

ECONOMICS of Soil Health Systems

Salmon Falls Watershed of Idaho



FARM SIZE

3,800 crop acres



CROPS GROWN

Corn
1,500 acres
Dry Bean
500 acres
Alfalfa
500 acres
Wheat
1,000 acres
All irrigated



SOIL TEXTURE

Silt loam



SOIL HEALTH MANAGEMENT SYSTEM

No-till production
Cover crops
Wheat-corn-dry
bean rotation
Local manure for
some nutrients
Monitoring of soil
nutrient levels



NET INCOME CHANGE

Corn
\$114.09/acre
Dry Bean
-\$6.45/acre

INTRODUCTION

The Lance Griff farm in the Salmon Falls Watershed of Idaho increased profitability for corn and dry bean by decreasing average farm production costs and increasing corn yield with a soil health management system (SHMS) of no-till production and cover crops. No-till production and cover crops were initiated in 2013 and increased incrementally.

Benefits of the SHMS reported by the farmer:



→ IMPROVED WATER INFILTRATION

→ REDUCED IRRIGATION WATER REQUIREMENTS

→ LESS SOIL COMPACTION

→ DECREASED PEST PRESSURE FROM INSECTS

→ INCREASED SOIL ORGANIC MATTER

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 in 2020 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.
- Wheat production was not changed by adoption of no-till practices.
- Four tillage operations were eliminated before planting both corn and dry bean.
- Two tillage operations were eliminated after planting dry bean.
- Nitrogen was reduced 80 lbs./acre applied as UAN 32% during fertigation of corn.
- Irrigation reductions were four applications for corn and two applications for dry bean.
- An insecticide spray for aphids was eliminated for corn.
- Total reduced expenses were \$101.98/acre for corn and \$62.51/acre for dry bean.

FARM #4

ECONOMICS of Soil Health Systems: Salmon Falls Watershed of Idaho

Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till production with cover crops before planting corn.
- In addition to volunteer wheat from a previous winter wheat crop, cover crops consisting of radish and turnip were drilled after harvest of the previous crop.
- Cover crop seed costs were \$25.00/acre, and custom application was \$18.00/acre.
- Cover crops were terminated with herbicide before planting corn.
- Dry bean additional herbicide expenses were \$52.03/acre.
- Post-harvest expenses due to increased corn yield were hauling, drying, and check-off fee.
- Total additional expenses were \$84.49/acre for corn and \$68.96/acre for dry bean.

Soil Health Management System Impact on Farm Income

- Reduced expenses were \$17.49/acre greater than additional expenses for corn.
- Reduced expenses were \$6.45/acre less than additional expenses for dry bean.
- Yield increased 23 bu./acre, and additional revenue was \$96.60/acre for corn.
- The SHMS was implemented without a reduction in dry bean yield.
- **Net farm income increased \$83.96/acre for corn and dry bean in a 75%-25% rotation.**

Table 1. Partial Budget¹ Analysis, 6 Years with a Soil Health Management System on a 3,800-Acre Farm, \$ per Acre per Year (2019 Dollars).

Expense Category	Corn		Dry Bean	
	BENEFITS	COSTS	BENEFITS	COSTS
	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE
Seed	0.00	25.00	0.00	0.00
Fertilizer & Amendments	37.59	0.00	0.00	0.00
Pesticides	4.68	10.64	0.00	52.03
Fuel & Electricity	12.27	1.34	11.26	1.34
Labor & Services	16.87	24.06	16.77	6.02
Post-harvest Expenses	0.00	13.88	0.00	0.00
Equipment Ownership	30.57	9.57	34.48	9.57
Total Expense Change	101.98	84.49	62.51	68.96
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE
Yield, bu./acre	23.00	0.00	0.00	0.00
Price Received, ² \$/bu.	4.20	4.20	NA	NA
Revenue Change	96.60	0.00	0.00	0.00
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	198.58	84.49	62.51	68.96
Change in Net Farm Income	114.09		-6.45	

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.