ECONOMICS of Soil Health Systems

Upper White River Watershed of Indiana

FARM SIZE
6,600 crop acres
Farrow-to-finish hogs

CROPS GROWN
Corn and soybean

SOIL TYPE
Clay

SOIL HEALTH MANAGEMENT SYSTEM
No-till practices
Cover crops
Corn-soybean rotation
Soils amended with hog manure
Monitoring of soil nutrient levels

NET INCOME INCREASE
Corn
$83.86/acre
Soybeans
$70.59/acre

FARM #8

INTRODUCTION

Rodney Rulon of Rulon Enterprises LLC in the Upper White River Watershed of Indiana increased farm profi tability by lowering production costs and increasing yield with a soil health management system (SHMS) of no-till production and cover crops. No-till practices have been followed for over 30 years and cover crops planted for almost 20 years.

Benefits of the SHMS reported by the farmer:

- → **INCREASED WATER INFILTRATION**
- → **REDUCED EROSION**
- → **REDUCED FERTILIZER APPLICATIONS**
- → **INCREASED BENEFICIAL INSECTS**
- → **IMPROVED DISEASE RESISTANCE**
- → **ENHANCED DROUGHT RESILIENCE**

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.

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.
- → A field trip with a chisel plow and two field cultivator fi eld trips were eliminated for corn.
- → A field trip with a disk was eliminated for soybean.
- → Phosphorous and potassium reductions were equal for both crops.
- → Nitrogen for corn was reduced 50 lbs./acre with anhydrous ammonia.
- → A spray application with an insecticide and fungicide was eliminated for each crop.
- → Total reduced expenses were $76.50/acre for corn $47.24/acre for soybean.

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ECONOMICS of Soil Health Systems: Upper White River Watershed of Indiana

Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till production with cover crops on 5,400 acres.
- Cover crop mixes included oats, winter/cereal rye, rapeseed, radishes, and clover.
- Cover crop seed cost was $18.50/acre before corn and $12.00/acre before soybean.
- Cover crops were planted with an air seeder in the fall, after the preceding crop harvest.
- Corn and soybean were planted with a no-till planter into the living cover crop.
- Cover crop termination with herbicide was not an additional expense.
- Post-harvest expenses due to increased yields were hauling, check-off fees, and drying corn.
- Total additional expenses were $47.24/acre for corn and $36.65/acre for soybean.

Soil Health Management System Impact on Farm Income

- Reduced expenses were $29.26/acre greater than additional expenses for corn.
- Reduced expenses were $10.59/acre greater than additional expenses for soybean.
- Yield increased 13 bu./acre, and additional revenue was $54.60/acre for corn.
- Yield increased 6 bu./acre, and additional revenue was $60.00/acre for soybean.
- **Net farm income increased $83.86/acre for corn and $70.59/acre for soybean.**

Table 1. Partial Budget[1] Analysis, 30 Years with a Soil Health Management System on a 6,600-Acre Farm, $ per Acre per Year (2019 Dollars).

	Corn		Soybean	
	BENEFITS	COST	BENEFITS	COST
Expense Category	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE
Seed	0.00	18.50	0.00	12.00
Fertilizer & Amendments	26.53	0.00	9.00	0.00
Pesticides	12.00	0.00	12.00	0.00
Fuel & Electricity	4.82	2.41	3.09	2.41
Labor & Services	11.31	7.56	7.76	7.40
Post-harvest Expenses	0.00	5.85	0.00	1.92
Equipment Ownership	21.84	12.92	15.39	12.92
Total Expense Change	**76.50**	**47.24**	**47.24**	**36.65**
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	ADDITIONAL REVENUE
Yield, bu./acre	13.00	0.00	6.00	0.00
Price Received,[2] $/bu.	4.20	4.20	10.00	10.00
Revenue Change	**54.60**	**0.00**	**60.00**	**0.00**
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	**131.10**	**47.24**	**107.24**	**36.65**
Change in Net Farm Income	**83.86**		**70.59**	

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.

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