

ECONOMICS of Soil Health Systems

Le Sueur Watershed of Minnesota



FARM SIZE

550 crop acres



CROPS GROWN

Corn and soybean



SOIL TEXTURE

Silty clay loam



SOIL HEALTH MANAGEMENT SYSTEM

Reduced tillage production, including strip-till for corn and no-till for soybean

Corn-soybean rotation

Cow manure for fertilizer

Monitoring of soil nutrient levels



FARM NET INCOME

Corn
\$23.92/acre

Soybean
\$0.19/acre

INTRODUCTION

The Tom Klug farm in the Le Sueur Watershed of Minnesota increased profitability with a soil health management system (SHMS) of cover crops and sustained crop rotation. Reduced tillage for corn and no-till for soybean have been applied for 20 years with cover crops introduced to the system during recent years.

Benefits of the SHMS reported by the farmer:



→ LESS SOIL COMPACTION

→ IMPROVED WATER INFILTRATION

→ LESS SOIL EROSION

→ REDUCED FERTILIZER APPLICATION

ADDITIONAL INFORMATION ON THE FARM IS AVAILABLE IN A REPORT AND VIDEO PRESENTATION AT WWW.NACDNET.ORG/SOIL-HEALTH-ECONOMICS.

METHODS

The Soil Health Institute conducted an interview to obtain production information for evaluating economics of the soil health system based on partial budget analysis. In this approach, the benefits and costs of a soil health system are assessed by calculating changes in revenue and expenses before and after adoption of that system. The change in net farm income associated with adopting a SHMS is calculated as shown below and presented in Table 1.



**Net change in farm income = Benefits - Costs, where:
Benefits = Reduced Expenses + Additional Revenue
Costs = Additional Expenses + Reduced Revenue**

A DETAILED DESCRIPTION OF THE METHODOLOGY FOR PARTIAL BUDGET ANALYSIS CAN BE FOUND AT [HTTPS://SOILHEALTHINSTITUTE.ORG/ECONOMICS](https://soilhealthinstitute.org/economics).

FINDINGS

Initial Management System and Reduced Expenses

- The initial management system included reduced tillage production without cover crops.
- Phosphorous and potassium expenses were reduced by \$24.83/acre for both crops.
- Nitrogen expense was reduced by \$23.18/acre for corn.
- Total reduced expenses were \$49.16/acre for corn and \$25.43/acre for soybean.

FARM #14

ECONOMICS of Soil Health Systems: Le Sueur Watershed of Minnesota

Soil Health Management System and Additional Expenses

- The soil health management system adopted was reduced tillage production with cover crops on approximately 50% of crop acreage.
- Cover crop seed costs were \$9.00/acre before planting both corn and soybean.
- Winter/cereal rye was planted with a no-till drill after harvest of the preceding rotation crop.
- Corn and soybean were planted into living cover crops.
- Terminating the cover crop with herbicide was not an additional expense.
- Total additional expenses were \$25.24/acre for corn and soybean.

Soil Health Management System Impact on Farm Income

- Reduced expenses were \$23.92/acre greater than additional expenses for corn.
- Reduced expenses were \$0.19/acre greater than additional expenses for soybean.
- Reduced expenses were achieved without decreased yields for both crops.
- **Net farm income increased \$12.06/acre for corn and soybean in a 50%-50% rotation.**

Table 1. Partial Budget¹ Analysis, 20 Years with a Soil Health Management System on a 550-Acre Farm, \$ per Acre per Year (2019 Dollars).

Expense Category	Corn		Soybean	
	BENEFITS	COSTS	BENEFITS	COSTS
	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE
Seed	0.00	9.00	0.00	9.00
Fertilizer & Amendments	48.01	0.00	24.83	0.00
Pesticides	0.00	0.00	0.00	0.00
Fuel & Electricity	0.00	1.73	0.00	1.73
Labor & Services	1.15	5.19	0.60	5.19
Equipment Ownership	0.00	9.32	0.00	9.32
Total Expense Change	49.16	25.24	25.43	25.24
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE
Yield, bu./acre	0.00	0.00	0.00	0.00
Price Received, ² \$/bu.	4.20	4.20	10.00	10.00
Revenue Change	0.00	0.00	0.00	0.00
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	49.16	25.24	25.43	25.24
Change in Net Farm Income	23.92		0.19	

¹ Expenses and expected yields based on farmer reported production practices. (<https://soilhealthinstitute.org/economics/>)

² Commodity prices applied to yields based on long-term average prices. Irwin, S. "IFES 2018: The New, New Era of Grain Prices?" Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, January 11, 2019.