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- Increasing Soil Health and Infiltration with Cover Crops [PDF]
  Proposal Number: FRG16-067
  Submitted to NCR SARE on December 3, 2015 at 2:33 PM ET.

  Attachments:
  - Heron Lake Watershed District Letter of Support [pdf format]
  - Ackermann Letter of Support [pdf format]

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2016 NCR SARE Farmer Rancher Grant
COVER SHEET

Project Title	Increasing Soil Health and Infiltration with Cover Crops
Proposal Number	FRG16-067
Project Description	This grant will help measure the benefits of cover crops focusing on increasing soil health and infiltration by using the Haney Soil Test and Infiltration Test
Farmer/Rancher	Vernon Uit De Flesch , Vernon Uit De Flesch
Mailing Address	32251 140th Street, Worthington, Minnesota 56187
County	Nobles
Phone	507-370-3980
E-mail	barbu@swwnet.com
Is the applicant a Farmer/Rancher?	yes
Type of Project	individual
Project Duration	2 years
Grant Funds Requested	$7,398
Have you submitted this, or a similar proposal, to NCR-SARE before?	No
Have you previously received a SARE Youth Educator Grant?	No
Does your project involve livestock?	no

SYSTEMS CATEGORY. This helps us sort proposals by topic for the review process. This is for SARE use only and will not affect your project review. Please select one category that best represents this project:

☑ Soil Management

CROP OR ENTERPRISE CATEGORY This is for SARE use only and will not affect your project review. Please select one category that best represents the crop or animal production enterprise being addressed:

☑ Grain Crops

USER NAME/EMAIL: BARBU@SWWNET.COM
PASSWORD: SARE1234

One Sentence Description of Project
This grant will help measure the benefits of cover crops focusing on increasing soil health and infiltration by using the Haney Soil Test and Infiltration Test.

Description of farm or ranch and project coordinator background
I grew up on a farm and started farming on my own in 1966. Currently, my wife and I own 475 acres and rent 640 acres. These fields include corn and soybean crop rotation and land enrolled in the Conservation Reserve Program. We also raise Holstein steers. We have worked with a private agronomist for about 20 years and my farming history is that I plowed everything with a moldboard plow for about 10 years.

After learning about other tillage practices, I tried mulch tilling. I began ridge tilling in 1984 because I wanted to protect the soil and reduce erosion. We rent out a quarter of our owned land to a young farmer who also ridge tills.

We would like to plant cover crops to further benefit the soil, prevent water and wind erosion, and to prove to other farmers that it is beneficial and can be done.

Problem
Soil erosion, infiltration, drainage, and tillage are popular topics within the agricultural community. Cover crops have been shown to reduce sediment, nutrients, and pesticide movement to surface waters. Cover crops protect agricultural fields from losing valuable top soil from erosion. The root systems break up compaction to allow better water infiltration. Nitrogen is drawn from deep below the surface back to the root zone for the next year's crop. Research is being done on cover crop establishment in many states across the Corn Belt. Local farmers have expressed interest in cover crops, but are hesitant to try them. There is a need for information about the soil health, infiltration, and potential yield benefits of cover crops. While there are some local farmers that have tried cover crop mixes to improve infiltration and soil structure, there is no side-by-side comparison data. This grant would provide the opportunity to gather soil health, infiltration, and yield data. That data would be shared with local farmers to promote the use of cover crops.

Solution
This project will include two 35-acre fields. One field will have cover crops planted and one will not. Both fields have the same cropping history of corn and soybeans; along with ridge till management practices. For this grant, I intend to seed a cover crop mix of Annual Rye, Tillage Radish, and Winter Wheat. This mix has been chosen to prevent soil erosion and improve infiltration. I also wanted to have a mix that would winter kill to avoid having to terminate the cover crop in the spring.

From each 35-acre field, soil samples will be collected. In addition to these samples, a control sample will be taken in a grassed buffer area. This sample will provide a standard for "good" soil condition compared to the crop fields. The Haney Soil Test will be done on these samples to determine micro community activities in the soil.

Along with the Haney Soil Test, an infiltration test will be completed in the fall and spring of 2016 and 2017. An infiltration rate (velocity at which water enters the soil) will be recorded in inches per hour. Infiltration is measured by placing a six-inch (height) by eight-inch (diameter) ring in the soil three inches deep, then adding sixteen ounces of water to the inside of the ring. The amount of time it takes for each inch of water to infiltrate the soil is recorded. This will give a farmers an idea of how much infiltration can be increased on their fields by using cover crops.
Yield data will be collected on the harvested crops. A simple per acre economic analysis of the different treatments will be done. Information will include cover crop seed, fertilizer, and crop seed costs, as well as crop yield and value, gross income, and net income.

Timeline
Spring 2016

1. Infiltration Test, Complete by May 15th on both fields by the HLWD

Fall 2016

1. Infiltration Test, Complete by December 1st on both fields by the HLWD
2. Haney Soil Test, Complete by December 1st on both fields by Steve Sodeman
3. Plant Cover Crops, Interseed the cover crop mix into a corn crop, by the end of August (weather and equipment availability dependent).

Spring 2017

1. Infiltration Test, Complete by May 15th on both fields by the HLWD

Fall 2017

1. Infiltration Test, Complete by December 1st on both fields by the HLWD
2. Haney Soil Test, Complete by December 1st on both fields by Steve Sodeman
3. Plant Cover Crops, Interseed the cover crop mix into a soybean crop, by the end of August (weather and equipment availability dependent).

Fall/Winter 2017

1. Outreach Mailing, Complete in November
2. Field Day, Complete in December

Outreach

The results from both tests will help local farmers to confidently determine the impact of management on soil characteristics. Adoption of cover crops is dependent upon presenting measurable results. This grant effort provides the opportunity for first-hand, measurable results in southwest Minnesota. Having this data will provide farmers with information that will assist them in determining how cover crops can be implemented in their farming operation.

A field day will be held at the end of the grant period. This field day will be held in partnership with Jerry and Nancy Ackermann, Jerry and Terry Perkins, Dave Christoffer, and Tim Hansberger. These farmers are currently working in partnership on a Minnesota Department of Agriculture Sustainable Agriculture Demonstration Grant. This grant also requires a field day. Partnering will make better use of time and resources, as well as provide a better opportunity for higher attendance than holding two separate events.

Outreach will also be done through a mailing. My intent is to work with the Heron Lake Watershed District (HLWD) to send a mailing to watershed farmers and agency personnel through the use of their mailing list. By working with the HLWD, I will be able to reach more farmers in the area. The mailing will include information on any findings from the research along with information on the field day's specific time, date, and location.

A spreadsheet will be used to track the number of people to determine attendance rates. I will also send a news release to local news media following the event.

Previous Research Review

This area of southwest Minnesota has seen a handful of research projects within the last few years of both SARE and non-SARE funded grants. Most of the projects included getting cover crops established on corn and soybean crop fields. I have been gathering information from area farmers that have established cover crops. That information was used to choose my seed mix, timing for seeding the cover crop, and how to seed the cover crop mix. With this grant, the project would provide the opportunity for first-hand, measurable results in southwest Minnesota on soil health and increased infiltration. Having this data will provide southwest Minnesota farmers with

information that will assist them in determining how cover crops can be implemented in their farming operation and how investing in cover crops can help improve their farms.

The Heron Lake Watershed District is currently working under an EPA 319 grant to demonstrate cover crops. Some of the field work includes tillage transects and water infiltration tests. Another part of this 319 grant was forming a committee of community members, farmers, bankers, cooperatives, crop consultants, and crop insurance agents. The goal is to gather input from this committee to make suggestions on cover crop promotion and implementation within the watershed. I was asked to be on the committee and I have attended field days, meetings, and presentations. We were asked to brainstorm ideas for cover crop research projects. The committee suggested a side-by-side trial containing two 40-acre plots, one with cover crops, one without. With these plots, the research would be done on infiltration, soil health, cost, and yield data. Being part of this committee was a major push for completing a SARE grant to help farmers understand the soil health benefits of implementing cover crops.

Through the successful and unsuccessful cover cropping efforts of local farmers, I have been able to gather information about cover crop seed mixes, seed timing, and equipment. All of these parameters have been taken into consideration for making this grant successful.

Evaluation

Environmental benefits:

Cover crops reduce erosion, decrease soil compaction, and increase water infiltration to prevent runoff. This project would provide the opportunity to measure changes in soil fertility and soil health through the use of the Haney Soil Test. These test results would be used to provide a dataset with which to analyze the impact of cover crop management and provide sufficient data points to statistically analyze the impact of that management. In addition, I will work with other local farmers to host a field day. This field day would provide an opportunity to have a model of managed cover crops and measured impacts on known indicators of soil health and infiltration. This grant effort provides the opportunity for first-hand, measurable results in southwest Minnesota. Having this data will provide southwest Minnesota farmers with information that they are seeking and will assist them in determining how cover crops can be implemented in their farming operation and how cover crops can help improve water quality in local streams.

Steve Sodeman, Certified Crop Advisor, has evaluated both 35-acre fields. The two fields will have a Haney Soil Test completed for the higher elevation soils and the lower elevation soils. Each field will have two test locations. A non-ag site, with continuous grass cover, will serve as a control sample along with the two crop fields. The following sampling procedures will be used to ensure an accurate representation of each field site. Sampling Information: 1) Use a standard soil core sampler, drill corer, or spade to obtain a furrow slice soil sample. 2) Take 10-15 cores either 0-6 or 0-8 inches deep if wanting fertility recommendations. 3) Combine all the cores, preferably in a plastic-lined paper soil bag, to make one composite sample. 4) Add all sample identification information you need to the sample bag and ship the samples in a regular box. 5) Mark each sample and the shipping container Haney Test or Soil Health Test to ensure proper handling on the lab end. 6) Include any paperwork and soil submittal forms that allow the lab to identify the customer/grower and the tests desired.

Economic benefits:

An internet search provided information about cover crop economic benefits. However, most of the information was for states other than Minnesota. It is my belief that before farmers will begin using cover crops more extensively, they need to have information from some place close to their individual farms. This grant will provide the opportunity to gather economic data in southwest Minnesota and the ability to share the results with local farmers.

Social benefits:

There are a number of farmers coming together to work on options for better soil health and increased yields

through cover crops. Local farmers are turning to other farmers for guidance and assistance. This grant provides a great opportunity to obtain first-hand information that measures the benefits cover crops through the Haney Soil Test and an infiltration test. A field day will be held at the end of the grant period to help quantify all the data.

Budget

Category	Line Item Description	Amount
Personnel	planning, compiling results, and field day	$600
Materials and Supplies	Cover Crop Seed	$2,920
Travel	Travel to and from Field Day, 40 miles at $0.575	$23
	Seed Pick Up	$58
Other Direct Costs	Steve Sodeman, Soil Samples	$720
	Brian Bigeler, Cover Crop Applicator	$1,050
	Heron Lake Watershed District, Infiltration Test	$190
	Haney Soil Test	$495
	Shipping Soil Samples	$40
	Field Day Mailing	$1,222
	Field Day Rental	$80
Equipment, Permanent fencing, Perennial seed, or Livestock	None	$0
Total Request		**$7,398**

Budget narrative and justification
Personnel

Vernon Uit De Flesh: planning, compiling results, and field day - 30 hrs @ $20/hr = $600.00

Materials and Supplies

Cover Crop Seed Mix for 35 acres:
Spring Wheat 19.6 lbs/ac=686 lbs X $0.22/lbs= $150.92
Tillage Radish 4.8 lbs/ac=168 lbs X $3.00/lbs= $504.00
Annual Ryegrass 23 lbs/ac=805 lbs X $1.00/lbs= $805.00
Total Cost= $1,459.92 X 2 years= $2,919.84 = $2,920.00

Travel (use $.575/mile for travel reimbursement)

Travel to and from field day: Home to Okabena, MN= 20 miles X 0.575 = 11.50 X 2 (Round Trip) = $23.00

Seed Pick Up: Home to Lakefield, MN=25 miles X $0.575=$14.38 X 2 (Round Trip) = $28.75 X 2 years = $57.50 = $58.00

Other Direct Costs (use for communications, photocopying, consultants, services conferences-meetings-workshops, speaker/trainer fees, honoraria/stipends, equipment rental, land-use charges, and fabrication of equipment.)

Collecting Soil Samples, Steve Sodeman: $60.00/hr X 6 hrs=360.00 X 2 years = $720.00

Broadcast Seed Cover Crop Mix, Brian Bigler: $15.00/ac X 35 ac=$525.00 X 2 years = $1,050.00

- BEST TIME, LAST WEEK IN AUG.

Heron Lake Watershed District, Infiltration Test: $31.67/hr X 3 hrs=$95.01 X 2 years =$190.02 = $190.00

Haney Soil Test-$49.50 X 5 soil zones = $247.50 X 2 years = $495.00

Shipping Soil Samples to the Lab: $20.00 X 2 years = $40.00

Field Day Mailing
Postage: $0.49 X 350= $171.50
Envelopes and Printing: $3.00 X 350= $1050.00
Total = $1221.50 = $1,222.00

Field Day Rental, Okabena American Legion Hall = $80.00

WATERSHED ASSISTANCE THROUGH EDUCATION & RESOURCES
HERON LAKE WATERSHED DISTRICT

Heron Lake Watershed District
PO Box 345, Heron Lake, MN 56137
507-793-2462 ~ FAX 507-793-2253
Email: jan.voit@mysmbs.com
Web: www.hlwdonline.org

November 17, 2015

Farmer Rancher Grant Program
NCR-SARE
120 Biosystems and Ag Eng Bldg
University of Minnesota
1390 Eckles Avenue
St. Paul, MN 55108

Dear Farmer Rancher Grant Program:

This correspondence is regarding Vern Uit de Flesch's grant application entitled "Increasing Soil Health and Infiltration Rates with Cover Crops". The Heron Lake Watershed District (HLWD) strongly supports this effort to learn more about the effects that cover crops have on soil fertility, soil health, and water quality improvement. Having information that is from southwest Minnesota will help us to promote cover crop adoption in the Heron Lake watershed.

The HLWD will assist with infiltration testing, field day promotion, and the field day. We look forward to working with Vern on this endeavor.

Thank you for your consideration.

Sincerely,

Jim Buschena
President

November 17, 2015

Farmer Rancher Grant Program
NCR-SARE
120 Biosystems and Ag Eng Bldg
University of Minnesota
1390 Eckles Avenue
St. Paul, MN 55108

Dear Farmer Rancher Grant Program:

This letter is regarding Vernon Uit de Flesch's grant application entitled "Increasing Soil Health and Infiltration with Cover Crops". As an active farmer we have been involved with on-the-farm research and test plots. Over the past couple years, our farm has partnered with various conservation groups and other local farmers on implementing cover crops, including field days in 2012, 2013, 2014 and 2015. Currently, our farming operation consists of 1,050 acres of corn, soybeans, and alfalfa on a crop rotation. In 2015, we seeded 100% cover crops on all our farms. We strongly support this effort to learn more about the effects that cover crops have on soil fertility, soil health, and infiltration improvement. We look forward to any research findings that is from our area that will help us to encourage cover crop adoption within the farming community. We feel like cover crops have numerous benefits and we are only starting to discover what those benefits are.

We look forward to learning more about the benefits of using cover crops through Vernon's research.

Sincerely,

Jerry D Ackermann Nancy K Ackermann

Nancy and Jerry Ackermann

39750 820th Street,
Lakefield, MN 56150

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