

ECONOMICS of Soil Health Systems

Shoal, Piney, and Swan Creeks Watershed of Alabama



FARM SIZE

950 crop acres



CROPS GROWN

Corn, Soybean,
Winter Wheat:
475 acres

Cotton:
475 acres



SOIL TEXTURE

Silt loam



SOIL HEALTH MANAGEMENT SYSTEM

No-till production
Cover crops
Poultry litter for
nutrients on some
acreage
Grid soil sampling to
monitor
nutrients levels
and for variable
rate application
of phosphorous,
potassium, and
lime



NET INCOME CHANGE

Corn
-\$3.81/acre
Soybean
\$62.63/acre
Cotton
\$130.19/acre

FARM #16

INTRODUCTION

The Stan Usery farm in the Shoal, Piney, and Swan Creeks Watersheds of Alabama increased profitability for a crop rotation of cotton, corn, soybean, and wheat with a soil health management system (SHMS) of no-till production and cover crops. No-till production has been practiced on the farm for more than 20 years.

Benefits of the SHMS reported by the farmer:



→ IMPROVED WATER INFILTRATION

→ DECREASED EROSION AND SOIL COMPACTION

→ IMPROVED SEED BED CONDITIONS

→ INCREASED ACCESS TO FIELD

→ LESS CROP YIELD VARIABILITY

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.
- No-till wheat production was unchanged from practices of conventional tillage production.
- Three tillage field trips were eliminated for corn and cotton.
- Two tillage field trips were eliminated for soybean.
- A post-emergent herbicide spray trip was eliminated for soybean.
- Decreased annual hours for field maintenance were valued at \$16.00/acre.
- Total reduced expenses were \$50.81/acre for both corn and cotton and \$74.73/acre for soybean.

ECONOMICS of Soil Health Systems: Shoal, Piney, and Swan Creeks Watershed of Alabama

Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till production with cover crops planted prior to corn and cotton on 25% of acreage.
- The \$27.00/acre cover crop seed mix consisted of triticale and crimson clover.
- Cover crop seed was custom broadcast at \$7.00/acre after harvesting the preceding crop.
- The cover crop was terminated with herbicide before planting corn and cotton.
- An insecticide spray was added as an expense for corn and cotton.
- Post-harvest expense for increased cotton yield was assumed paid with cottonseed value.
- Total additional expenses were \$54.62/acre for both corn and cotton and \$12.10/acre for soybean.

Soil Health Management System Impact on Farm Income

- Reduced expenses were \$3.81/acre less than additional expenses for corn and cotton.
- Reduced expenses were \$62.63/acre greater than additional expenses for soybean.
- Yield increased 200 lb./acre, and additional revenue was \$134.00/acre for cotton.
- The SHMS was adopted without yield reductions for corn and soybean.
- **Net farm income increased \$79.80/acre for cotton, corn, and soybean in a 50%-25%-25% rotation.**

Table 1. Partial Budget¹ Analysis, 20 Years with a Soil Health Management System on a 950-Acre Farm, \$ per Acre per Year (2019 Dollars).

Expense Category	Corn		Soybean		Cotton	
	BENEFITS	COSTS	BENEFITS	COSTS	BENEFITS	COSTS
	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE
Seed	0.00	27.00	0.00	0.00	0.00	27.00
Fertilizer & Amendments	0.00	0.00	0.00	0.00	0.00	0.00
Pesticides	0.00	4.02	21.05	0.00	0.00	4.02
Fuel & Electricity	4.73	1.34	4.20	1.03	4.73	1.34
Labor & Services	25.84	12.69	26.72	4.07	25.84	12.69
Post-harvest Expenses	0.00	0.00	0.00	0.00	0.00	0.00
Equipment Ownership	20.24	9.57	22.76	7.00	20.24	9.57
Total Expense Change	50.81	54.62	74.73	12.10	50.81	54.62
	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	200.00	0.00
Price Received, ² \$/unit	4.20	4.20	10.00	10.00	0.67	0.67
Revenue Change	0.00	0.00	0.00	0.00	134.00	0.00
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	50.81	54.62	74.73	12.10	184.81	54.62
Change in Crop Income	-3.81		62.63		130.19	
Change in Net Farm Income³	79.80					

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.

³ Weighted average of crop income with acreage weights 50% cotton, 25% corn, & 25% soybean.