Economic Impacts of Soil Health Practice Adoption

A SUMMARY OF 26 FARMER CASE STUDIES

There is substantial scientific evidence indicating that soil health practices can improve soil and water quality, as well as reduce greenhouse gas emissions. Still, farmers may be reluctant to change management techniques without knowing how it will impact their bottom line. AFT staff and our partners have taken out some of the guesswork by conducting a partial budget analysis on the operations of "soil health successful" producers.

Through interviews with each selected farmer, AFT and partners calculated the increases and decreases in income and cost associated with the farmer's adoption of soil health practices (e.g., no-till, reduced tillage, cover crops, conservation crop rotation, nutrient management, compost application, and mulching). The partial budget analysis for each case study was performed using the free, accessible Excel-based Retrospective Soil Health Economic Calculator (R-SHEC) Tool, which is part of the Soil Health Case Study Tool Kit. This Tool Kit provides you with resources to produce your own case study.

These two-page soil health economic case studies can help farmers and landowners who are curious about soil health practices to further explore the costs and benefits of practice adoption. Below, we summarize some key findings across all 26 case studies.

Overview of the 26 farms:

- 23 were row crop farms growing 11 crops (alfalfa, barley, canola, corn, hay, oats, rye, sorghum, soybeans, triticale, wheat) in 11 states (Idaho, Illinois, Kentucky, Maryland, New York, Ohio, Oklahoma, Pennsylvania, Virginia, Washington, Wisconsin).
- 3 were almond growers in California.

KEY RESULTS

- **Improved Yield** attributed to soil health practices:
  - 20 of the 23 **row crop farmers** increased annual revenue by **$16 to $356** per acre; the remaining three did not attribute a yield improvement to their soil health practices.
  - All three **almond growers** increased annual revenue by **$519 to $1,156** per acre.

- **Annual Change in Net Income** by comparing the changes in revenue and cost:
  - 22 **row crop farmers** improved their bottom line by **$2 to $209** per acre per year, while one row crop farmer experienced a decrease in net income of **$5** per acre per year.
  - All three **almond growers** improved their bottom line by **$581 to $1,257** per acre per year.

- **Return on Investment (ROI)** shows the efficiency of investment (net income divided by cost):
  - 22 **row crop farmers** had ROIs ranging from **7% to 345%**; the row crop farmer with a negative net income had an ROI of -6%.
  - The three **almond growers** had ROIs ranging from **198% to 553%**.

- **Machinery, Fuel, and Labor** savings due to adopting no-till or reduced till:
  - All 16 **row crop farmers** who implemented no-till or reduced till saved **$17 to $92** per acre per year.

- **Changes in Fertilizer Costs** due to adopting soil health practices:
  - 14 of the 23 **row crop farmers** reported fertilizer **savings** ranging from **$5 to $84** per acre per year (due to implementing nutrient management plans, using variable rate technology, etc.).
  - Six other **row crop farmers** reported increases in fertilizer **costs** ranging from **$9 to $82** per acre per year (due to switching from synthetic fertilizers to manure, adopting foliar and micronutrients, etc.).
  - **Almond growers** had a range of outcomes, with one increasing costs, one decreasing costs, and one experiencing no change.

- **Cover Crop Costs** include all seed, planting, and termination costs:
  - The 21 **row crop farmers** who adopted cover crops spent from **$34 to $106** per acre per year on cover crops, with an average of $56.

- **Learning Costs** include time spent reading articles, attending conferences, etc.:
  - All 26 producers invested time in learning about soil health practices, with an estimated annual cost ranging from **$243 to $5,923** per year, with an outlier of $16,425 per year.

WORDS OF WISDOM from “Soil Health Successful” Farmers

Our trees are more productive, the soil is healthier, and my orchard is providing environmental benefits like better local air and water quality and lower climate emissions. My philosophy is simple, take care of the soil and it will take care of the trees.

— Tom Rogers, almond grower in Madera County, California

The number one reason I plant cover crops is to keep the soil covered and reduce erosion. I sleep excellently not worrying that I let soil wash off my farm. When mother nature throws a big curve ball, I’ll know I did everything I could.

— Jim Hebbe, grows corn, soybeans, and wheat in Green Lake & Fond du Lac Counties, Wisconsin

I am focused on building my soil health and letting nature do some of the work for me. I may not be setting records for high yields, but at the end of the day, I’ve got more money in my pocket instead of shelling it all out upfront.

— John Macauley, grows corn, soybeans, and wheat in Livingston County, New York

We’ve seen a drastic decrease in erosion on our farm after planting cereal rye, and there is noticeably less standing water in our fields compared to our neighbors. Our use of covers has allowed us to reduce our tillage and herbicide inputs and improved our soil structure which has contributed to increased yields.

— Jim Ifft, grows corn and soybeans in Livingston County, Illinois

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See tables below for information about each of the 26 farms featured in the case studies. These results have been updated to 2023 prices to ensure comparability. Prices in individual case studies were published with price data from 2018, 2020 or 2023 and will differ to the results below.

STATE	FARM	CROP	SOIL HEALTH PRACTICES	$/AC/YR INCREASE	ROI
CA	Faith Home Orchard	Almond	2012 - Cover Crops	$581	459%
	Rogers Farm	Almond	2018 - Conservation Cover 2018 - Nutrient Management 2018 - Compost Application 2019 - Mulching	$1,258	553%
	Okuye Farms	Almond	2005 - Conservation Cover 2005 - Nutrient Management 2005 - Compost Application 2005 - Mulching	$834	198%
ID	Heglar Creek Farms	Corn Silage, Triticale Silage, Alfalfa	2017 - No-Till 2017 - Cover Crops 2017 - Conservation Crop Rotation	$156	309%
	Picabo Livestock	Alfalfa, Malt Barley	2014 - No-Till 2015 - Nutrient Management 2016 - Cover Crops	$76	136%
IL	Thorndyke Farms	Corn, Soybeans	2010 - Nutrient Management 2014 - Cover Crops	$43	129%
	Yorkshire Farms	Corn, Soybeans	2008 - Reduced Tillage 2011 - Cover Crops 2015 - Nutrient Management	$28	123%
KY	Springhill Farms	Canola, Corn, Soybeans	2012 - Nutrient Management 2016 - Cover Crops 2020 - Conservation Crop Rotation	$129	151%
	Circle G Farms	Corn, Rye, Soybeans	2017 - Cover Crops 2019 - Conservation Crop Rotation	-$5	-6%
MD	Racine Family Farm	Corn, Soybeans	2015 - Nutrient Management 2017 - Conservation Crop Rotation 2019 - No-Till 2019 - Cover Crops	$71	52%
	Burrier's Linganore Farm	Corn, Soybeans, Wheat, Hay, Alfalfa	2018 - Nutrient Management	$70	108%
NY	Gary Swede Farm LLC	Corn Grain, Corn Silage, Sweet Corn, Alfalfa	2005 - Reduced Tillage 2005 - Cover Crops 2010 - Nutrient Management	$70	343%
	Macauley Farms	Corn, Soybeans, Wheat	2009 - No-Till 2012 - Cover Crops 2012 - Nutrient Management	$56	135%
	HaR-Go Farms	Corn, Soybeans, Sorghum, Hay	2009 - No-Till 2009 - Cover Crops 2009 - Nutrient Management	$13	18%
OH	Lyden Farms	Corn, Soybeans, Wheat, Hay, Alfalfa Hay	2013 - Nutrient Management 2016 - No-Till 2016 - Cover Crops	$82	158%
	Homewood Farms	Corn, Soybeans	2003 - Strip-Till 2014 - Cover Crops 2014 - Nutrient Management	$71	142%
	MadMax Farms	Corn, Soybeans	2011 - No-Till 2011 - Nutrient Management 2014 - Cover Crops	$48	35%
OK	Herriman Farms	Corn, Soybeans	2010 - No-Till (Soybeans), Strip-Till (Corn) 2016 - Cover Crops 2016 - Nutrient Management	$5	7%
	2N2E Farms	Wheat, Grain Sorghum (Milo)	2017 - No-Till 2018 - Nutrient Management 2019 - Cover Crops 2020 - Conservation Crop Rotation	$33	34%
PA	B & R Farms	Corn, Soybeans, Hay	2017 - Nutrient Management 2017 - Cover Crops	$23	42%
	Thiele Dairy Farm	Corn, Soybeans, Oats, Hay	2015 - No-Till 2015 - Cover Crops	$36	96%
VA	Piedmont Ag	Corn, Soybeans	2012 - No-Till 2013 - Cover Crops	$209	208%
	Brandon Farm	Corn, Soybeans	2010 - Cover Crops 2014 - Nutrient Management	$64	70%
WA	McDonald Farms	Canola, Wheat	2015 - No-Till 2016 - Nutrient Management 2017 - Conservation Crop Rotation	$70	311%
WI	Hebbe Farms	Corn, soybeans, Wheat	2013 - Cover Crops 2013 - Conservation Crop Rotation	$2	7%
	Kaderly Ag LLC	Corn, Soybeans, Wheat	2006 - Nutrient Management 2007 - No-Till 2015 - Cover Crops 2020 - Conservation Crop Rotation	$119	194%