

ECONOMICS of Soil Health Systems

Coxey Creek- Tennessee River Watershed of Alabama



CROPS GROWN

50% Cotton
50% Double-cropped Soybean and Wheat



SOIL TEXTURE

Ranged from Sandy loam to Clay



SOIL HEALTH MANAGEMENT SYSTEM

Minimum tillage
Cover crops
Monitoring of soil nutrient levels



NET INCOME INCREASE

Cotton \$7.96/acre
Soybean \$11.80/acre
Wheat \$29.33/acre

INTRODUCTION

The Shun Binford farm in the Coxey Creek-Tennessee River Watershed of Alabama increased profitability for cotton, soybean, and wheat by decreasing production costs with a soil health management system (SHMS) of minimum tillage production and cover crops. The farm began using minimum tillage practices on the heavier clay soils and no-till on the lighter soils in 1997. Cover crops have been planted for four years.

Benefits of the SHMS reported by the farmer:



→ IMPROVED WATER INFILTRATION

→ REDUCED EROSION

→ ENHANCED RESILIENCE TO EXTREME WEATHER

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 operations were eliminated for cotton and soybean, and two were eliminated for wheat.
- Total reduced expenses were \$53.14/acre for cotton, \$31.90/acre for soybean, and \$53.49/acre for wheat.

FARM #11

ECONOMICS of Soil Health Systems: Coxey Creek-Tennessee River Watershed of Alabama

Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till production for soybean and wheat along with minimum tillage production and cover crops before cotton.
- Wheat as a cover crop before cotton was broadcast by custom application for \$8.00/acre in the fall at a seed rate of one bu./acre.
- The cover crop was terminated with herbicide and incorporated into the soil with a vertical tillage implement.
- Total additional expenses were \$45.18/acre for cotton, \$20.10/acre for soybean, and \$24.16/acre for wheat.

Soil Health Management System Impact on Farm Income

- Reduced expenses were \$7.96/acre greater than additional expenses for cotton.
- Reduced expenses were \$11.80/acre greater than additional expenses for soybean.
- Reduced expenses were \$29.33/acre greater than additional expenses for wheat.
- Reduced expenses were realized for all crops without yield reductions.
- **Net farm income increased \$7.96/acre for cotton, \$11.80/acre for soybean, and \$29.33 for wheat.**

Table 1. Partial Budget¹ Analysis, 24 Years with a Soil Health Management System, \$ per Acre per Year (2019 Dollars)

Expense Category	Cotton		Soybean		Wheat	
	BENEFITS	COSTS	BENEFITS	COSTS	BENEFITS	COSTS
	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE
Seed	0.00	5.50	0.00	0.00	0.00	0.00
Fertilizer & Amendments	0.00	0.00	0.00	0.00	0.00	0.00
Pesticides	0.00	3.84	0.00	3.84	0.00	3.84
Fuel & Electricity	7.63	2.77	4.19	1.34	7.66	2.05
Labor & Services	14.42	15.84	8.78	4.87	14.34	5.78
Post-harvest Expenses	0.00	0.00	0.00	0.00	0.00	0.00
Equipment Ownership	31.09	17.23	18.93	10.05	31.49	12.49
Total Expense Change	53.14	45.18	31.90	20.10	53.49	24.16
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE
Yield, bu./acre; Cotton, lb./acre	0.00	0.00	0.00	0.00	0.00	0.00
Price Received, ² \$/unit	0.67	0.67	10.00	10.00	5.50	10.00
Revenue Change	0.00	0.00	0.00	0.00	0.00	0.00
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	53.14	45.18	31.90	20.10	53.49	24.16
Change in Net Farm Income	7.96		11.80		29.33	

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.