

ECONOMICS of Soil Health Systems

Roebuck Lake-Yazoo River Watershed of Mississippi



FARM SIZE
3,200 acres



CROPS GROWN
Corn
2,200 acres
Soybean
1,000 acres



SOIL TEXTURE
Ranged from
sandy loam
to clay



SOIL HEALTH MANAGEMENT SYSTEM

Reduced tillage
Poultry litter
applications
Cover crops
Monitoring of soil
nutrient levels



NET INCOME INCREASE

Corn
\$57.55/acre
Soybean
\$168.13/acre

INTRODUCTION

The Dr. Harold Wheeler farm in the Roebuck Lake-Yazoo River Watershed of Mississippi increased profitability for corn and soybean by increasing crop yield with a soil health management system (SHMS) of reduced tillage, poultry litter applications, and cover crops. The farm has practiced soil health management systems for 20 years. Other farms in the area have adopted reduced tillage, and the distinguishing soil health practices of the farm were poultry litter applications and planting cover crops.

Benefits of the SHMS reported by the farmer:



- **IMPROVED WATER INFILTRATION**
- **REDUCED EROSION**
- **IMPROVED SOIL STRUCTURE**
- **ENHANCED RESILIENCE TO EXTREME WEATHER CONDITIONS**
- **HIGHER CROP YIELDS THAN OTHER FARMS IN THE AREA**

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 reduced tillage production.
- Reduced tillage consisted of fall disking and reshaping beds before spring planting.
- There were no reduced expenses due to adopting the SHMS.

FARM #22

ECONOMICS of Soil Health Systems: Roebuck Lake-Yazoo River Watershed of Mississippi

Soil Health Management System and Additional Expenses

- The soil health management system adopted was reduced tillage production with poultry litter applications and planting cover crops on approximately 60% of crop acreage.
- Wheat as a cover crop was drilled at a rate of 2 bu./acre in the fall before corn and soybean.
- Two tons per acre of poultry litter was applied at an expense of \$45.00/ton.
- Cover crops were terminated with herbicide before planting corn and soybean.
- Post-harvest expense due to increased corn and soybean yields reflected the additional hauling and check-off fees for corn and soybean, and additional drying expense for corn.
- Total additional expenses were \$152.45/acre for corn and \$131.87/acre for soybean.

Soil Health Management System Impact on Farm Income

- Corn yield increased 50 bu./acre, and additional revenue was \$210.00/acre.
- Soybean yield increased 30 bu./acre, and additional revenue was \$300.00/acre.
- **Net farm income increased \$57.55/acre for corn and \$168.13/acre for soybean.**

Table 1. Partial Budget¹ Analysis, 20 Years with a Soil Health Management System on a 3,200-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	11.00	0.00	11.00
Fertilizer & Amendments	0.00	90.00	0.00	90.00
Pesticides	0.00	3.84	0.00	3.84
Fuel & Electricity	0.00	1.63	0.00	1.63
Labor & Services	0.00	6.80	0.00	6.80
Post-harvest Expenses	0.00	30.18	0.00	9.60
Equipment Ownership	0.00	9.00	0.00	9.00
Total Expense Change	0.00	152.45	00.00	131.87
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE
Yield, bu./acre	50.00	0.00	30.00	0.00
Price Received, ² \$/bu.	4.20	4.20	10.00	10.00
Revenue Change	210.00	0.00	300.00	0.00
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	210.00	152.45	300.00	131.87
Change in Net Farm Income	57.55		168.13	

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.