green Fallow Alternative on North-Central Montana No-Till Operations
- **SARE Support:** $24,250
- **Project Leaders:**
  - Dr. Perry Miller
  - Montana State University
  - Justin O'Dea
  - Washington State University


- **Project #:** GW09-012
- **Title:** Joint Management of Wheat Stem Sawfly, Fusarium Crown Rot, and Weeds: Assessing the Ecological Basis of a Total Systems Approach to Pest Management Strategies
- **SARE Support:** $21,964
- **Project Leaders:**
  - Fabian Menalled
  - Dept. of Land Resources and Environmental Sciences
  - Ilai Keren
  - Montana State University

### Effects of Weed Communities in Conventional and Organic Agricultural Systems.

- **Project #:** GW06-026
- **Title:** Effects of Weed Communities in Conventional and Organic Agricultural Systems.
- **SARE Support:** $7,536
- **Project Leaders:**
  - 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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<tbody>
<tr>
<td>OW22-372</td>
<td>The Buzz on the Range: Promoting healthy soils and pollinators on Montana rangeland</td>
<td>$55,990</td>
<td>Michael DeChellis&lt;br&gt; We Are For The Land Foundation, Inc.&lt;br&gt; Michael DeChellis&lt;br&gt; OpenTeam And We Are For the Land Board Member&lt;br&gt; Michal DeChellis&lt;br&gt; Cultivating Minds LLC and We Are For the Land Foundation</td>
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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&lt;br&gt; Montana State University</td>
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<tr>
<td>OW17-026</td>
<td>Montana Food Economy Initiative</td>
<td>$50,000</td>
<td>Lindsay Ganong&lt;br&gt; AERO</td>
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<tr>
<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&lt;br&gt; Montana State University Extension</td>
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<tr>
<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&lt;br&gt; 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&lt;br&gt; 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&lt;br&gt; 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>Dr. Jeff Mosley&lt;br&gt; 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&lt;br&gt; Bio-Energy Center&lt;br&gt; Dr. Nestor Soriano, Jr.&lt;br&gt; Lead Research Scientist</td>
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</table>
Total funding from the USDA SARE program to Montana
$9,853,640

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).