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Progress Report

2022 South Dakota Nutrient Research and Education Council Invited Proposals

Progress Report Title:	Interim Report - Due July 1, 2022
Applicant Name:	Peter Kovacs
Application Title:	Influences of manure and fertilizer application in corn-soybean-spring wheat/cover crops rotation on Water availability and quality, Soil Fertility, and Crop Yield-YEAR 2
Application ID:	1833
Review Deadline:	07/1/2022 11:59 PM

Interim Report - Due July 1, 2022

Project

	Start Date	End Date
Start and End Dates of Funding:	01/1/2022	12/31/2022
Title of Project:	Influences of manure and fertilizer application in corn-soybean-spring wheat/cover crops rotation on Water availability and quality, Soil Fertility, and Crop Yield-YEAR 2.	
Project Description:	<p>Soils managed with manure and inorganic fertilizers have sometime issues of higher N and P losses. Therefore, diversifying the crop rotations with the inclusion of cover crops can help in minimizing the N losses while maintaining adequate N supply for crop yields. Cover crops are beneficial in enhancing soil health and water quality. Further, manure and fertilization management with cover crops can improve soil water storage and availability, and the crop yield. Thus, the proposed project will focus on comparing the soil organic carbon, N losses, soil health, water retention and availability, and crop yield as impacted by different manure and inorganic nitrogen (N) fertilizer rates under corn-soybean-spring wheat/cover crop rotation. The current proposal is an extension of these activities with the inclusion of cover crops and adding new objectives that include water retention and availability and nitrate leaching leveraging the previous work. This proposal will help in incorporation of cover crops at both sites, and changing the corn-soybean rotation to corn-soybean-spring wheat/cover crop rotation.</p>	

Publications

Publication Title:	-
Publication Date:	07/1/2022
Status:	-
Publication Description:	.

Influences of manure and fertilizer application in corn-soybean-spring wheat/cover crops rotation on Water availability and quality, Soil Fertility, and Crop Yield- YEAR 2.

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Collaborators: Anuoluwa Sangotayo (PhD student started in Fall 2020).

Summary. Soils managed with manure and inorganic fertilizers have sometime issues of higher N and P losses. Therefore, diversifying the crop rotations with the inclusion of cover crops can help in minimizing the N losses while maintaining adequate N supply for crop yields. Cover crops are beneficial in enhancing soil health and water quality. Further, manure and fertilization management with cover crops can improve soil water storage and availability, and the crop yield. Thus, the proposed project will focus on comparing the soil organic carbon, N losses, soil health, water retention and availability, and crop yield as impacted by different manure and inorganic nitrogen (N) fertilizer rates under corn-soybean-spring wheat/cover crop rotation. The current proposal is an extension of these activities with the inclusion of cover crops and adding new objectives that include water retention and availability and nitrate leaching leveraging the previous work. This proposal will help in incorporation of cover crops at both sites, and changing the corn-soybean rotation to corn-soybean-spring wheat/cover crop rotation.

Goal and Objectives: The primary goal of this project is to provide information to producers on the optimum rates of inorganic fertilizer and manure for enhancing soil fertility and crop yields without losing extra N and P losses. The specific objectives of the project are to:

Objective 1. Soil Organic Carbon, Water Retention and Availability. Assess the impacts of manure and inorganic fertilizer applications under corn-soybean-spring wheat-cover crop (multispecies cover crops that include radish, clovers, sorghum, turnips, oats) rotation on soil water retention and available water content for 0-10, 10-20, 20-30 and 30-40 cm depths at two sites (Beresford and Brookings).

Objective 2. Soil Health and Water Quality. Assess the impacts of manure and inorganic fertilizer applications on water quality (nitrate leaching) (0-120 cm depth).

Objective 3. Crop Yield. Assess the impacts of manure and inorganic fertilizer applications on crop growth parameters, nutrients in plants, and N use efficiency.

The soybean plots were established on May 19th in Beresford, and on May 20th near Brookings. Early season stand counts have been completed.

We are going to collect soil samples in the coming weeks for the water retention and water availability objectives and will follow the plant growth parameters of the treatments.