

Missouri Producer Envisions Future Fiber Fuel Jobs

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In Kingsville, MO, a perennial and native seed crop producer has been developing and processing energy crops and agricultural residues into biomass engineered fiber fuel, and now he and other producers in MO could help determine the future of cellulosic-based biofuels.

As a producer, Steve Flick grows several hundred thousand pounds of seed in western Missouri. In addition, he is Chairman of the Board of Show Me Energy Cooperative, where his cellulosic biomass facility owned by 600 farmers is trying to establish an innovative, profitable, leading model for production of biomass-based fuels.

In 2007, Flick was curious about growing *Miscanthus*/elephant grass in the Midwest. He submitted a proposal to the NCR-SARE Farmer Rancher Grant Program and was awarded \$5,995 to learn more about planting and growing *Miscanthus* as a bioenergy crop in MO.

"Interest in developing energy from biomass continues to grow. Giant *Miscanthus* (*Miscanthus x giganteus*) is a vigorous perennial grass that can grow as tall as 14 feet," said Flick. "It has tremendous potential for bioenergy because it recycles nutrients, has a significant yield, has little or no need for chemical weed control or fertilizer, and will produce for many years."

Flick's original plan was to use a modified potato planter to plant the rhizomes, but decided it would be easier to work with a modified Bermudagrass Sprigger to plant the rhizomes. He thought this would allow them to take the planting to a larger level, but it caused problems because the rhizomes were not uniform.

"It took us about a day to figure all the metrics out- I wouldn't do it again with the same equipment- the rhizomes were too clean and the machine wanted to plant way too fast," explained Flick. "For the eight-acre field, it took four hours of planting and 40 hours of engineering for it to work right. Smaller and simpler methods seemed to work better. Not all of the rhizomes are uniform."

He said that planting the *Miscanthus* rhizomes was labor intensive, and suspects farmers will adopt small fields (less than five acres) to harvest. He thinks *Miscanthus* is most likely to be of interest to young, beginning farmers, displaced tobacco farmers, and truck gardeners. Small-city farmers might also be interested, he said.

Results achieved were measured by harvesting biomass tons/acre. Biomass harvested per acre was 6.7 tons in 2008 and 11.7 tons in 2009. Flick says this is more than the traditional switchgrass that is grown in the area. He learned that *Miscanthus* handled abundant rainfall and heat well. In fact, Flick suggested growing *Miscanthus* in very heavy wet soils, and not on hill ground.

As to the marketing of *Miscanthus*, Flick says a biorefinery, first and foremost, needs to be built. Flick suspects producers will organize, fund, and engineer plants like Show Me Energy Cooperative, depending on local interest. The cooperative presently licenses technologies to other producers groups so they can emulate their model.

[Miscanthus story continued on page 2.](#)



Steve Flick conducts a tour for NCR-SARE state coordinators, staff, and Administrative Council members, who visited Show Me Energy Co-op in November 2011.



Photo courtesy of University of Texas at El Paso.

New NCR-SARE Professional Development Program Award Honors Dr. Paula Ford

On October 8, 2011, our dear SARE colleague and friend, Dr. Paula Ford, passed away peacefully.

From 1991-1997 Dr. Ford served as the Program Coordinator for the Southern Region SARE program. She was the NCR-SARE Professional Development Program (PDP) Coordinator at Kansas State University for 11 years (1999-2009), and supported sustainable agriculture and SARE for more than 20 years.

Dr. Ford's passion for science-based research, coupled with her work in sustainable agriculture led to her pursuit of a doctorate in Human Nutrition, which she completed in the spring of 2009. She accepted the position of Assistant Professor in the Department of Health Promotion at the University of Texas at El Paso in June 2009.

Dr. Ford was instrumental in creating a vibrant and responsive NCR-SARE PDP that helped train and equip a new cadre of state sustainable agriculture educators across the region. Holding the program to high standards, she implemented outcome-based programming. Dr. Ford provided leadership as SARE developed meaningful needs assessments and outcomes throughout the region's programs to ensure impact at the educator level. She was instrumental in developing evaluation standards for all the regions and the entire program.

To honor Dr. Ford's contributions to the NCR-SARE PDP, the Administrative Council created the "Paula Ford Professional Development Program Proposal of the Year" award. Each year one Professional Development Program funded project in

the North Central Region will be given this special designation. The region will select the project that best exemplifies Dr. Ford's contributions and passion for evaluation, professional development and/or science-based research.

In 2011, the Paula Ford Professional Development Program Proposal of the Year award has been awarded to Dr. Tapan Pathak, Extension Educator at the University of Nebraska. At the University of Nebraska, Pathak applies climate variability and climate change science to communicate risks, adaptation, and mitigation strategies to diverse clientele across the state of Nebraska, and has assisted extension professionals and the agricultural community with their needs of climate information for decision-making.

The objective of Pathak's Professional Development Grant Program proposal is to provide regionally tailored climate change and sustainable agriculture professional development for Extension and Natural Resources Conservation Service educators through two activities: the creation of a Climate Change and Sustainable Agriculture Resource Handbook and curriculum, and two climate change and sustainable agriculture workshops.

"In the long-term, this program will result in educators and farmers making informed choices that lead to sustainable agriculture in the face of climate change," said Pathak. He continued, "It will also enable educators and farmers to tap into policy programs that reduce greenhouse gas emissions from agricultural lands and increase their stewardship of the land."

Miscanthus continued from page 1

"With today's tight capital markets I see these plants on a small scale of less than 150,000 tons per year and providing real jobs in rural America," said Flick. "Processing biomass is not easy, but the demand for renewable fuel is growing, especially for European export."

In May 2011, the USDA announced that it would award \$15 million to help more than 600 producers in 39 MO and KS counties establish biograss plots to provide alternative fuel to the Show Me Energy Cooperative under the Biomass Crop Assistance Program. The Show Me Energy project aims to reduce dependence on foreign oil and create jobs domestically, while at the same time demonstrating the sustainability gains of energy biomass.

The Biomass Crop Assistance Program area designation creates a "fuel shed" of 39 counties in western MO and eight adjacent eastern KS counties. Farmers in the fuel shed will grow dedicated energy crops of native grasses on marginal land, using best conservation practices to protect soil and water resources. Show Me Energy's processing plant in Centerview, MO, has been designated by USDA as a biomass conversion facility, and will take the energy crops grown by the farmers and use them to produce electric power and liquid, "drop-in" fuel that replaces gasoline/diesel in autos.

Read more about this NCR-SARE Farmer Rancher Grant project online on the SARE project reporting website. Simply search by the project number, FNC07-692, at <http://mysare.sare.org/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.



Miscanthus (*Miscanthus x giganteus*) is a vigorous perennial grass that can grow as tall as 14 feet. Photo by David Riecks.

SARE Publication Touts Benefits of Sheep Grazing in Northern Plains Grain and Alfalfa Systems



Grazing sheep reduce insect pest damage in alfalfa and wheat. Photo by Hayes Goosey, Montana State University.

Wheat and alfalfa growers in the Northern Plains face major challenges in managing pests and weeds on their farms. Arthropod pests alone cause an estimated \$260 million in alfalfa damage each year across the United States. Traditional control methods come with significant drawbacks: in many areas, stricter environmental regulations have led to bans on burning, and herbicide applications can be costly and management intensive.

SARE is pleased to release a new fact sheet, *Sheep Grazing to Manage Crop Residues, Insects and Weeds in Northern Plains Grain and Alfalfa Systems*. The fact sheet provides strategies for farmers and educators interested in using sheep for pest control.

A team of Montana State University (MSU) researchers have turned their attention to sheep as an alternative solution to controlling alfalfa weevil, wheat stem sawfly and other pests. In three separate on-farm studies funded by SARE, they developed recommendations for effectively using sheep for pest control.

Sheep grazing wheat stubble in the fall and spring killed 75 percent of wheat stem sawfly compared with a no-treatment control (42 percent sawfly killed), tillage (40 percent killed), and burning (45 percent killed).

On a commercial sheep operation in southwestern Montana, adult weevils were reduced in grazed plots by 35-100 percent, and larvae were reduced by 40-70 percent, depending on sampling date and study year.

The fact sheet presents results from the MSU research and covers key details of animal selection, stocking rates, timing, economics and other issues, all according to the farmer's objectives.

Because targeted grazing is gaining prominence as a land management tool, crop producers can usually find nearby sheep producers who provide this service. Grain farmers do not have to become sheep producers to take advantage of the strategies described in this fact sheet.

Along with effectively controlling pests, grazing also: provides an environmentally friendly alternative to herbicides and pesticides; increases soil nutrient cycling and soil carbon from sheep waste deposited across the field; provides an important tool for erosion control by allowing the grower to control the amount of remaining plant residue, whereas herbicides and cultivation can leave the soil completely exposed; and lowers equipment and fossil fuel costs through reduced tillage.

Using sheep as a management tool in cropping systems also benefits the sheep producer. Sheep are traditionally grazed on rangelands or pasture forages and supplemented during winter with harvested feeds. Using sheep to graze hay and grain residue not only provides a new and valuable feed source, it can also reduce costs and offer new business opportunities.

View the fact sheet online and download it at <http://www.sare.org/Learning-Center/Fact-Sheets/National-SARE-Fact-Sheets/> or contact NCR-SARE for more information at ncrsare@umn.edu.



Small ruminants (sheep and goats) are adaptable to many different production systems and can be raised with relatively few inputs, but they face huge production challenges. Control of internal parasites is a primary concern for many sheep and goat producers and is particularly challenging in humid regions. Read more about it in SARE's *Sustainable Control of Internal Parasites in Small Ruminant Production* fact sheet at <http://www.sare.org/Learning-Center/Fact-Sheets/National-SARE-Fact-Sheets>

Illinois Researchers Explore Use of Sorghum-Sudangrass In the Battle Against Weeds



Researchers at the University of Illinois (U of I) are using sorghum-sudangrass as a summer smother crop in the battle against Canada thistle. Photo courtesy of SARE Outreach.

Researchers at the University of Illinois (U of I) are using sorghum-sudangrass as a summer smother crop in the battle against aggressive perennial weeds.

Perennial weeds threaten the sustainability of farms. Perennial weeds can establish from seed or extensive, deep creeping roots. They are vigorous and very competitive against annual crops. At field days and other events U of I researchers John Masiunas, Dan Anderson, and Abram Bicksler heard about the challenge organic farmers were having with perennial weeds, the worst being Canada thistle.

U of I Professor, John Masiunas, is a weed scientist of more than 20 years, with a strong emphasis on the ecology of weeds and weed seed bank management. U of I Extension Specialist Dan Anderson has a long research and outreach history in sustainable and organic agriculture. In 2007, the two researchers, along with a U of I PhD student, Abram Bicksler, submitted a proposal to the NCR-SARE Research and Education Grant Program and were awarded \$144,003 to increase farmer knowledge and awareness of perennial

weeds, and increase skills and practices in managing perennial weeds using integrated management approaches.

Research has shown that when sown at higher rates than normally used for forage crops, sorghum-sudangrass hybrids make an effective smother crop. Their seedlings, shoots, leaves and roots secrete allelopathic compounds that suppress many weeds. The main root exudate, sorgoleone, is strongly active at extremely low concentrations, comparable to those of some synthetic herbicides. In their research, Bicksler and Masiunas used Canada thistle as a model weed to test different strategies with sorghum-sudangrass grass as a warm-season cover crop.

Bicksler and Masiunas developed a set of practices which employed a “many little hammers” approach to controlling perennial weeds without chemical inputs. The approach utilized timely tillage and mowing, coupled with a warm-season grass cover crop.

In 2007, Anderson began working with from nine to twenty farmers each summer on environmentally friendly ways to control Canada thistle using sorghum-sudangrass. The principles

and methods were taught to nearly 40 participating farmers in four Midwestern states over three years. Masiunas stressed that the Canada thistle problem is usually found in patches, and their management strategy was implemented where Canada thistle was present in patches.

Sorghum-Sudangrass story continued on page 5.



University of Illinois Extension Specialist, Dan Anderson, worked with 9 to 20 farmers each summer during their project on environmentally friendly ways to control Canada thistle using sorghum-sudangrass. Photo by David Riecks.

According to Anderson, those farmers now have a tool for managing perennial weeds without the use of chemical agents, using the following integrated approach for Canada thistle:

1. multiple tillage or mowing of the weed patch
2. final thorough tillage of thistle patch in early June
3. heavy planting of sterile sorghum sudangrass cover crop
4. mowing of sudangrass cover at 4 to 6 feet tall
5. allow sudangrass to tiller and regrow
6. final mowing in late fall or leave standing cover until spring

“Our project increased farmer, Extension educator, and scientist knowledge of key times during the life cycle of perennial weeds when the weeds are most susceptible to control,” explained Anderson. “It also improved knowledge of how sustainable management strategies can suppress perennial weeds.”

This was accomplished through on-line fact sheets, reports, presentations at farmer meetings, participatory on-farm research, farmer-to-farmer communication, and project participant co-learning. These outputs improved Extension, scientist, and farmer awareness of how integrated approaches can be used to manage difficult-to-control perennial weeds in sustainable and organic systems.

Through workshops, field days, and a mini-grant program they were able to share with farmers the results of their on-farm testing of research-based, chemical-free, thistle management practices. Farmers who participated in the project were paid a stipend at the beginning of the study and another stipend after they submitted a report.

According to Anderson, results varied, but in general, farmers who closely followed the management plan and planted the sudangrass cover crop before mid-June reported excellent control of Canada thistle during the growing season.

“Our audience was sustainable and organic farmers along with Extension educators,” said Anderson. “We measured success through direct farmer feedback during summer farm visits by the project coordinator. Our project will, in the intermediate term, change farmer, Extension, and scientist behavior and attitudes toward managing perennial weeds. We believe the method developed here has very high potential to contribute to the sustainability of organic farmers struggling with Canada thistle. This weed can be so invasive and render some fields useless. An organic solution will save some fields and encourage some farmers that realistic solutions do exist.”

Presentations were made at the Illinois Specialty Growers Convention, and the 2009 Midwest Organic Production and Marketing Conference. Two field days were held in 2009, both featured organic farms. Perennial weed management was discussed at these events. A total of at least 130 farmers, advisors, and Extension personnel attended these events. In 2010, a presentation was given at the MOSES Organic Farming Conference. Project information was also presented at the organic transition session of Organic University.

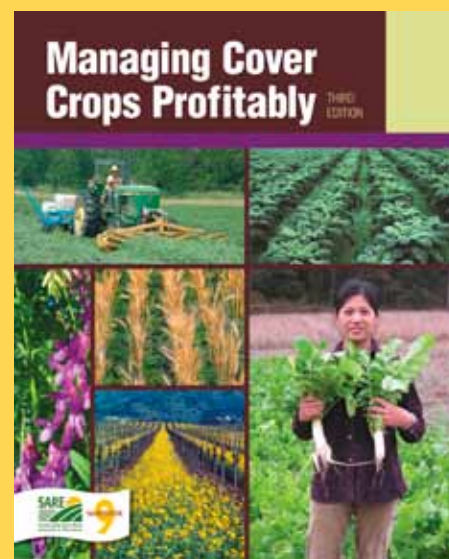
“Canada Thistle (*Cirsium arvense*) Suppression with Buckweat or Sudangrass Cover Crops and Mowing” was co-authored by Bicksler and Masiunas, and was published in the October-December 2009 issue of *Weed Technology*.

Read more about this NCR-SARE Research and Education project online on the SARE project reporting website. Simply search by the project number, LNC07-282, at <http://mysare.sare.org/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.



Sorghum-sudangrass hybrids make an effective smother crop. Their seedlings, shoots, leaves and roots secrete allelopathic compounds that suppress many weeds. Photo courtesy of SARE Outreach.

To learn more about using cover crops for weed suppression, take a look at *Managing Cover Crops Profitably*. The book explores how and why cover crops work and provides all the information needed to build cover crops into any farming operation. The book is available online at <http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition> or by dialing (301) 374-9696.





Fact Sheets Shed Light on North Dakota Riparian Ecosystem

Five new extension fact sheets on riparian ecosystems and grazing management recommendations within riparian ecosystems in North Dakota are now available. Photo by Miranda Meehan.

A graduate student from North Dakota State University created five extension fact sheets after monitoring and reporting on the riparian ecosystem associated with the Middle Sheyenne River, a perennial stream in eastern North Dakota.

Miranda Meehan first became interested in plant communities and best management practices when she attended ND Youth Range Camp for the first time. It eventually led her down a path to range management. Meehan had been researching plant communities in ND, becoming familiar with the ecological processes taking place within these communities. She wanted to do an inventory and condition determination of the grazed areas of the Middle Sheyenne's riparian corridor.

A riparian zone or riparian area is the interface between land and a river or stream. Riparian ecosystems are transitional ecosystems occurring between terrestrial ecosystems, where hydrology has little influence, and aquatic ecosystems where hydrology has a significant impact on ecosystem function and formation (Gregory et al. 1991; Naiman et al. 1993; Svejcar 1997). Plant communities associated with the riparian ecosystem of the Middle Sheyenne include: the greenline, woodlands, shrublands, grasslands, and wetlands.

"The majority of the riparian corridor of the Middle Sheyenne is forest, native rangeland, or undisturbed grassland. Currently, most of this area is utilized for

forage by domestic livestock in animal production systems," said Meehan. "Increased information concerning the plant communities and proper grazing management of the riparian corridors of the Middle Sheyenne will help ranchers utilize these areas in a way that is both sustainable and profitable."

In 2009, Meehan submitted a proposal to the NCR-SARE Graduate Student Grant Program and received \$9,528 to identify the natural sustainable plant communities and best management practices of the Middle Sheyenne watershed through ecological site description development, and provide rangeland technical assistance through media development and consultation with relevant land managers. She developed ecological site descriptions which are reports that describe an ecosystem's resources and dynamics. These reports allow landowners and/or land managers to identify, assess, predict change, manage, restore, and monitor ecosystems under their management. Her state-and-transition model synthesizes both science-based and local knowledge to formally represent the dynamics of the Middle Sheyenne's riparian corridor.

Meehan's ecological site descriptions and state-and-transition model describe channel morphology, community phases, and plant community components associated with each state. She hopes her description of environmental and anthropogenic disturbances triggering transitions between states and community phases

within the Middle Sheyenne's riparian ecosystem will help aid in the establishment of realistic goals for restoration and maintenance of natural, sustainable communities.

"The overall benefits really are seen at the landscape level, in recognizing the present state the riparian zones are in, then identifying the management strategies that best fit the landscape to reduce erosion, stabilize or improve the riparian zones, and improve water quality to downstream users," said Meehan.

A series of five NDSU extension fact sheets on riparian ecosystem and grazing management recommendation within riparian ecosystems were developed as a result of Meehan's project.

Read more about this NCR-SARE Graduate Student Grant project online on the SARE project reporting website. Simply search by the project number, GNC09-113, at <http://mysare.sare.org/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.



As part of her NCR-SARE project, Miranda Meehan developed a series of five extension fact sheets on riparian ecosystems and grazing management recommendations within riparian ecosystems in ND. To download these fact sheets, simply search by the project number, GNC09-113, at <http://mysare.sare.org/> or contact the NCR-SARE office for more information at ncrsare@umn.edu.

Listening Sessions with Ranchers and Graziers Guide Grant-Making Process for NCR-SARE

Contributions made by Pixie Martin



On July 19-21, 2011, a caravan of NCR-SARE representatives traveled from Bismarck, ND south through SD to the Sand Hills of NE, touring ranches and conducting group listening sessions with area ranchers and graziers.

Ranchers and graziers from NE, ND, and SD traveled significant distances to attend the tours and discussions, and they shared their perceptions of current trends in their communities and how to sustain their livelihoods and lifestyles in the future.

NCR-SARE listening sessions serve as an opportunity to bring together people with differing viewpoints within a community of place to share their perspectives of sustainability and agriculture. Reports resulting from the listening sessions serve as a respected information source on the status and prospects of sustainable agriculture and as such guide the Administrative Council that directs the NCR-SARE competitive grants and other programs.

NCR-SARE members looked, listened, and learned. En route to ranches, they saw the effects of the summer's serious flooding, witnessing sand bags on the banks of the Missouri River still standing to prevent further damage and flourishing grasslands and prairie wildflowers, blowing like flowing waves across the expansive plains. They experienced the distances between communities that residents of all three states experience as they travel to buy groceries, attend schools and community events, exchange information, and see how their peers ranch.

"Like nearly all those involved in production agriculture, ranchers depend on the sustainability of the resource they manage for their livelihood," explained Roger Gates of the SD Grassland Coalition.

"Maintenance of this extensive grassland resource, consisting almost entirely of privately owned land in the North Central region, is critical to the livelihood of these ranchers and the mutually dependent rural communities," Gates continued.

Formal listening sessions were conducted in Mandan, ND and Nenzl, NE. Before each session, participants toured local ranches, guided by the ranchers, seeing how sustainable grazing and grassland reclamation was done on ranches, ranging in size from 1000-7000 acres. In addition, NCR-SARE members visited two ranches in SD and toured one of them.

NCR-SARE members from the ND, SD, and NE were joined by colleagues from MI, TX, MO, and MN. Detailed planning and arrangements were made by a coordinator in each state and shared through conference calls with the wider planning team for several months prior to the tours. The goal of the listening sessions was to learn what was on the minds of ranchers as recipients of NCR-SARE grants, potential applicants for NCR-SARE grants, and participants who were unfamiliar with NCR-SARE. At each location, NCR-SARE representatives discussed the opportunities NCR-SARE offers through its programs so those interested in submitting grants could understand the process for applying and the types of proposals that are likely to be funded.

The rich experiences afforded through these sessions and tours is the fourth listening session conducted by the NCR-SARE Circle of Sustainability, a committee of NCR-SARE's Administrative Council, which works within communities to strengthen rural communities, increase farmer rancher profitability, and improve the environment by supporting research and education. Previous sessions were conducted in tribal areas of ND and SD, in soybean and corn growing areas in southwestern MN, and in urban areas of Nebraska. Those who have participated hope that future sessions will be hosted in the eastern parts of the region to discover what sustainable agricultural issues face Midwesterners and to introduce NCR-SARE Administrative Council members to the listening sessions and the beneficiaries of NCR-SARE's programs.

In order to generate and disseminate sound and practical information and to increase the sustainability of agriculture, NCR-SARE will continue to listen and respond to groups and communities of farmers, ranchers, researchers, and extension agents throughout the region. Suggestions of where listening sessions should take place are welcome. You can read more at <http://www.northcentralsare.org/About-Us/Regional-Initiatives/Listening-Sessions> and direct ideas to ncrsare@umn.edu.

Listening Session participants visited the Rock Hills Ranch in Lowry, SD. Lyle Perman (far right), a SD rancher, and Kyle Schell (second from right), a Range Management Outreach Coordinator at South Dakota State University, shared their perceptions of current trends in their communities and how to sustain their livelihoods and lifestyles in the future.



Photo by Ava Schrenk.



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Did you know NCR-SARE is on Facebook?
Keep track of our grant opportunities, events, and more.
Search for North Central Region SARE and “like” us!



ABOUT NCR-SARE

NCR-SARE has awarded more than \$40 million worth of competitive grants to farmers and ranchers, researchers, students, educators, public and private institutions, nonprofit groups, and others exploring sustainable agriculture in 12 states.

NCR-SARE funds cutting-edge projects every year through grant programs.

Are you interested in submitting a proposal for a NCR-SARE grant? Before you write the grant proposal, determine a clear project goal, and engage in sustainable agriculture research on your topic. Need help determining which program is best suited for your project? Go to <http://www.northcentralsare.org/Grants> for more information, or contact the NCR-SARE office.

For more information about any of the NCR-SARE grant programs, go to <http://www.northcentralsare.org/Grants> or contact the NCR-SARE office at 612-626-3113 or ncrsare@umn.edu.

Photo Credits for this issue of Field Notes: Marie Flanagan, Hayes Goosey, Miranda Meehan, Jacqueline K M Paulsen, David Riecks, Ava Schrenk, SARE Outreach, and University of Texas at El Paso.

GRANT PROGRAM TIMELINES*

Farmer Rancher Grant Timeline

Late August - Call for Proposals
Early December - Proposals Due
March - Funding Decisions
Spring - Funds Available to Recipients

Graduate Student Grant Timeline

Fall - Call for Proposals
January - Proposals Due
March - Funding Decisions
Fall - Funds Available to Recipients

Research and Education Grant Timeline

April - Call for Pre-Proposals
June - Pre-Proposals Due
Early Fall - Preproposal Status Notification
Late Fall - Full Proposals Due
March - Funding Decisions Made
Fall - Funds Available to Recipient

Professional Development Grant Timeline

Late March - Call for Pre-Proposals
Late May - Pre-Proposals Due
Late June - Preproposal Notification
Late August - Full Proposals Due
November - Funding Decisions Made
Early Spring - Funds Available to Recipient

Youth and Youth Educator Grant Timeline

Late August - Call for Proposals
Mid January - Proposals Due
March - Funding Decisions
Spring - Funds Available to Recipients

*Timelines are subject to change.

NORTH CENTRAL REGION SUSTAINABLE AGRICULTURE RESEARCH AND EDUCATION PROGRAM CONTACT INFORMATION
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Online: <http://www.northcentralsare.org/>
SARE Outreach: <http://www.sare.org/>



Photo by Jacqueline K M Paulsen.