

ECONOMICS of Soil Health Systems

Yellow River and Upper Iowa River Watersheds of Iowa



FARM SIZE

1,040 crop acres



CROPS GROWN

Corn:
692 acres
Soybean:
346 acres



SOIL TEXTURE

Silty clay loam



SOIL HEALTH MANAGEMENT SYSTEM

No-till production
Cover crops
Soils amended with
dairy manure
Grid sampling to
monitor nutrient
levels and for
variable rate
applications



NET INCOME INCREASE

Corn
\$32.72/acre
Soybean
\$24.26/acre

FARM #20

INTRODUCTION

The Don Elsbernd farm in the Yellow River and Upper Iowa River Watersheds of Iowa increased profitability by increasing yields for corn and soybean with a soil health management system (SHMS) of no-till production and cover crops. No-till and strip till have been practiced for 25 years and cover crops planted for 10 years.

Benefits of the SHMS reported by the farmer:



→ IMPROVED WATER INFILTRATION

→ DECREASED EROSION

→ REDUCED PHOSPHOROUS AND POTASSIUM APPLICATIONS

→ INCREASED SOIL ORGANIC MATTER

→ IMPROVED WEED MANAGEMENT

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 was conventional tillage.
- Post-plant weed management was exclusively with herbicide in conventional tillage.
- A field trip with a chisel plow and a field cultivator were eliminated for both crops.
- Phosphorous and potassium were reduced 20% for both crops.
- Total reduced expenses were \$33.94/acre for both corn and soybean.



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**United States
Department of
Agriculture**
Natural Resources Conservation Service

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Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till production with cover crops.
- Cover crops were planted on as much acreage as weather conditions permitted.
- Winter/cereal rye was drilled in the fall, after the preceding crop harvest.
- Corn and soybean were planted into the living cover crop with a no-till planter.
- Termination of cover crops with herbicide was not an additional expense.
- Cover crop seed costs were \$10.00/acre for both corn and soybean.
- Winter/cereal rye was custom drilled at an expense of \$16.00/acre.
- Post-harvest expenses due to increased yields were hauling and check-off fees for corn and soybean, as well as additional drying cost for corn.
- Total additional expenses were \$43.22/acre for corn and \$39.68/acre for soybean.

Soil Health Management System Impact on Farm Income

- Additional expenses were \$9.28/acre greater than reduced expenses for corn.
- Additional expenses were \$5.74/acre greater than reduced expenses for soybean.
- Yield increased by 10 bu./acre, providing additional revenue of \$42.00/acre for corn.
- Yield increased by 3 bu./acre, providing additional revenue of \$30.00/acre for soybean.
- **Net farm income increased by \$32.72/acre for corn and \$24.26/acre for soybean.**

Table 1. Partial Budget¹ Analysis, 25 Years with a Soil Health Management System on a 1,040-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	10.00	0.00	10.00
Fertilizer & Amendments	7.64	0.00	7.64	0.00
Pesticides	0.00	0.00	0.00	0.00
Fuel & Electricity	3.30	1.03	3.30	1.03
Labor & Services	7.81	20.69	7.81	20.69
Post-harvest Expenses	0.00	4.50	0.00	0.96
Equipment Ownership	15.19	7.00	15.19	7.00
Total Expense Change	33.94	43.22	33.94	39.68
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE
Yield, bu./acre	10.00	0.00	3.00	0.00
Price Received, ² \$/bu.	4.20	4.20	10.00	10.00
Revenue Change	42.00	0.00	30.00	0.00
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	75.94	43.22	63.94	39.68
Change in Net Farm Income	32.72		24.26	

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.