ECONOMICS of Soil Health Systems

Pee Dee Watershed of South Carolina

FARM SIZE
700 crop acres

CROPS GROWN
Corn
350 acres
Yellow Pea,
Soybean
350 acres

SOIL TEXTURE
Sandy loam

SOIL HEALTH MANAGEMENT SYSTEM
No-till production
Cover crops
Zone soil sampling and tissue testing for phosphorous and potassium, and variable rate fertilizer application

NET INCOME INCREASE
Corn
$94.36/acre
Yellow Pea
$66.74/acre
Soybean
$31.33/acre

FARM #30

INTRODUCTION

The Carl Coleman farm in the Pee Dee Watershed of South Carolina increased profitability by decreasing production costs for corn, soybean, and yellow pea with a soil health management system (SHMS) of no-till production and cover crops. The farm has practiced no-till production for approximately 30 years, and cover crops have been planted for seven years.

Benefits of the SHMS reported by the farmer:

- **IMPROVED SOIL STRUCTURE AND SOIL BIOLOGY**
- **LESS COMPACTION**
- **REDUCED SUBSOIL TILLAGE**
- **REDUCED PHOSPHOROUS, POTASSIUM, AND LIME**

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.
- Four tillage operations were eliminated for corn and three were eliminated for both yellow pea and soybean.
- Phosphorous, potassium, and lime expenses were reduced for corn and yellow pea.
- Herbicide and insecticide expenses were reduced for corn.
- Total reduced expenses were $147.06/acre for corn, $113.30/acre for yellow pea, and $47.36/acre for soybean.

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ECONOMICS of Soil Health Systems: Pee Dee Watershed of South Carolina

Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till production with cover crops.
- Summer cover crops included sorghum Sudan, millet, sunflower, soybean, radish, cowpea, and buckwheat.
- Summer cover crops were drilled after corn harvest and terminated by frost conditions before planting yellow pea in December.
- Fall cover crops that were drilled after soybean harvest included cereal rye, triticale, hairy vetch, crimson clover, and radish.
- Corn was planted into the living fall cover crops which were terminated with herbicide that was not an additional expense.
- Cover crop seed costs were $24.00/acre for corn and $18.00/acre for yellow pea.
- Total additional expenses were $52.70/acre for corn, $46.56/acre for yellow pea, and $16.03/acre for soybean.

Soil Health Management System Impact on Farm Income

- Reduced expenses were $94.36/acre greater than additional expenses for corn.
- Reduced expenses were $66.74/acre greater than additional expenses for yellow pea.
- Reduced expenses were $31.33/acre greater than additional expenses for soybean.
- Reduced expenses were achieved for all crops without reductions in yield.
- **Net farm income increased $94.36/acre for corn, $66.74/acre for yellow pea, and $31.33/acre for soybean.**

Table 1. Partial Budget[1] Analysis, 30 Years with a Soil Health Management System on a 700-Acre Farm, $ per Acre per Year (2019 Dollars).

	CORN		YELLOW PEA		SOYBEAN	
	BENEFITS	COSTS	BENEFITS	COSTS	BENEFITS	COSTS
Expense Category	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE
Seed	0.00	24.00	0.00	18.00	0.00	0.00
Fertilizer & Amendments	65.68	0.00	65.68	0.00	0.00	0.00
Pesticides	17.50	0.00	0.00	0.00	0.00	0.00
Fuel & Electricity	9.95	2.76	7.99	2.76	8.12	1.73
Labor & Services	17.72	9.62	13.87	9.48	12.26	4.98
Equipment Ownership	36.21	16.32	25.76	16.32	26.98	9.32
Total Expense Change	**147.06**	**52.70**	**113.30**	**46.56**	**47.36**	**16.03**
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE
Yield, bu./acre	00.00	0.00	00.00	0.00	0.00	0.00
Price Received,[2] $/bu.	4.20	4.20	NA	NA	10.00	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	**147.06**	**52.70**	**113.30**	**46.56**	**47.36**	**16.03**
Change in Net Farm Income	**94.36**		**66.74**		**31.33**	

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.

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