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.

www.sare.org

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](http://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](http://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](http://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  
Dr. 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 |
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

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

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

Dr. Richard Engel
Montana State University

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

Devon Ragen
Montana State University

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

Dr. Chengci Chen
Montana State University

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

Dr. Carmen Byker Shanks
Montana State University

Sustainable Cropping Systems for Dual-Purpose Biennial Canola

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

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

Laura Burkle
Montana State University

Landscape Collaborative Grazing and Greater Sage Grouse Survival

Dr. Bok Sowell
MSU-Animal & Range Sciences

Low Glycemic Potatoes, a value-added crop for Montana

Dr. David Sands
Montana State University

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

Dr. Hayes Goosey
Montana State University
<table>
<thead>
<tr>
<th>Project ID</th>
<th>Description</th>
<th>Funding</th>
<th>Principal Investigator(s)</th>
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<tr>
<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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<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>
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<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 Jeff Mosley Montana State University</td>
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<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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<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>Jeff Mosley Montana State University Rachel Frost Montana State University</td>
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<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 precticide 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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<tr>
<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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<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>
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<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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<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>
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### Project Details

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<td>SW01-048</td>
<td>Using Crop Diversity in No-till and Organic Systems to Reduce Inputs and Increase Profits and Sustainability in the Northern Plains</td>
<td>$157,888</td>
<td>Bruce Maxwell MSU</td>
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<td>SW00-015</td>
<td>An Alternative to Traditional Wheat Stubble Management Using Sheep to Control Pests and Improve Soil Nutrient Cycling</td>
<td>$166,147</td>
<td>Patrick Hatfield Department of Animal and Range Sciences</td>
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<td></td>
<td></td>
<td></td>
<td>Sue Blodgett Montana State University, Dept. Entomology</td>
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<td></td>
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<td></td>
<td>Dr. Hayes Goosey Montana State University</td>
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<td>Duane Griffith Montana State University, Ag Econ and Ext Dept</td>
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<tr>
<td>SW98-064</td>
<td>Selecting Cattle to Prevent Grazing Distribution Problems</td>
<td>$115,598</td>
<td>Derek Bailey Montana State University</td>
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<tr>
<td>SW97-056</td>
<td>Comparison of Pest Management Interactions in Spring Wheat-Cover Crop and Spring Wheat-Fallow Cropping Systems</td>
<td>$150,964</td>
<td>Andrew Lenssen Montana State University</td>
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<td>SW96-019</td>
<td>Sustaining Agriculture and Community: Moving the Farm Improvement Club Program Beyond the Farm Gate</td>
<td>$124,425</td>
<td>Jonda Crosby Alternative Energy Resources Organization</td>
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<tr>
<td>LW92-004</td>
<td>Sustainable Farming Quarterly</td>
<td>$17,500</td>
<td>Nancy Matheson Alternative Energy Resources Organization (AERO)</td>
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<tr>
<td>LWD92-004</td>
<td>The Sustainable Farming Quarterly (SFQ) A Regional Newsletter</td>
<td>$17,500</td>
<td>Al Kurki Alternative Energy Resources Organization (AERO)</td>
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<tr>
<td>LW91-023</td>
<td>Farm Improvement Club Network for Sustainable Agriculture</td>
<td>$69,000</td>
<td>Nancy Matheson Alternative Energy Resources Organization (AERO)</td>
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<tr>
<td>LW91-024</td>
<td>Specifying and Analyzing Whole-Ranch Systems for Sustainable Range Livestock Production in Environmentally Sensitive Areas</td>
<td>$290,000</td>
<td>Jack Riesselman Montana State University</td>
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<tr>
<td>LW91-025</td>
<td>Practical Education in Sustainable Production Systems</td>
<td>$14,250</td>
<td>Wade Crouch Montana State University</td>
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<tr>
<td>LWD91-003</td>
<td>Regional Farm and Research Center Matching System-FARMS</td>
<td>$3,000</td>
<td>J. Jacobsen Montana State University</td>
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<td>LW89-014</td>
<td>Low-Input Legume/Cereal Rotations for the Northern Great Plains/Intermountain Region</td>
<td>$162,000</td>
<td>James Sims Montana State University</td>
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<tr>
<td>LW89-016</td>
<td>Bio-Priming for the Control of Pythium Reemergence Damping-Off in Vegetable Crops</td>
<td>$14,984</td>
<td>Nancy Callan Montana State University</td>
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<tr>
<td>LW89-019</td>
<td>Livestock Health and Nutrition Alternatives: A Western States Conference</td>
<td>$5,000</td>
<td>Al Kurki Alternative Energy Resources Organization (AERO)</td>
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<tr>
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<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>
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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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<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>
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<td>EW16-029</td>
<td>Best Management Practices (BMPs) for Mitigating Herbicide Resistance in the Northern Great Plains - Educational Tools for Agricultural Professionals</td>
<td>$68,871</td>
<td>Dr. Prashant Jha Montana State University, Southern Agricultural Research Center, Huntley, MT</td>
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<td>EW16-036</td>
<td>Catalyzing Increased Agricultural Sales through a Common Understanding of Montana’s New Food Modernization Law</td>
<td>$22,332</td>
<td>Jennifer Hill-Hart 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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<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</td>
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<td>EW12-004</td>
<td>Tour of sustainable Small Grain Production in Eastern Washington</td>
<td>$7,350</td>
<td>Dan Picard MSU Extension-Pondera County</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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<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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<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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<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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<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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<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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<td>EW95-012</td>
<td>Sustainable Agriculture Training Project A Model of Collaborative Learning</td>
<td>$31,450</td>
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<td>EW94-006</td>
<td>Sustainable Agriculture Training Project: A Model of Collaborative Learning</td>
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</table>
| FW21-372       | Collaborative monitoring for ranch resilience and social-ecological sustainability in central Montana | $29,000 | Bill Milton  
Milton Ranch                                       |
| FW21-382       | Evaluating Clamp Storage to Help Montana Farmers Adjust to Climate Change-Induced Shortened Harvest Windows | $25,000 | Chris Nedens  
Peritsa Creek Farms Inc.                              |
| FW21-388       | TEST                                                                           | $1,000  | Dr. Western SARE  
Western SARE                                          |
| FW19-340       | Improving Winter Greens Production and Storage for Cold Climate Farmers        | $19,990 | Katelyn Madden  
MGVC                                                 |
| FW15-039       | Making the Most of Fine Fleece: Environmental, Economic, and Social Costs and Benefits of Alternative Strategies for Marketing Sheep Wool | $10,646 | Linda Poole  
Prairie Shepherd                                      |
| FW11-024       | Organic Control of Perennial Weeds with Vinegar and Biologicals                | $20,790 | Jess Alger  
Organic control of Perennial Weeds                   |
| FW10-042       | Marketing J Bar L Ranch Grassfed Beef to Members of Conservation Organizations | $13,000 | Bryan Ulring  
J Bar L Ranches, LLC                                   |
| FW09-305       | Composting Recommendations and Marketing Evaluation for Livestock Operations in Cold Semi-Arid Environments | $49,315 | Thomas Bass  
Montana State University                              |
| FW08-016       | Can Producers in Five Montana Counties Successfully Use No-Till Methods for Renovation of Irrigated and Dryland Pastures? | $29,999 | Ron Carlstrom  
MSU Extension- Gallatin County  
George Reich                                           |
| FW08-023       | Pasture-Raised Heritage Turkeys in a Dryland Farming System                   | $6,413  | Jacob Cowgill                                        |
| FW08-034       | High-Nutrition Drought-Tolerant Corn                                           | $30,000 | Dave Christensen                                    |
| FW08-317       | Sustainable Food and Bioenergy Systems: Student Internships Development Plan   | $29,983 | Dr. William Dyer  
Montana State University                               |
| FW06-025       | Agroecosystem Approach to Managing Imported Cabbage Worm (Peris rapae)        | $6,356  | Helen Atthowe  
Biodesign Farm                                         |
| FW05-012       | Forage Winter Wheat Production for Grazing or Hay Production in Eight Montana Counties | $19,795 | George Reich                                         |
| FW05-301       | Protecting High Quality Rangelands in Garfield County from Invasive Weed Spread | $20,000 | Eric Miller  
Montana State University                              |
| FW05-305       | Demonstration of Leafy Spurge Management Using Sheep Grazing in a Leafy Spurge Barrier Zone | $9,960  | Sharla Sackman  
Montana State University Extension Service             |
<p>| FW04-018       | Forage Winter Wheat Production for Jay or Grain in Gallatin County, Montana    | $5,370  | George Reich                                         |</p>
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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</td>
<td>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</td>
<td>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</td>
<td>Carter-Fallon Forage Committee</td>
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**FW95-078**  
Managing a Living Mulch System in an Intensive Organic Vegetable Cropping Operation to Enhance Weed, Nutrient, and Pest Management  
$5,000  
Helen Atthowe  
Biodesign Farm

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

## GRADUATE STUDENT GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| GW21-218   | Integrating thistle rust into weed management of Canada thistle                | $30,000      | Timothy Seipel  
Department of Land Resources and Environmental Sciences, Montana State University  
Dr. Jed Eberly  
Montana State University  
Fabian Menalled  
Dept. of Land Resources and Environmental Sciences  
Daniel Chichinsky  
Montana State University |
| 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 |

*Note: Project details and project leaders have been updated for clarity and accuracy.*
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 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
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>
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<th>Project #</th>
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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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</table>
Are Feedlot-based Performance Cattle Limiting Ecological Services for Rangeland Ecosystems in Northern Mixed-grass prairies? $49,961 Dr. Emily Meccage Montana State University

Reference strips and precision sensors for increased nitrogen use efficiency in wheat production $49,907 Dr. Olga Walsh Montana State University

Effects of Late-Season Water Lease on Forage Crops $24,950 Jodi Pauley Montana State University

Best Management Practices for Livestock Protection Dogs $49,998 Jeff Mosley Montana State University

Developing Community Based Oilseed Industry in Montana $49,830 Taylor Lyon Bio-Energy Center Dr. Nestor Soriano, Jr. Lead Research Scientist

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.
Sustainable Agriculture Research and Education (SARE) is funded by USDA’s National Institute of Food and Agriculture (NIFA).