How healthy is your soil?

August 2018

The Minnesota Board of Water and Soil Resources (BWSR) received $253,000 in 2015 from the Minnesota Environment and Natural Resources Trust fund. This purpose of these funds is to accelerate the adoption of cover crops with the goal of reducing pollution runoff and sedimentation, improve water quality, and improve soil health in southeast Minnesota through education, outreach, and research. This project concluded in June 2018 and marks the beginning of BWSR's work to promote conservation through cover crops and soil health. Throughout this project, everyone involved learned about the benefits of cover crops, the opportunities and challenges associated with them, and the benefits of enhancing soil health over time.

Field day held in Oronoco at one of the project demonstration sites.

Producers throughout the area worked with Soil Health Technician Dean Thomas, who works out of the Fillmore Soil and Water Conservation District office in Preston. Thomas has established approximately 2,000 acres of cover crop demonstration projects to show their effectiveness in reducing soil erosion and runoff, improving water quality, improving the health of the soil, and providing secondary benefits of increased wildlife habitat. Thomas completed a cover crop seeding and management plan for each producer and then payment is provided to offset additional costs of incorporating cover crops into routine cropping systems for two or three years.

Thirteen producers planted cover crops in the fall of 2016 and 2017 as part of this project. University of Minnesota staff spoke to these producers about the benefits they have observed on the main crops that followed those cover-cropped fields this year, along with the costs of terminating cover crops before planting. One producer has a dairy farm where the cover crop followed corn silage, with the field planted back to corn silage in a rotation with alfalfa. Two producers raise peas for canning along with corn and soybeans. Two producers have beef cattle, and one was able to graze the cover crop in the fall of the year. The rest of the producers raised corn grain and soybeans.

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Spring emergence of cover crops on one of the projects demonstration sites

A total of thirteen landowners participated in the project with cover crops located at sixteen different sites over a two year time frame. During the first year, four of the producers planted a mix of four or more cover crop species, six went with two or three species, and three planting winter cereal rye. The specific seed mixes varied. Rye, triticale, turnip, rapeseed, and wheat were the most common species, but 24 different species were planted on at least one farm. There were eight different legume species, four brassicas, and twelve grains or non-legumes. Most of the producers used a drill or row planter to plant the cover crop. One broadcast it and worked it in with a light tillage operation and two used an aerial applicator. Participating landowners experimented with similar seed mixes in the second year of the project.

Dr. William Lazarus with the University Of Minnesota's Department Of Applied Economics analyzed the costs and benefits in order to show the diversity of situations in southeastern Minnesota and the issues that producers face in managing cover crops that are economically beneficial. The goal is to help producers make informed choices about cover crop adoption and management. A recent report outlining the findings of the project can be found here.

Left: Dr. Bill Lazarus, U of M Applied Economics, talks about cover crop economic results.

Over the course of the project, 11 winter workshops attended by 832 people and nine field days attended by 575 people were held to provide guidance on cover crop use from researchers, agriculture professionals, and farmers.

Left: Dan Nath, USDA-NRCS, talk about soil health and the positive impacts of cover crops/no till.

Dr. Scotty Wells, University of Minnesota, talks about the Forever Green Initiative

These field days and workshops provide farmers and others with information on the benefits of cover crops, establishment recommendations, species selection, and termination logistics, on-farm benefits to producers, and benefits to soil health and water quality. These events have been well attended, demonstrating the interest in cover crops and the need for these efforts.

A rainfall simulator was purchased for this project to provide a portable station where demonstrations of different land management practices during a rain event can be provided at field days, workshops, and other educational events. This simulation is beneficial in illustrating the effectiveness of cover crops in reducing soil erosion and runoff in a region of the state where cover crops are greatly needed and can have significant positive environmental impacts.

Rainfall simulator in use at the field day in Eyota.

Additional project partners include the University of Minnesota Extension, which is helping develop and conduct the workshops and field days, coordinate the participation of local and regional experts for additional educational events, and develop and disseminate educational materials. The University of Minnesota Forever Green Initiative, Natural Resource Conservation Service (NRCS), and Minnesota Department of Agriculture (MDA) have all assisted with guidance, resources, and training efforts.

In the fall of 2016 and 2017, soil samples were taken after harvest on demonstration project fields with cover crops as well as adjacent non-cover crop fields to measure differences in soil biological activity. Both the Phospholipid Fatty Acid (PLFA) test and Haney test were run to give producers an idea of the microbial community in their fields when cover crops are incorporated. These tests are not done frequently and will provide an additional measurement in the benefits of cover crops.

Left: BWSR staff Adam Beilke collects soil samples from cover crop field

Future Steps: BWSR is working with the Univeristy of Minnesota through the recent formation of the Minnesota Office for Soil Health. The project was instrumental in setting the groundwork for this new venture. Click here to learn more about the Minnesota Office for Soil Health.

For more informaton on this project, contact Matt Drewitz (507-344-2821) or Adam Beilke (507-206-2892) at the Minneota Board of Water and Soil Resources.

CLEAN WATER LAND & LEGACY AMENDMENT