

ECONOMICS of Soil Health Systems

Inland Bays Watershed of Delaware



FARM SIZE

1,000 crop acres



CROPS GROWN

Corn and soybean



SOIL TEXTURE

Sandy loam



SOIL HEALTH MANAGEMENT SYSTEM

No-till production

Cover crops

Poultry litter for
fertilizer

Monitoring of soil
nutrient levels



NET INCOME INCREASE

Corn

\$42.38/acre

Soybean

\$35.24/acre

INTRODUCTION

The Blaine Hitchens and Chip Baker farm in the Inland Bays Watershed of Delaware increased profitability by decreasing expenses with a soil health management system (SHMS) of no-till production with cover crops. No-till production has been practiced for more than 20 years and cover crops planted for four years. Cover crop species included hairy vetch, cereal rye, annual ryegrass, and tillage radish.

Benefits of the SHMS reported by the farmer:



→ **DECREASED EROSION**

→ **INCREASED WATER INFILTRATION**

→ **REDUCED FERTILIZER APPLICATIONS**

→ **REDUCED SOIL COMPACTION**

→ **IMPROVED WATER HOLDING CAPACITY**

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 production.
- Post-plant weed management was exclusively with herbicide for both crops.
- Four tillage activities were eliminated for corn and soybean.
- Potash and lime expense reductions were \$50.60/acre for corn and soybean.
- Nitrogen for corn was reduced 100 lbs./acre with UAN 32%.
- Irrigation was reduced by two applications for both crops.
- Total reduced expenses were \$164.51/acre for corn and \$104.13/acre for soybean.

FARM #7

ECONOMICS of Soil Health Systems: Inland Bays Watershed of Delaware

Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till with cover crops on all acreage.
- Cover crops were broadcast after harvest of the preceding crop and incorporated with vertical tillage.
- Cover crop seed expense was \$35.00/acre for corn and \$22.00/acre for soybean.
- Both crops were planted into living cover crops which were terminated with herbicide which was not an additional expense.
- Additional nutrient amendments were \$6.00/acre for corn and soybean.
- Additional nitrogen for corn was 75 lbs./acre with urea.
- Total additional expenses were \$122.13/acre for corn and \$68.89/acre for soybean.

Soil Health Management System Impact on Farm Income

- Reduced expenses were \$42.38/acre greater than additional expenses for corn.
- Reduced expenses were \$35.24/acre greater than additional expenses for soybean.
- Reduced expenses were achieved without decreases in crop yields.
- **Net farm income increased \$42.38/acre for corn and \$35.24/acre for soybean.**

Table 1. Partial Budget¹ Analysis, 20 Years with a Soil Health Management System on a 1,000-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	35.00	0.00	22.00
Fertilizer & Amendments	97.80	39.42	50.60	6.00
Pesticides	6.51	14.75	2.75	11.23
Fuel & Electricity	10.52	3.58	9.36	3.18
Labor & Services	18.16	10.99	14.64	9.08
Equipment Ownership	31.52	18.39	26.78	17.40
Total Expense Change	164.51	122.13	104.13	68.89
	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	164.51	122.13	104.13	68.89
Change in Net Farm Income	42.38		35.24	

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.