Soil Health Case Study Jimmy Smith, Smith Farms, OK

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Introduction

Jimmy Smith and his family (Cathy, Spencer and Calli) farm around 2,500 acres near Elk City, Oklahoma. For over 50 years, they have planted cotton as their main cash crop. This case study analyzes Jimmy's adoption of no-till planting and cover crop grazing on a 280-acre study field.

The Smiths are one of the area's earliest adopters of cover crops. “We never called it a cover crop. We simply planted rye after cotton to keep the sand from blowing, grazed a few cattle on it, and cut enough seed to plant for next year,” Jimmy explains.

The need for preventing erosion, along with seeing the importance of soil organic matter and reduced input costs, brought Jimmy to switch to no-till planting on every acre in 2010. “We used to moldboard plow the stubble under then plant cotton. We went to strip tilling for a while. But since we always planted back in the same row, we were already on a controlled traffic pattern. So we decided to go full no-till.”

The benefits of using a rye cover crop, combined with no-till, is proving to be a saving grace when the weather doesn’t cooperate. In dry years, Jimmy still able to harvest a decent crop, where some others may have a crop failure. And when those not-uncommon Oklahoma cloudbursts drop 3 inches of rain in 3 hours, he has noticed that his fields are capturing more moisture, reducing runoff, and his ditches and the end of the field are much cleaner than his neighbors.

Field repair due to blown out terraces has been vastly reduced as well. “We have a lot of terraced ground, and we used to spend weeks out repairing terraces, especially after 2007 when Tropical storm Erin stalled out over us. Now we hardly ever have to fix a terrace.”

Spencer (left) has joined his father and grandfather to carry Smith Farms into the future.

Economic Benefits

A partial budget analysis (PBA) was used to analyze the marginal benefits and costs of adopting no-till, cover crops and cover crop grazing within the 280-acre study area.

We used a combination of published machinery and material cost estimates and farmer-provided data to estimate the cost of operations, on average, before and after soil health practice adoption. The analysis was limited to only those income and cost variables affected by the adoption of these practices.

No yield or nutrient use data was reported as part of this study. Jimmy believes that the increase in his recent yield is due to improved plant genetics, making it irrelevant to this analysis. We excluded any factors not directly attributable to the above-listed soil health practices. Any increase in fertilizer use is due to the improved cotton varieties' ability to utilize additional nutrients.

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Farm at a Glance

COUNTY: Beckham, OK

WATERSHED: North Fork of Red River

CROPS: cotton, rye

FARM SIZE: 2,500 acres (280-acre study area)

SOILS: fine sandy loam, 1-3% slopes

SOIL HEALTH PRACTICES: No-till, cover crops, grazing

Below: a rye cover crop grows between rows of cotton on Smith Farms

4Ag Manufacturing's puncture-proof gauge wheel

Jimmy Smith, Smith Farms, OK

The PBA table below summarizes these economic effects, revealing that due to soil health management, Jimmy's net income increased by $90/acre/year, a total of $25,316/year. He achieved a 177% return on investment.

Much of this profit comes from eliminating 6 annual tillage and cultivation passes Jimmy used to make for each cotton crop. Keeping the tractor parked saves him about $95/acre every year.

It is estimated that Jimmy also kept almost $400 in nutrient value on this acreage that he would have lost to erosion had he produced his cotton with full tillage.

Jimmy credits improved conservation practices and new crop technology when discussing his successes. "Roundup-Ready cotton was a game-changer. We simply could not control weeds without that technology." Jimmy notes that while increased herbicide use is now necessary for him ($19 more/acre/year), his labor, equipment, and time savings are worth it!

By charging a local rancher $45/acre to graze the rye cover crop, Jimmy brings in an additional $13/acre over what he spends to grow it. The soil health benefits of cattle excrement and living plants all year are an added advantage.

Closing Thoughts

Jimmy states that adopting new practices come with new challenges. "We were wearing out planter gauge wheels like crazy. Planting back in the same row, the cotton stalks were chewing up the rubber gauge wheels, so we had to replace them almost annually." Jimmy got together with his son Spencer and neighbor Danny Davis to design a wheel with better materials that could stand up to the tough cotton stalks. The project has morphed into a full-time business, 4Ag Manufacturing.

"We don't know how long they last. The first set we made in 2012 is still on the planter!"

Economic Effects of Soil Health Practices for Jimmy Smith

Increases in Net Income

Increase in Income

Item	Per Acre	Acres	Total
Cover crop custom grazing income	$45.00	280	$12,600
Total Increased Income			**$12,600**

Decrease in Cost

Item	Per Acre	Acres	Total
Change in Machinery Cost due to Change in Tillage	$95.00	280	$26,600
Value of Decreased Erosion due to Change in Tillage	$1.42	280	$396
Total Decreased Cost			**$26,996**
Annual Total Increased Net Income			**$39,596**
Total Acres in this Study Area			**280**
Annual Per Acre Increased Net Income			**$141**

Decreases in Net Income

Decrease in Income

Item	Per Acre	Acres	Total
None			
Total Decreased Income			**$0**

Increase in Cost

Item	Per Acre	Acres	Total
Impact of Change in Tillage on Pesticide Use	$19.00	280	$5,320
Cover crop costs	$32.00	280	$8,960
Total Increased Cost			**$14,280**
Annual Total Decreased Net Income			**$14,280**
Total Acres in this Study Area			**280**
Annual Per Acre Decreased Net Income			**$51**

Annual Change in Total Net Income = $25,316

Annual Change in Net Income Per Acre = $90

Return on Investment = 177%

• This table represents estimated average costs and benefits reported by the farmer, Jimmy Smith, with his adoption of no-till and cover crop grazing over a 280-acre study area. • All values are in 2020 dollars. • Prices used: Wheat: $5.00/bu (USDA NASS, Feb 2021, Crop Values: 2020 Summary); Net income (value of production minus operating costs) Wheat: $310/ac, Milo: $204/ac (USDA ERS, May 2021, Commodity Costs and Returns: Recent Costs and Returns); Nitrogen: $0.34/lb, Phosphate: $0.39/lb (ISU Extension and Outreach, Jan 2021, Ag Decision Maker: Estimated Costs of Crop Production in Iowa). • Value of decreased erosion ($1.18/ton) is based on estimated N & P content of the soil (2.32 lbs N/ton, 1 lb P/ton) and fertilizer prices (USDA NRCS, May 2010, Final Benefit-Cost Analysis for the EQIP). • Return on Investment is the ratio of Annual Total Change in Net Income to Annual Total Decreased Net Income, as a percent. • For information about: (1) study methodology, see farmland.org/soilhealthcasestudies; (2) USDA's NTT, see ntt.tiaer.tarleton.edu/; and (3) USDA's COMET-Farm Tool, see comet-farm.com. • This material is based on OCC's work supported by The Nature Conservancy.

For more information about this study or to discuss soil health practices, please contact

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