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, 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

$9,023,616 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

www.sare.org
SARE Grants in Montana

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

Total funding: $9,023,616
- $6,426,771 Research and Education
- $1,225,264 Professional Development Program
- $427,219 Farmer/Rancher
- $349,613 On Farm Research/Partnership
- $373,767 Graduate Student
- $220,982 Research to Grass Roots

Find a complete list of projects on page 3.

SARE's Impact

- 53 percent of producers report using a new production technique after reading a SARE publication.
- 79 percent of producers said they improved soil quality through their SARE project.
- 64 percent of producers said their SARE project helped them achieve higher sales.

Learn about local impacts at: western.sare.org/sare-in-your-state/montana

Contact Your SARE State Coordinator

SARE sustainable ag coordinators run state-level educational programs for Extension and other ag professionals, and many help grant applicants and recipients with planning and outreach. Visit western.sare.org/state-pages/montana to learn more.

Patrick Mangan
MSU Extension
(406) 375-6611
patrick.mangan@montana.edu

For detailed information on SARE projects, go to www.SARE.org

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

This report includes summaries of competitive grant programs only. Some competitive grant programs that are no longer offered may be included or excluded from the totals in this report depending on the grant program and SARE region.
Montana has been awarded $9,023,616 grants to support 129 projects, including but not limited to, 44 research and/or education projects, 21 professional development projects and 36 producer-led projects. Montana has also received additional SARE support through multi-state projects.

### RESEARCH AND EDUCATION GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| SW21-929   | Indigenous Food-Science-Ways: Integrating Indigenous knowledge with food science research and education to support value-added Native foods | $349,898     | Wan-Yuan Kuo Montana State University  
Rachel Andrews-Gould Salish and Kootenai College  
Eric Belasco Dr. Jane Boles Montana State University  
Dr. Paul Gannon Montana State University  
Dr. Paul Lachapelle Montana State University  
Dr. Brent Peyton Montana State University  
Brenda Richey Montana State University |
| SW21-930   | Intercropping chickpea with flax: An alternative sustainable way to manage Ascochyta blight of Chickpea | $347,557     | Dr. Chengci Chen Montana State University  
Dr. Frankie crutcher Montana State University-EARC  
Dr. William Franck Montana State University-EARC  
Dr. Qasim Khan Montana State University-SARC  
Dr. Kevin McPhee Montana State University-EARC  
Dr. Kent McVay Montana State University-SARC |
<table>
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<tr>
<th>Project Code</th>
<th>Project Title</th>
<th>Award Amount</th>
<th>Investigator(s)</th>
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<tr>
<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. Cathy 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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<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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<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 University</td>
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<td>SW11-086</td>
<td>Degree Day Modeling and Economic Considerations of Insects and Weeds in Sheep Grazed Alfafla, Grain, and Range Production Systems</td>
<td>$206,700</td>
<td>Dr. Hayes Goosey, Montana State University</td>
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<tr>
<td>Project Code</td>
<td>Project Title</td>
<td>Budget</td>
<td>Principal Investigator(s)</td>
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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</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</td>
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<td>SW09-068</td>
<td>Integrating Biological Control with Targeted Sheep Grazing to Suppress Spotted Knapweed</td>
<td>$49,865</td>
<td>Rachel Frost, Jeff Mosley</td>
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<tr>
<td>SW09-601</td>
<td>Infrastructure Support for Small Livestock Processing Facilities</td>
<td>$46,796</td>
<td>Dr. Jane Boles</td>
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<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</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</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, Rachel Frost</td>
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<td>SW07-028</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</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</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, Dr. Tracy Mosley</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</td>
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<td>SW04-007</td>
<td>Methane Recovery from Small Dairy Operations</td>
<td>$123,834</td>
<td>Ron Carlstrom</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</td>
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<td>SW03-063</td>
<td>Factors Affecting Alfalfa Stand Longevity in Montana</td>
<td>$139,397</td>
<td>Dennis Cash</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</td>
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<tr>
<td>Code</td>
<td>Title</td>
<td>Budget</td>
<td>Principal Investigator(s)</td>
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| 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 | 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) |
<table>
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<tr>
<th>Project #</th>
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<tbody>
<tr>
<td>WRGR21-001</td>
<td>Montana’s Soil Health Network: Deepening the Roots in Four Regions</td>
<td>$51,223</td>
<td>Maggie Gordon, Northern Plains Resource Council, Caroline Canarios, Charlie French, Stephen Charter, Charter Beef</td>
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<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, Mac Burgess, Dr. Jed Eberly, Timothy Seipel</td>
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<td>RGR20-009</td>
<td>Montana Food Economy Initiative</td>
<td>$74,759</td>
<td>Lindsay Ganong, AERO</td>
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**RESEARCH TO GRASS ROOTS GRANTS**

**PROFESSIONAL DEVELOPMENT PROGRAM GRANTS**

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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, Callie Cooley, Molly Hammond, Elin Kittelmann, Kari Lewis, Montana State University</td>
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<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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<td>EW18-011</td>
<td>Pheromones as Tools for Monitoring the Insect Pests in the Northern Plains - Instructive Tools for Agricultural Professionals</td>
<td>$73,510</td>
<td>Dr. Michael Ivie, Montana State University-Bozeman</td>
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<tr>
<td>EW17-011</td>
<td>Integrated Parasite Management: Train the Trainer</td>
<td>$74,189</td>
<td>David Scott, National Center for Appropriate Technology</td>
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<tr>
<td>Project #</td>
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<td>Project Leaders</td>
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</tbody>
</table>
| 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 Agricultural 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 |
| EW97-007 | Sustainable Agriculture Youth Education: Professional Dev. for Youth Program Leaders and Educators | $100,000 | Jonda Crosby  
Alternative Energy Resources Organization |
| EW95-002 | Sustainable Noxious Weed Management on Northwestern Rangelands | $43,800 | Roger Sheley  
Montana State University |
| EW95-003 | Agency Personnel Training in Riparian Monitoring and Management of Wildlife and Livestock in the Intermountain West | $98,000 | Dr. Jim Knight  
Extension Wildlife Specialist |
| EW95-012 | Sustainable Agriculture Training Project A Model of Collaborative Learning | $31,450 | Nancy Matheson  
Alternative Energy Resources Organization (AERO) |
| EW94-006 | Sustainable Agriculture Training Project: A Model of Collaborative Learning | $91,000 | Nancy Matheson  
Alternative Energy Resources Organization (AERO) |
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<th>Title</th>
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<td>FW21-372</td>
<td>Collaborative monitoring for ranch resilience and social-ecological sustainability in central Montana</td>
<td>$29,000</td>
<td>Bill Milton, Milton Ranch</td>
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<tr>
<td>FW21-382</td>
<td>Evaluating Clamp Storage to Help Montana Farmers Adjust to Climate Change-Induced Shortened Harvest Windows</td>
<td>$25,000</td>
<td>Chris Nedens, Peritsa Creek Farms Inc.</td>
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<td>FW21-388</td>
<td>TEST</td>
<td>$1,000</td>
<td>Dr. Western SARE, Western SARE</td>
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<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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<td>FW10-042</td>
<td>Marketing J Bar L Ranch Grassfed Beef to Members of Conservation Organizations</td>
<td>$13,000</td>
<td>Bryan Ulring, J Bar L Ranches, LLC</td>
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<td>FW09-305</td>
<td>Composting Recommendations and Marketing Evaluation for Livestock Operations in Cold Semi-Arid Environments</td>
<td>$49,315</td>
<td>Thomas Bass, Montana State University</td>
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<tr>
<td>FW08-016</td>
<td>Can Producers in Five Montana Counties Successfully Use No-Till Methods for Renovation of Irrigated and Dryland Pastures?</td>
<td>$29,999</td>
<td>Ron Carlstrom, MSU Extension- Gallatin County, George Reich</td>
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<td>FW08-023</td>
<td>Pasture-Raised Heritage Turkeys in a Dryland Farming System</td>
<td>$6,413</td>
<td>Jacob Cowgill</td>
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<td>FW08-034</td>
<td>High-Nutrition Drought-Tolerant Corn</td>
<td>$30,000</td>
<td>Dave Christensen</td>
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<tr>
<td>FW08-317</td>
<td>Sustainable Food and Bioenergy Systems: Student Internships Development Plan</td>
<td>$29,983</td>
<td>Dr. William Dyer, Montana State University</td>
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<td>FW06-025</td>
<td>Agroecosystem Approach to Managing Imported Cabbage Worm (Peris rapae)</td>
<td>$6,356</td>
<td>Helen Atthowe, Biodesign Farm</td>
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<td>FW05-012</td>
<td>Forage Winter Wheat Production for Grazing or Hay Production in Eight Montana Counties</td>
<td>$19,795</td>
<td>George Reich</td>
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<td>FW05-301</td>
<td>Protecting High Quality Rangelands in Garfield County from Invasive Weed Spread</td>
<td>$20,000</td>
<td>Eric Miller, Montana State University</td>
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<td>FW05-305</td>
<td>Demonstration of Leafy Spurge Management Using Sheep Grazing in a Leafy Spurge Barrier Zone</td>
<td>$9,960</td>
<td>Sharla Sackman, Montana State University Extension Service</td>
</tr>
<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>
</tr>
</tbody>
</table>
FW02-036  Sheep and Cattle Grazing Complementarity Project  $5,055  Randall Tunby

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
**GW21-218** Integrating thistle rust into weed management of Canada thistle  
SARE Support: $30,000  
**Project Leaders:**  
- Timothy Seipel  
- Dr. Jed Eberly  
- Fabian Menalled  
- Daniel Chichinsky  

**GW20-204** Restoring Disturbed Rangelands With Site-Specific Seeding  
SARE Support: $25,000  
**Project Leaders:**  
- Lisa Rew  
- Colter Mumford  

**GW20-205** Measuring intra-field variability in pea protein to understand influencing factors in Montana cropping systems  
SARE Support: $25,000  
**Project Leaders:**  
- Dr. Clay Jones  
- Dr. Perry Miller  
- Samuel Koeshall  

**GW19-190** Nitrogen Fertilizer Management Based on Site-Specific Maximized Profit and Minimized Pollution  
SARE Support: $24,992  
**Project Leaders:**  
- Dr. Stephanie Ewing  
- Bruce Maxwell  
- Paul Hegedus  

**GW19-197** Fostering resilient plant-soil interactions on working ranches in semi-arid steppe ecosystems of north-central and eastern Montana.  
SARE Support: $24,988  
**Project Leaders:**  
- Dr. Craig Carr  
- Dr. Stephanie Ewing  
- Dr. Christine Gobrogge  
- Seth Newton  
- Bear Gulch Ranch  
- Jay "Butch" Ortner  
- Ortner Ranch  
- Danny Pratt  
- 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  
SARE Support: $22,500  
**Project Leaders:**  
- Bruce Maxwell  
- 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  
                      Central Agricultural Research Center

GW18-151  Advancing Cover Crop Knowledge: Assessing the Role of Plant Diversity on Soil Change  $25,000  Dr.Perry Miller  
                      Montana State University  
                      Kristen Dagati  
                      Montana State University

GW17-040  Sustainability of dormant season grazing: Does protein supplementation impact beef cattle performance, soil organic matter, vegetation, and residual cover for wildlife?  $24,970  Dr.Janice Bowman  
                      Montana State University  
                      Dr.Lance McNew  
                      Montana State University  
                      Samuel Wyffels  
                      Montana State University

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

GW12-004  Multiple Forms of Uncertainty as a Barrier to the Adoption of Sustainable Farming Practices  $24,830  Patrick Lawrence  
                      Montana State University

GW10-032  Investigating the Legume Green Fallow Alternative on North-Central Montana No-Till Operations  $24,250  Dr.Perry Miller  
                      Montana State University  
                      Justin O’Dea  
                      Washington State University

                      Dept. of Land Resources and Environmental Sciences  
                      Ilai Keren  
                      Montana State University

GW06-026  Effects of Weed Communities in Conventional and Organic Agricultural Systems.  $7,536  Bruce Maxwell  
                      MSU  
                      Fabian Menalled  
                      Dept. of Land Resources and Environmental Sciences  
                      Fred Pollnac  
                      Montana State University

ON FARM RESEARCH/PARTNERSHIP GRANTS

<table>
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<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
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| OW17-009  | Soil Moisture Network and Tools - MT and WY collaborative | $49,995 | Lee Schmelzer  
Montana State University |
| OW17-026  | Montana Food Economy Initiative | $50,000 | Lindsay Ganong  
AERO |
| OW17-021  | Evaluating Nitrates and Forage Quality in Fall Regrowth of Annual Cereal Forages | $19,972 | Dr.Tracy Mosley  
Montana State University Extension |
OW15-026  Are Feedlot-based Performance Cattle Limiting Ecological Services for Rangeland Ecosystems in Northern Mixed-grass prairies? $49,961  Dr. Emily Meccage Montana State University

OW13-017  Reference strips and precision sensors for increased nitrogen use efficiency in wheat production $49,907  Dr. Olga Walsh Montana State University

OW13-144  Effects of Late-Season Water Lease on Forage Crops $24,950  Jodi Pauley Montana State University

OW12-044  Best Management Practices for Livestock Protection Dogs $49,998  Jeff Mosley Montana State University

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

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

Total funding from the USDA SARE program to Montana $9,023,616

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