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 7,724 initiatives.

SARE is grassroots with far-reaching impact

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

SARE communicates results

SARE shares project results by requiring grantees to conduct outreach and grower engagement, and by maintaining an online library of practical publications, granteeproduced information products and other educational materials.

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

$9,022,616 in total funding

129 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: **129 grants**
- 45 Research and Education
- 21 Professional Development Program
- 35 Farmer/Rancher
- 9 On Farm Research/Partnership
- 16 Graduate Student
- 3 Research to Grass Roots

Total funding: **$9,022,616**
- **$6,426,771** Research and Education
- **$1,225,264** Professional Development Program
- **$426,219** 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 $9,022,616 grants to support 128 projects, including but not limited to, 44 research and/or education projects, 21 professional development projects and 35 producer-led projects. Montana has also received additional SARE support through multi-state projects.

### RESEARCH AND EDUCATION GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</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  |
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
Using cover crop mixtures to improve soil health in low rainfall areas of the northern plains

Enhancing Cropping System Sustainability by Minimizing Ammonia-N Losses from Biological and Chemical Inputs

Integrating Biological Control with Targeted Sheep Grazing to Suppress Spotted Knapweed

Infrastructure Support for Small Livestock Processing Facilities


Grower-based selection of varieties and systems for wheat stem sawfly control

Is Sulfur Cinquefoil a Candidate for Control with Sheep and Goats?

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 prestatec and mechanical methods of weed and insect control

Survey and Economic Analysis of Montana Farms Utilizing Integrated Livestock-Cereal Grain (Ley Farming) Systems

Does Timing of Defoliation Affect Spotted Knapweed Seed Viability and Germination?

Developing Distance Learning Based on Perceptions and Knowledge of Producers and Agricultural Professionals

Methane Recovery from Small Dairy Operations

Ecologically Based Integrated Weed Management to Restore Plant Diversity

Factors Affecting Alfalfa Stand Longevity in Montana

Increasing Crop Water Use Efficiency in Advanced No-Till Systems
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Budget</th>
<th>Principal Investigator</th>
<th>Affiliation/Institution</th>
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<tr>
<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</td>
<td>MSU</td>
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<tr>
<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</td>
<td>Department of Animal and Range Sciences</td>
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<td></td>
<td></td>
<td></td>
<td>Sue Blodgett</td>
<td>Montana State University, Dept. Entomology</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Dr. Hayes Goosey</td>
<td>Montana State University</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Duane Griffith</td>
<td>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</td>
<td>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</td>
<td>Montana State University</td>
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<tr>
<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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>Montana State University</td>
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<tr>
<td>LW91-003</td>
<td>Regional Farm and Research Center Matching System-FARMS</td>
<td>$3,000</td>
<td>J. Jacobsen</td>
<td>Montana State University</td>
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<tr>
<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</td>
<td>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</td>
<td>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</td>
<td>Alternative Energy Resources Organization (AERO)</td>
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</tbody>
</table>
Soil-building Cropping Systems Conference—Legumes and Other Green Manures in Cropping Systems of The Northern Plains, Rockies and Intermountain Region

Robert Gillespie
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>
| 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>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| PDP20-020  | Building Internal and Community Capacity for the Blackfeet Nation Through Agriculture | $73,795      | Will Seeley  
Blackfeet Tribe: Agriculture Resource Management Plan  
Loren BirdRattler  
Blackfeet Agriculture Resource Management Plan |
| WPDP19-15  | Sustainable Beef Cattle Production: Ranch to Ribeye                            | $57,310      | Megan Van Emon  
Montana State University  
Colleen Buck  
Montana State University  
Callie Cooley  
Montana State University  
Molly Hammond  
Montana State University  
Elin Kittelmann  
Montana State University  
Kari Lewis  
Montana State University |
| EW18-027   | Building Internal Capacity for the Blackfeet Tribe Agricultural Resource Management Plan (ARMP) | $52,155      | Loren Bird Rattler  
Blackfeet Tribe |
| EW18-011   | Pheromones as Tools for Monitoring the Insect Pests in the Northern Plains - Instructive Tools for Agricultural Professionals | $73,510      | Dr. Michael Ivie  
Montana State University-Bozeman |
| EW17-011   | Integrated Parasite Management: Train the Trainer                             | $74,189      | David Scott  
National Center for Appropriate Technology |
<table>
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<tr>
<th>Project #</th>
<th>Project Title</th>
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<th>Project Leaders</th>
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<tbody>
<tr>
<td>EW16-029</td>
<td>Best Management Practices (BMPs) for Mitigating Herbicide Resistance in the Northern Great Plains—Educational Tools for Agricultural Professionals</td>
<td>$68,871</td>
<td>Dr. Prashant Jha Montana State University, Southern Agricultural Research Center, Huntley, MT</td>
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<tr>
<td>EW16-036</td>
<td>Catalyzing Increased Agricultural Sales through a Common Understanding of Montana’s New Food Modernization Law</td>
<td>$22,332</td>
<td>Jennifer Hill-Hart AERO</td>
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<tr>
<td>EW15-009</td>
<td>Conservation and Augmentative Biological Control in the Northern Plains - Providing Tools for Agricultural Professionals</td>
<td>$68,182</td>
<td>Dr. Michael Ivie Montana State University-Bozeman</td>
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<tr>
<td>EW13-014</td>
<td>Enhancing the Exploring Energy Efficiency &amp; Alternatives (E3A) Curriculum</td>
<td>$42,277</td>
<td>Milton Geiger University of Wyoming Extension Dr. Glen Whipple University of Wyoming Extension</td>
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<tr>
<td>EW12-004</td>
<td>Tour of sustainable Small Grain Production in Eastern Washington</td>
<td>$7,350</td>
<td>Dan Picard MSU Extension-Pondera County Jesse Fulbright Montana State University</td>
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<tr>
<td>EW12-006</td>
<td>Montana State University Extension Range Management Institute</td>
<td>$60,000</td>
<td>Dr. Tracy Mosley Montana State University Extension</td>
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<tr>
<td>EW11-012</td>
<td>Wildlife Damage Control for Traditional and Organic Farmers</td>
<td>$96,053</td>
<td>Dr. Jim Knight Extension Wildlife Specialist</td>
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<tr>
<td>EW01-007</td>
<td>Training Tour 2002-03-04</td>
<td>$30,024</td>
<td>Jonda Crosby Alternative Energy Resources Organization</td>
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<tr>
<td>EW01-016</td>
<td>Growing Our Own: Communities That Sustain Entrepreneurs</td>
<td>$52,483</td>
<td>Richard Williams Montana State University Extension Service</td>
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<tr>
<td>EW99-008</td>
<td>Developing a Sustainable and Organic Master Gardener Horticulture Production Manual</td>
<td>$22,483</td>
<td>Helen Atthowe Missoula County Extension Service</td>
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<tr>
<td>EW99-015</td>
<td>Harvesting the Wealth: of AERO’s Farm and Ranch Improvement Clubs</td>
<td>$60,000</td>
<td>Jonda Crosby Alternative Energy Resources Organization</td>
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<tr>
<td>EW97-007</td>
<td>Sustainable Agriculture Youth Education: Professional Dev. for Youth Program Leaders and Educators</td>
<td>$100,000</td>
<td>Jonda Crosby Alternative Energy Resources Organization</td>
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<tr>
<td>EW95-002</td>
<td>Sustainable Noxious Weed Management on Northwestern Rangelands</td>
<td>$43,800</td>
<td>Roger Sheley Montana State University</td>
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<tr>
<td>EW95-003</td>
<td>Agency Personnel Training in Riparian Monitoring and Management of Wildlife and Livestock in the Intermountain West</td>
<td>$98,000</td>
<td>Dr. Jim Knight Extension Wildlife Specialist</td>
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<tr>
<td>EW95-012</td>
<td>Sustainable Agriculture Training Project A Model of Collaborative Learning</td>
<td>$31,450</td>
<td>Nancy Matheson Alternative Energy Resources Organization (AERO)</td>
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<tr>
<td>EW94-006</td>
<td>Sustainable Agriculture Training Project: A Model of Collaborative Learning</td>
<td>$91,000</td>
<td>Nancy Matheson Alternative Energy Resources Organization (AERO)</td>
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</table>

**FARMS/RANCHER GRANTS**
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<thead>
<tr>
<th>Grant Number</th>
<th>Project Title</th>
<th>Budget</th>
<th>Principal Investigator</th>
<th>Organization</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</td>
<td>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</td>
<td>Peritsa Creek Farms Inc.</td>
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<tr>
<td>FW19-340</td>
<td>Improving Winter Greens Production and Storage for Cold Climate Farmers</td>
<td>$19,990</td>
<td>Katelyn Madden</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>J Bar L Ranches, LLC</td>
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<tr>
<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</td>
<td>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</td>
<td>MSU Extension- Gallatin County</td>
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<tr>
<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>
<td>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</td>
<td>Biodesign Farm</td>
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<td>FW05-012</td>
<td>Forage Winter Wheat Production for Grazing or Hay Production in Eight Montana Counties</td>
<td>$19,795</td>
<td>George Reich</td>
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<td>FW05-301</td>
<td>Protecting High Quality Rangelands in Garfield County from Invasive Weed Spread</td>
<td>$20,000</td>
<td>Eric Miller</td>
<td>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</td>
<td>Montana State University Extension Service</td>
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<tr>
<td>FW04-018</td>
<td>Forage Winter Wheat Production for Jay or Grain in Gallatin County, Montana</td>
<td>$5,370</td>
<td>George Reich</td>
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<td>FW02-036</td>
<td>Sheep and Cattle Grazing Complementarity Project</td>
<td>$5,055</td>
<td>Randall Tunby</td>
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</table>
FW01-032 Biological Weed Control: Education and Implementation $7,500 Noah Poritz

FW01-085 Biological and Mechanical Control of Perennial Weeds in North-Central Montana $6,387 Robert Quinn Montana State University

FW00-017 Establishing a Sustainable Program for Recycling and Propagation of Quality Flower Bulbs in a Wholesale Flower Production Operation $2,197 Laura Smith

FW00-260 Test Marketing Campaign to Conduct In-Store Lamb Cooking and Recipe Demonstration for Montana Natural Lamb Cooperative in the Billings, Montana Market Area $9,300 Gayle Ott

FW00-282 Better Board of Trade.Com $8,054 David Oien

FW00-288 TEAM-Team Effort in Agricultural Marketing for the McAlpine Ranch $9,705 Clay McAlpine

FW00-314 Montana Arnica Web Page $870 Rod Daniel


FW99-102 Range Monitoring in the Badlands Grazing District $10,000 Jack McCuin

FW98-035 Annual Forages for Dryland Rotations $1,540 Vern Pluhar

FW98-093 Cull Potato Composting $7,500 Steve McCullough

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

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

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

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

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

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

<table>
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<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
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<tbody>
<tr>
<td>GW21-218</td>
<td>Integrating thistle rust into weed management of Canada thistle</td>
<td>$30,000</td>
<td>Timothy Seipel&lt;br&gt;Department of Land Resources and Environmental Sciences, Montana State University&lt;br&gt;Dr. Jed Eberly&lt;br&gt;Montana State University&lt;br&gt;Fabian Menalled&lt;br&gt;Dept. of Land Resources and Environmental Sciences&lt;br&gt;Daniel Chichinsky&lt;br&gt;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&lt;br&gt;Montana State University&lt;br&gt;Colter Mumford&lt;br&gt;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&lt;br&gt;Montana State University&lt;br&gt;Dr. Perry Miller&lt;br&gt;Montana State University&lt;br&gt;Samuel Koeshull&lt;br&gt;Montana State University</td>
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<td>GW19-190</td>
<td>Nitrogen Fertilizer Management Based on Site-Specific Maximized Profit and Minimized Pollution</td>
<td>$24,992</td>
<td>Dr. Stephanie Ewing&lt;br&gt;Montana State University&lt;br&gt;Bruce Maxwell&lt;br&gt;MSU&lt;br&gt;Paul Hegedus&lt;br&gt;Montana State University</td>
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<td>GW19-197</td>
<td>Fostering resilient plant-soil interactions on working ranches in semi-arid steppe ecosystems of north-central and eastern Montana.</td>
<td>$24,988</td>
<td>Dr. Craig Carr&lt;br&gt;Montana State University&lt;br&gt;Dr. Stephanie Ewing&lt;br&gt;Montana State University&lt;br&gt;Dr. Christine Gobrogge&lt;br&gt;Montana State University Environmental Analytical Laboratory&lt;br&gt;Seth Newton&lt;br&gt;Bear Gulch Ranch&lt;br&gt;Jay &quot;Butch&quot; Ortner&lt;br&gt;Ortner Ranch&lt;br&gt;Danny Pratt&lt;br&gt;Natural Resources Conservation Services&lt;br&gt;Tiffany Salveson&lt;br&gt;Natural Resources Conservation Service&lt;br&gt;Timothy Seipel&lt;br&gt;Department of Land Resources and Environmental Sciences, Montana State University&lt;br&gt;Joseph Capella&lt;br&gt;Montana State University</td>
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<td>GW19-198</td>
<td>Precision Agriculture Applied to Organic Systems</td>
<td>$22,500</td>
<td>Bruce Maxwell&lt;br&gt;MSU&lt;br&gt;Royden Loewen&lt;br&gt;Montana State University</td>
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<td>GW19-199</td>
<td>Effects of Habitat Heterogeneity on Crop Yield and Biodiversity</td>
<td>$24,972</td>
<td>Bruce Maxwell&lt;br&gt;MSU&lt;br&gt;Hannah Duff&lt;br&gt;1992</td>
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<td>GW18-050</td>
<td>Montana Hardy Fruit Nutraceutical Quality</td>
<td>$17,765</td>
<td>Mac Burgess&lt;br&gt;Montana State University&lt;br&gt;Durc Setzer&lt;br&gt;Montana State University</td>
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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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<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</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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<td>OW15-026</td>
<td>Are Feedlot-based Performance Cattle Limiting Ecological Services for Rangeland Ecosystems in Northern Mixed-grass prairies?</td>
<td>$49,961</td>
<td>Dr.Emily Meccage Montana State University</td>
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<td>OW13-017</td>
<td>Reference strips and precision sensors for increased nitrogen use efficiency in wheat production</td>
<td>$49,907</td>
<td>Dr.Olga Walsh Montana State University</td>
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<td>OW13-144</td>
<td>Effects of Late-Season Water Lease on Forage Crops</td>
<td>$24,950</td>
<td>Jodi Pauley Montana State University</td>
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Best Management Practices for Livestock Protection Dogs
OW12-044 $49,998 Jeff Mosley Montana State University

Developing Community Based Oilseed Industry in Montana
OW11-326 $49,830 Taylor Lyon Bio-Energy Center
Dr. Nestor Soriano, Jr. Lead Research Scientist

Preserving Farms and Ranches
FW04-313 $5,000 Robert "Rob" Johnson
Montana State University

Total funding from the USDA SARE program to Montana
$9,022,616

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