

ECONOMICS of Soil Health Systems

Palouse Watershed of Washington



FARM SIZE
3,000 acres



CROPS GROWN
Winter Wheat
850 acres
Spring Wheat,
Canola
850 acres
Fallow
850 acres
Alfalfa
450 acres



SOIL TEXTURE
Silt loam



**SOIL HEALTH
MANAGEMENT
SYSTEM**

No-till production
Rotation program
Monitoring of soil
nutrient levels



**NET INCOME
INCREASE**

Winter Wheat
\$21.83/acre
Spring Wheat
\$2.18/acre
Canola
\$30.78/acre

FARM #17

INTRODUCTION

The Tracy Eriksen farm in the Palouse Watershed of eastern Washington increased profitability for a crop rotation of winter wheat, spring wheat, and canola by decreasing production costs with a soil health management system (SHMS) of no-till production. No-till production was introduced in 1985 and no-till production has been practiced on all acreage for approximately 30 years.

**Benefits of the
SHMS reported by
the farmer:**



→ **IMPROVED WATER INFILTRATION**

→ **DECREASED EROSION**

→ **IMPROVED SOIL STRUCTURE**

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 herbicides in conventional tillage.
- Ten tillage operations including a disc, chisel plow, and multiple operations with a field cultivator, harrow, and rod weeder were eliminated for winter wheat.
- Five tillage operations including a disc, chisel plow, harrow, rod weeder, and field cultivator, as well as one field trip with a mower were eliminated for spring wheat and canola.
- An herbicide spray trip was eliminated for winter wheat.
- A field trip to apply nitrogen as anhydrous ammonia was eliminated for all crops.
- Post-harvest expense reductions due to decreased spring wheat yield were hauling and check-off fee.
- Total reduced expenses were \$77.72/acre for winter wheat, \$61.83/acre for spring wheat, and \$60.43/acre for canola.

ECONOMICS of Soil Health Systems: Palouse Watershed of Washington

Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till production.
- Three herbicide spray trips were added for winter wheat, and two were added for spring wheat and canola.
- Nitrogen as aqua ammonia was applied at planting for all crops.
- Total additional expenses were \$55.89/acre for winter wheat and \$29.65/acre for spring wheat and canola.

Soil Health Management System Impact on Farm Income

- Reduced expenses were \$21.83/acre greater than additional expenses for winter wheat.
- Reduced expenses were \$32.18/acre greater than additional expenses for spring wheat.
- Reduced expenses were \$30.78/acre greater than additional expenses for canola.
- Yield decreased 5 bu./acre, and reduced revenue was \$30.00/acre for spring wheat.
- Reduced expenses were achieved for winter wheat and canola without reductions in yield.
- **Net farm income increased \$19.16/acre for winter wheat, spring wheat, and canola in a 50%-25%-25% rotation.**

Table 1. Partial Budget¹ Analysis, 30 Years with a Soil Health Management System on a 3,000-Acre Farm, \$ per Acre per Year (2019 Dollars).

Expense Category	Winter Wheat		Spring Wheat		Canola	
	BENEFITS	COSTS	BENEFITS	COSTS	BENEFITS	COSTS
	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE
Seed	0.00	0.00	0.00	0.00	0.00	0.00
Fertilizer & Amendments	0.00	0.00	0.00	0.00	0.00	0.00
Pesticides	3.14	28.40	0.00	6.28	0.00	6.28
Fuel & Electricity	11.49	2.67	9.04	2.36	9.04	2.36
Labor & Services	20.67	7.78	17.50	6.54	17.50	6.54
Post-harvest Expenses	0.00	0.00	1.40	0.00	0.00	0.00
Equipment Ownership	42.42	17.04	33.89	14.47	33.89	14.47
Total Expense Change	77.72	55.89	61.83	29.65	60.43	29.65
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE
Yield, bu./acre	0.00	0.00	0.00	5.00	0.00	0.00
Price Received, ² \$/bu.	5.50	5.50	6.00	6.00	9.40	9.40
Revenue Change	0.00	0.00	0.00	30.00	0.00	0.00
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	77.72	55.89	61.83	59.65	60.43	29.65
Change in Net Farm Income	21.83		2.18		30.78	

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.