

ECONOMICS of Soil Health Systems

Tippecanoe Watershed of Indiana



FARM SIZE

3,500 crop acres



CROPS GROWN

Corn and soybean



SOIL TEXTURE

Various soil textures ranging from silty loam to heavy clay



SOIL HEALTH MANAGEMENT SYSTEM

No-till production
Cover crops
Zone sampling as determined by soil type to monitor nutrient levels and for variable rate fertilizer application



NET INCOME INCREASE

Corn
\$56.52/acre
Soybean
\$46.12

INTRODUCTION

The David Ransbottom farm in the Tippecanoe Watershed of Indiana increased profitability by decreasing production costs and increasing yields for corn and soybean with a soil health management system (SHMS) of no-till production and cover crops. No-till production has been practiced for approximately 30 years and cover crops planted for 12 years.

Benefits of the SHMS reported by the farmer:



→ **DECREASED EROSION**

→ **IMPROVED WATER INFILTRATION**

→ **IMPROVED RESILIENCE TO WET CONDITIONS**

→ **MORE TIMELY ACCESS TO FIELD OPERATIONS**

INCREASED ORGANIC MATTER

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 in conventional tillage.
- Three tillage field trips were eliminated for both crops.
- One insecticide spray trip was eliminated for corn and soybean.
- One herbicide spray trip was eliminated for soybean.
- Herbicide rate was reduced in one spray application for corn.
Nitrogen was reduced in corn production 10 lbs./acre with UAN 32%.
- Field maintenance decreased from five days to one day per year due to decreased erosion.
- Total reduced expenses were \$62.86/acre for corn and \$60.92/acre for soybean.

FARM #25

ECONOMICS of Soil Health Systems: Tippecanoe Watershed of Indiana

Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till production with cover crops.
- Annual rye cover crop seed cost was \$16.00/acre before planting both corn and soybean.
Aerial application of cover crop seed was \$15.00/acre.
- Cash crops were planted into living cover crops, and termination with herbicide was not an additional expense.
- Post-harvest expenses were hauling and check-off fees, as well as drying cost for corn.
- Total additional expenses were \$48.34/acre for corn and \$44.80/acre for soybean.

Soil Health Management System Impact on Farm Income

- Reduced expenses were \$14.52/acre greater than additional expenses for corn.
- Reduced expenses were \$16.12/acre greater than additional expenses for soybean.
- Yield increased 10 bu./acre, and additional revenue was \$42.00/acre for corn.
- Yield increased 3 bu./acre, and additional revenue was \$30.00/acre for soybean.
- **Net farm income increased \$56.52/acre for corn and \$46.12/acre for soybean.**

Table 1. Partial Budget¹ Analysis, 30 Years with a Soil Health Management System on a 3,500-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	16.00	0.00	16.00
Fertilizer & Amendments	4.80	0.00	0.00	0.00
Pesticides	7.77	0.00	7.15	0.00
Fuel & Electricity	5.49	1.03	5.81	1.03
Labor & Services	19.53	19.81	20.11	19.81
Post-harvest Expenses	0.00	4.50	0.00	0.96
Equipment Ownership	25.27	7.00	27.85	7.00
Total Expense Change	62.86	48.34	60.92	44.80
	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	104.86	48.34	90.92	44.80
Change in Net Farm Income	56.52		46.12	

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.