

What is SARE?

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

SARE is grassroots with far-reaching impact

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

SARE communicates results

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



www.sare.org

SARE: Advancing the Frontier of Sustainable Agriculture in...

South Dakota

Project Highlight: *High-Efficiency, Year-Round, Tropical Greenhouse*

In South Dakota, soybeans, corn, wheat, sunflowers, and alfalfa come to mind when contemplating the state's number one industry - agriculture. In Aurora, South Dakota, Wayward Springs Acres boasts 30 acres of pasture, 20 acres of grass hay ground, sheep, cattle, and goats on their farm. But some of the crops at Wayward Springs have veered in a different, more exotic, direction.

As a child, mechanical engineer Shannon Mutschelknaus developed an interest in horticulture and eventually began saving seeds and growing tropical and sub-tropical trees.

"I discovered the demand for exotic tropical fruit trees was robust because they are regularly ravaged by seasonal hurricanes," said Mutschelknaus. "Examples of the many plants I've successfully propagated include soursop, mamey, *Garcinia humilus*, *Garcinia madruno*, cherimoya, *Monstera deliciosa*, and passion fruit."

Mutschelknaus wanted to use his engineering, research, and horticultural expertise to build a specialized greenhouse to expand his exotic plant business. With support from a SARE grant, he built a greenhouse with an insulated rear wall, passive solar heat, and an in-ground "climate battery." Climate battery greenhouses like Mutschelknaus's use the earth below the greenhouse to manage excess heat captured during the day. Tubing is buried beneath the greenhouse, and a fan circulates air through the tubing. Warm, humid daytime air circulates underground, where it cools down before re-entering the greenhouse. And at night, fans push the cool air underground to absorb the earth's heat and bring warmth back into the structure.

Mutschelknaus now grows leafy greens and tomatoes in his greenhouse along with novel fruits like lowquats, soursops, and cherimoya. His plans are available to the public with easy-to-read graphs, illustrations, videos, and clear guidelines.

View Wayward Spring's greenhouse plans and instructional videos at sare.org/projects; search for project number **FNC19-1185**.

SARE in South Dakota

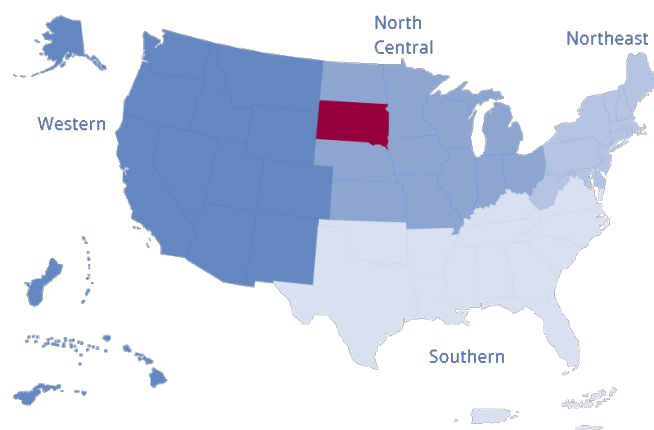
northcentral.sare.org/state-programs/south-dakota

\$4,794,402
in total funding

126 grant projects

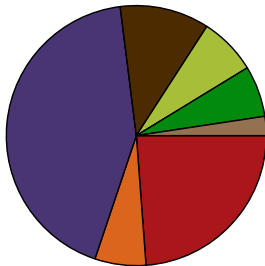
(since 1988)

For a complete list of grant projects state by state, go to www.sare.org/state-summaries



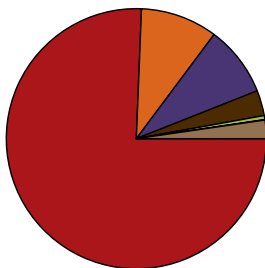
SARE Grants in South Dakota

Total awards: 126 grants



30 Research and Education
8 Professional Development Program
54 Farmer/Rancher
14 Graduate Student
9 Youth Educator
8 Youth
3 On Farm
3 Research/Partnership

Total funding: \$4,794,402



\$3,626,345 Research and Education
\$458,940 Professional Development Program
\$421,646 Farmer/Rancher
\$150,698 Graduate Student
\$24,335 Youth Educator
\$2,580 Youth
\$109,858 On Farm
\$109,858 Research/Partnership

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:

northcentral.sare.org/state-programs/south-dakota

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 northcentral.sare.org/state-pages/south-dakota to learn more.

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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.



AGRICULTURE PROJECTS FUNDED IN SOUTH DAKOTA

by USDA's
Sustainable Agriculture Research and Education (SARE) Program

South Dakota has been awarded \$4,794,402 grants to support 123 projects, including but not limited to, 27 research and/or education projects, 8 professional development projects and 54 producer-led projects. South Dakota has also received additional SARE support through multi-state projects.

RESEARCH AND EDUCATION GRANTS

Project #	Project Title	SARE Support	Project Leaders
LNC23-479	Ethnobotany Education Project	\$66,442	Marla Bull Bear Lakota Youth Development
LNC23-485	Assessing and Improving Lakota Land-User Social-Ecological Interactions and Impacts on Sustainability	\$249,768	Dr.Francisco Munoz-Arriola University of Nebraska-Lincoln, School of Natural Resources
LNC23-493	Evaluating sustainability of dairy production systems in South Dakota: Relationship between milk carbon footprint and farm profitability	\$249,824	Dr.Maristela Rovai, DVM South Dakota State University - DEPT. DAIRY & FOOD SCIENCE Md Elias Uddin South Dakota State University
LNC22-460	Comparing soil tarping and solarization for early season weed control in vegetable crop systems - a research and demonstration study	\$249,935	Dr.Rhoda Burrows South Dakota State University
LNC21-445	Improving watershed health, wildlife habitat, and ranch profitability: education and demonstration of low-cost, low-tech riparian restoration tools	\$246,721	Dr.Krista Ehlert South Dakota State University
LNC19-419	Investigating Rangeland Systems and Practices: Enhancing Sustainable Agriculture Curriculum in South Dakota	\$122,488	Dr.Krista Ehlert South Dakota State University
LNC18-405	Using native rhizobia to create a drought-resilient field pea production system	\$199,813	Christopher Graham South Dakota State University
LNC18-410	Dynamics of Dung Invertebrate Communities, and Their Contributions to Profitability in Regenerative Rangelands	\$200,000	Dr.Jonathan Lundgren, PhD Ecdysis Foundation
LNC15-371	Managing Grassland Vegetation with Winter-Patch Grazing: Potential Benefits to Livestock and Wildlife	\$199,294	Dr.Patricia Johnson South Dakota State University
LNC11-338	Mob Grazing Increases Efficiency and Profitability of Livestock Production	\$199,988	Dr.Alexander Smart South Dakota State University
LNC10-322	Development and Demonstration of a New Method of Physical Weed Control	\$174,603	Dr.Frank Forcella USDA-ARS

LNC10-326	Small Acreage Success: Connecting Natural Resource Professionals with a Non-Traditional Audience	\$95,319	Mindy Hubert South Dakota State University Dr. Roger Gates SDSU Extension
LNC09-311	South Dakota Beginning Farmer Training and Linking Project	\$25,000	Frank James Dakota Rural Action Tonya Haigh Dakota Rural Action
LNC07-277	Patch Burn-Grazing to Promote Environmental Sustainability	\$144,685	Dr. Alexander Smart South Dakota State University
LNC07-278	Benefits of forage-based heifer development and post-AI supplementation.	\$149,026	Dr. George Perry South Dakota State University
LNC07-280	Post-Prairie Dog Rangeland Recovery	\$147,470	Dr. Patricia Johnson South Dakota State University
LNC05-260	Effectiveness of thiamin in reducing the impacts of high-sulfate water	\$144,805	Dr. Patricia Johnson South Dakota State University
LNC03-224	From Food Stamps to Home Production	\$135,000	Ann Krush Center for Permaculture as a Native Science
LNC01-194	Profit by Planning: Helping Fresh Market Vegetable Growers Meet Financial Goals and Improve their Quality of Life	\$71,914	John Hendrickson CIAS, UW-Madison
LNC00-163	Rosebud Producers Develop WIC Markets	\$94,000	Ann Krush Center for Permaculture as a Native Science
LNC96-108	Restoration of Economic and Ecological Sustainability in Western Rangeland: A Handbook	\$62,800	W. Carter Johnson S. Dakota St. Univ., Dept of Hort., Forestry, Landscape, & Parks
LNC95-079	The Effect of Spring Seeded Annual Medic, Genus Medicago, on Weed Management and Soil Quality in Corn Production	\$73,000	Sharon Clay Dept of Agronomy, Horticulture, and Plant Science, South Dakota State University
LNC93-055	Economic and Environmental Implications of 1990 Farm Bill Sustainability Provisions in Water Quality Sensitive Areas	\$82,650	Thomas Dobbs South Dakota State University
LNC92-009.3	Agronomic and Whole-Farm Economic Analyses of Alternative Small Grain/Row Crop Production Systems for the Northern Plains	\$47,150	James Smolik South Dakota State University
LNC90-009.2	Agronomic and Whole-Farm Economic Analyses of Alternative Small Grain/Row Crop Production Systems for the Northern Plains	\$67,950	James Smolik South Dakota State University
LNC89-009.1	Agronomic and Economic Analyses of Alternative Small Grain/Row Crop Production Systems for the Northern Plains	\$60,000	James Smolik South Dakota State University
LNC88-009	Agronomic and Economic Analyses of Alternative Small Grain/Row Crop Production Systems for the Northern Plains	\$66,700	James Smolik South Dakota State University

PROFESSIONAL DEVELOPMENT PROGRAM GRANTS

Project #	Project Title	SARE Support	Project Leaders
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ENC22-216	Strengthening High Tunnel Training and Support for the Next Generation of Technical Service Providers and Producers	\$89,805	Kristine Lang South Dakota State University
ENC15-144	Learning About the Benefits of Integrated Crop-Livestock Systems on Soil Health	\$73,861	Julie Walker South Dakota State University
ENC07-095	Educational Curricula and Professional Development Training for Energy Efficient Production Practices.	\$49,947	Dr.David Clay South Dakota State University
ENC04-077	Building Knowledge of Sustainable Rangeland Management Using Information Technology - Northern Great Plains Partnership	\$16,719	Dr.Roger Gates SDSU Extension
ENC03-074	Advanced Training in Sustainable Production Systems in the Northern Great Plains	\$63,556	Dr.Roger Gates SDSU Extension
ENC00-052	Training in Sustainable Livestock Production Systems on Rangelands of the Western Dakotas	\$80,642	Hubert Patterson South Dakota State University
ENC98-037.1	Outreach Education for Permaculture as Native Science	\$36,450	Ann Krush Center for Permaculture as a Native Science
ENC97-022	Outreach Education for Permaculture as Native Science	\$47,960	Ann Krush Center for Permaculture as a Native Science

FARMER/RANCHER GRANTS

Project #	Project Title	SARE Support	Project Leaders
FNC22-1340	Create artisan-in-residence program to further education in value-added agricultural products specific to our remote, ranching community	\$3,905	Eliza (Blue) Loughlin Plainsong Farm and Fiber
FNC20-1221	Exploring the use of compost & biochar as both soil amendments and as heat sources to extend the growing season inside high-tunnels on the Pine Ridge	\$27,000	Patricia Hammond Rebel Earth Farms
FNC20-1256	Growing Camelina (Camelina sativa) in Western South Dakota	\$9,641	Dr.Jennifer Walker Walker Farm
FNC19-1185	High Efficiency Year-Round Tropical Greenhouse	\$9,000	Shannon Mutschelknaus Wayward Springs Acres
FNC19-1187	The evaluation of Integrated Weed Management practices to control chicory infestation in the pastures and hay ground of conventional and organic agricultural operations.	\$8,935	Doug Pavel Butte Vista Farm
FNC19-1197	Wiconi Waste Resistance Farm a Lakota regenerative agroforestry permaculture demonstration farm	\$9,000	Michelle Tyon Wiconi Waste Farm
FNC19-1203	The Evaluation of Integrated Weed Management Practices to Control Chicory Infestation in the Pastures and Hay Ground of Conventional and Organic Agricultural Operations	\$9,000	Sue Hillard Three Heart Farm

FNC18-1124	Rebel Earth Farms' Value-Added, Direct Marketing Lakota Herbal Tea High-tunnel Production	\$7,500	Patricia Hammond Rebel Earth Farms
FNC18-1131	Edible Net Wrap: A Possible Solution to Livestock Longevity	\$7,500	Amanda Konechne Chris and Amanda Konechne
FNC17-1079	Research of Methods to Improve the Processing of Hops (<i>Humulus lupulus</i> L.)	\$7,500	Yvonne Hines Hines Hops Farm
FNC16-1031	Controlling Cedar Tree Invasion by Rotational Grazing Goats through Pasture	\$6,793	Adam Carlson Hanson Homestead
FNC16-1036	Examination of the Productivity of Four Hops Varieties (<i>Humulus lupulus</i> L.) in Two Soil Types in Southwest South Dakota.	\$7,500	Yvonne Hines Hines Hops Farm
FNC14-942	Making Goats Milk Soap Business Sustainable by Implementing Standard Manufacturing and Testing Protocols	\$5,635	Penny Adler 444Farm
FNC14-947	Examining Water and Nutrient Dynamics of a Cover Crop in an Upper Great Plains Vineyard	\$7,467	Chris Graham Piedmont Valley Vineyard and Farm
FNC14-977	Reduced Pesticide Fly Control in Feedlots and Native Rangeland to Conserve Dung Beetles and Benefit Beef and Sheep Production	\$21,287	Linda Simmons Whetstone Grazing, LLC Peter Bauman South Dakota State University
FNC12-846	The Producer-Initiated Development of a Goat Meat Market in the Black Hills Region of South Dakota	\$14,999	Tom Barnes Pleasant Valley Farm
FNC12-862	Growing, Processing and Selling Organic Grape Vinegar and Verjus	\$7,391	Steven Hauff Three Heart Farm
FNC12-892	A Hoop House in western South Dakota	\$5,290	Cathy Timmons Timmons Ranch
FNC10-815	The economic value of multi-species grazing of cattle and goats utilizing goats for brush and weed control	\$18,000	Jim Deboer Kelly Frensko Penny Adler 444Farm
FNC09-764	Grazing Lambs to Manage Weeds and Grass in a Cold Climate Vineyard	\$2,291	Karlys Wells
FNC08-699	Field Harvest of Grassfed Bison	\$17,802	Dan O'Brien
FNC08-746	Winter Greenhouse	\$1,922	Bill Powers Six Mile Creek Farm
FNC07-666	Effects of Eastern South Dakota Soils and Climate on Sustainable Production of Cold Hardy Grape Varieties	\$5,990	Dave Greenlee
FNC07-688	Standing Grain as Winter Grazing for Cattle	\$930	Jennifer Walker

FNC06-597	Monitoring Rangeland Health as a Means to Sustain the Rural Family Enterprise	\$9,600	Dan Anderson
FNC06-615	Utilizing Late Season Cover Crops in a No-Till System	\$5,937	Dan Forgey
FNC06-635	From Field to Store-Front - Designing On-Line Commerce for Wunder Flax	\$5,200	John Wunder
FNC05-566	Strengthening Grazing Success Through Genetics with Flax in an Organic Environment	\$5,995	Angela Jackson-Pridie
FNC05-575	Sustainable Energy for Sustainable Production	\$17,632	Shawn Burke
FNC04-542	LaCreek Growing Solutions	\$15,066	Gail Kocer
FNC04-543	South Dakota Grazing/Pasture Management Research and Tour	\$3,162	Phil Raml
FNC03-450	Growing Native Fruits of the North Central Region	\$6,000	Kim Graber
FNC03-471	South Dakota Grasslands Coalition Bus Tour to Grassland Grazing Demonstration Sites	\$5,000	Dan Rasmussen South Dakota Grasslands Coalition
FNC03-482	Cider Hill Farm Cheese Plant	\$5,997	Joan Williams Cider Hill Farm
FNC02-412	Low Cost Precision Supplements to Add Profit to Cow-Calf Operations	\$5,153	Jim Faulstich Day Break Ranch
FNC02-437	Development of Self-Sustaining Farmer's Market in Clay County, South Dakota	\$4,032	Grace Freeman
FNC01-348	Management and Control of Candian Thistle in Limited Access and Field Locations	\$3,040	Jordan Dawn Enormous Brontosaurus Organic Farm
FNC01-351	Developing Added Value, Convenience Products From Free-Range Pastured Chickens	\$14,513	Tom Neuberger
FNC01-354	The Value of Value Added Products from Farm to Farm Market	\$4,858	Gail Dawn
FNC00-327	Kiyaksa Timber Salvage and Restoration Project	\$2,546	Marcell Bull Bear
FNC00-331	Weed Control	\$5,000	Duane Lammers
FNC99-008	Interns for Garden Markets	\$8,000	Ann Krush

FNC99-009	Horse Spirit Youth Ranch	\$14,700	Victor Young
FNC99-248	Improve Grazing Profits by Marketing Cedar	\$5,000	Leroy Smith
FNC98-004	Interns for Rosebud WIC Gardens	\$8,000	Ann Krush
FNC98-201	Wolf's Native Garden Project	\$4,160	Charlie Smoke
FNC98-216	The Expansion of the South Dakota Goosemobile Project to include Beef, Pork and Lamb	\$9,025	Tom Neuberger
FNC98-232	Swath-grazing: A Potential Alternative to Hay Feeding for Wintering Beef Cows	\$2,955	Mark Sip
FNC97-001	Reestablishing Native Bison on Native Lands	\$4,923	Rick McLaughlin
FNC97-002	Gardening and Gathering on the Rosebud Reservation	\$8,000	Ann Krush
FNC97-185	Rotational Grazing in South Dakota - Dairy Cattle	\$3,448	Willard Maas
FNC96-144	Finishing Beef Calves on Legume Pasture	\$2,504	raymond berry
FNC95-107	Alternative Strategies for Building Soil and Soil Erosion Control	\$5,000	Vincent Meyer
FNC94-070	Riparian/Range Restoration	\$4,923	Jeff Mortenson

GRADUATE STUDENT GRANTS

Project #	Project Title	SARE Support	Project Leaders
GNC20-313	Measuring the impacts of returning to tillage on soil health parameters after long-term no-till soil management: An educational opportunity.	\$14,976	Dr.David Clay South Dakota State University Shaina Westhoff South Dakota State University
GNC19-286	Field evaluation of traffic-induced compaction and its potential impact on soil physical characteristics and crop yield	\$14,982	Dr.Sandeep Kumar South Dakota State University Jasdeep Singh South Dakota State University
GNC18-254	Predation, Herbivory, and Farmer Profitability and Sustainability in Response to Inter Seeded Covercrops in Standing Corn for Agroecosystem Diversification	\$11,906	Jonathan Lundgren South Dakota State University Michael Bredeson South Dakota State University
GNC16-227	Interactive Effects of Cover Crops, Soil Health Practices, and Insect Community Dynamics on Corn Production	\$9,998	Jonathan Lundgren South Dakota State University Claire LaCanne, M.S. South Dakota State University

GNC15-200	Effect of Cover Crops on Beef Animal Performance and Soil Health	\$9,999	Dr.Derek Brake South Dakota State University Brooke Brunsvig South Dakota State University
GNC15-207	Contributions of Dung Arthropods to Sustainable Pest Management in Rangeland Systems of the Northern Great Plains	\$9,994	Jonathan Lundgren South Dakota State University Jacob Pecenka South Dakota State University
GNC14-185	Developing Guidelines for Sustainable Livestock Grazing in South Dakota Ponderosa Pine Forests: Balancing Economically Important Ecosystem Goods with Ecological Integrity	\$9,978	Dr.Roger Gates SDSU Extension Kurt Chowanski South Dakota State University West River Ag Center
GNC12-148	A Process-Based Nutrient Model for the Bedpack Manure of Confined Beef Systems	\$9,860	Dr.Erin Cortus South Dakota State University Ferouz Ayadi South Dakota State University
GNC10-118	Using Forage Quality Testing to Predict Nitrogen Replacement Value of Cover Crops	\$9,967	Peter Sexton Greg DeRynck South Dakota State University
GNC10-124	Interseeding Yellow-flowered Alfalfa into Crested Wheatgrass Stands for Multiple Uses and Benefits	\$9,060	Dr.Roger Gates SDSU Extension Lan Xu South Dakota State University Christopher Misar South Dakota State University
GNC10-130	Prairie Restoration: Effects of Burning, Herbicide, and Nitrogen Manipulation to Reduce Invasive Cool-Season Grasses	\$9,978	Dr.Sharon Clay SDSU Shauna Waughtel SDSU
GNC09-115	Restoring Native Tallgrass Prairie and Improving Profitability on Eastern South Dakota Grasslands with Intensive Early Stocking	\$10,000	Dr.Eric Mousel South Dakota State University Kyle Schell South Dakota State University
GNC08-098	Floristic Quality of Native Tallgrass Pastures in Eastern South Dakota	\$10,000	Dr.Alexander Smart South Dakota State University Matthew Nelson South Dakota State University
GNC03-021	Effects of Prairie Dogs on Sustainability of Cattle Grazing in Mixed-Grass Prairie	\$10,000	Dr.Alexander Smart South Dakota State University Matthew Stoltenberg South Dakota State University

ON FARM RESEARCH/PARTNERSHIP GRANTS

Project #	Project Title	SARE Support	Project Leaders
ONC21-084	Enhancing producer resources to build small meat processing capacity and local meat demand	\$39,862	Dr.Amanda Blair South Dakota State University
ONC21-093	Developing a guide for farmers or local machine shops to build an affordable roller-crimper by repurposing tillage equipment	\$39,996	Dr.Ryan Schmid Ecdysis Foundation
ONC17-026	Oat Variety Trial under Organic Management: Increasing Profitability for Organic Producers in the North Central Region	\$30,000	Dr.Melanie Caffe-Trembl South Dakota State University

YOUTH EDUCATOR GRANTS

Project #	Project Title	SARE Support	Project Leaders
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YENC23-199	YFS Sowing Opportunities for Youth Leadership (SOYL)	\$6,000	Sharon Oney Youth & Family Services, Inc.
YENC20-155	Cheyenne River Youth Project — Traditional Lakota Herbs, Fruits, and Roots Garden	\$4,000	Julie Garreau Cheyenne River Youth Project
YENC19-138	Planting the Pond	\$4,000	Dr.Kelsey Murray Western Dakota Tech Bryan Mitchell Western Dakota Tech
YENC15-084	Sustainable Agriculture Using All Five Senses	\$1,342	Linda Grace Freeman Irene-Wakonda School
YENC15-090	Producer-led, multi-topic, hands-on informational seminar to educate youth about sustainable and profitable meat goat production	\$1,000	Doug Pavel Butte Vista Farm
YENC12-041	Youth Livestock Skill-a-thon	\$1,993	Megan Nielson SDSU Extension
YENC08-002	Native American Roots & Shoots Farmers, Gardeners, & Gatherers Market & Educational Garden	\$2,000	Jason Schoch Jane Goodall's Roots & Shoots Native Amerias Proje
YENC08-003	Cover Crops - Grazing Alternatives Research Project	\$2,000	Steve Sutera Bon Homme 4-H Clubs & Bon Homme FFA Chapter
YENC08-004	Understanding the Historical Uses, Current Uses, and Importance of Native Plants on the Cheyenne River Sioux Reservation	\$2,000	Justine Kougl South Dakota State University Cooperative Extension

YOUTH GRANTS

Project #	Project Title	SARE Support	Project Leaders
YNC12-067	Cost Benefit Comparison of Raising Araucana Chicks into Egg Production Hens	\$400	Sierra Dennison
YNC09-037	Success of Late Planted Cover Crops	\$350	Lyndsey Effling
YNC09-040	Interseeding Clovers into Cool-Season Pasture	\$400	Austin Effling
YNC09-048	Beekeeping	\$400	Gretchen Rops
YNC08-005	Continuing Egg Production - A More Natural Way	\$400	Michael Anderson
YNC08-017	“Putting Poultry Out to Pasture”	\$130	Rex Schlicht
YNC08-018	Roaming & Raising Rabbits	\$100	Spens Schlicht
YNC08-023	Wild Berry Opportunities	\$400	Ashlee Stepp

**Total funding from the USDA SARE program to
South Dakota
\$4,794,402**



For further information on projects, contact North Central SARE at (612) 626-3113 or ncrsare@umn.edu.

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