

# Soil Health Case Study Rodney Hern, Hern Farms, OK

## Introduction

Rodney Hern is the fifth generation to farm land claimed by his family in the Oklahoma land runs of the 1890s. He grows wheat, milo (sorghum), soybeans, other small grain crops, and raises cattle on 2,000 acres in and around Grant County. This case study compares one of Rodney's fields, managed with soil health practices, to a conventionally-managed field just across the fence.

Rodney formerly worked as an agriculture teacher in the Oklahoma Panhandle, where he met his wife Pat. They learned from farmers in that area to be very mindful of water conservation and erosion prevention. When he took the reins of the family farm, Rodney built on the example of his elders. "They used cover crops as "green manure" in the 1950s, before synthetic fertilizers became available," he said.

Rodney switched to no-till to combat the wind erosion of his soil. He was one of the first adopters of the USDA-NRCS's Conservation Stewardship Program, which helped defray the cost of changing his equipment. Rodney sold all of his tillage implements, replacing them with a drill and sprayer. He says it's necessary for farmers who adopt no-till to own those two items.

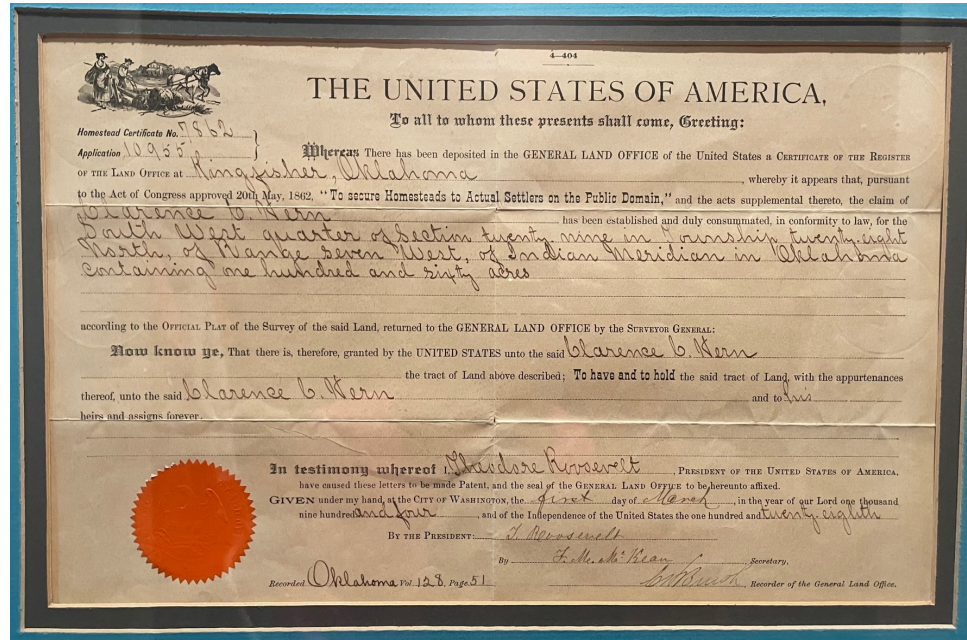
In Rodney's area it is common for farmers to plant wheat every fall and leave fields fallow after spring harvest. Rodney implemented cover cropping and crop rotation to fight the weeds, pests and diseases that came with continuous wheat production. He also hoped to rebuild soil organic matter and cut input costs.

Rodney has now been using no-till, mixed-species cover crops and crop rotation for thirty years. He says this management program saves time, fuel and fertilizer compared to his past practices.

Farmers, students and ag professionals at a field day on Rodney's farm



The original Land Run deed to Rodney's family farm, signed by President Roosevelt



Rodney has noticed less soil erosion and better retention of rainfall. He has also been spared some pest infestations that befell his neighbors, enabling him to outyield them even without starting up the sprayer. Though encroachment of windmillgrass and maretail are still a challenge, Rodney has fewer problems with pigweed and kochia than he did while farming conventionally.

Rodney works closely with the Oklahoma Conservation Commission (OCC)'s Soil Health Team as he continues to learn and teach others. He is the Grant County farmer mentor for the General Mills/OCC regenerative agriculture program. Rodney is also a board member of No-Till On The Plains (NTOP), a conservation agriculture group based in Wichita, KS. He was a presenter at the very first NTOP conference in the 1990s.

## Economic Benefits

A partial budget analysis (PBA) was used to analyze the marginal benefits and costs of Rodney's approach compared to that of his conventional neighbor. For one wheat crop cycle, Rodney kept track of his field operations versus those performed on his neighbor's similarly-sized field, right across the fenceline. We used a combination of published machinery and material cost estimates and farmer-provided data to estimate the cost of operations, on average, with and without soil health management. The analysis was limited to only those income and cost variables affected by the adoption of soil health practices.

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## Farm at a Glance

**COUNTY:** Grant, OK

**WATERSHED:** Salt Fork of Arkansas River

**CROPS:** wheat, soybeans, milo, cattle

**FARM SIZE:** 2,000 acres (107-acre study area)

**SOILS:** silt loam, 1-3% slopes

**SOIL HEALTH PRACTICES:** No-till, cover crops, crop rotation, nutrient management

Rodney and Pat Hern



The PBA table below summarizes these economic effects, revealing that Rodney's wheat crop was \$73 per acre more profitable than the adjacent conventional crop. Rodney achieved a 105% return on his soil health investment on this crop alone.

Over the course of the year he documented, Rodney made one planting pass across his 107-acre study field. His neighbor made three tillage passes before planting 109 acres to wheat. Rodney saved almost \$80 per acre in equipment costs by using no-till management.

It is estimated that Rodney also kept over \$150 in nutrient value on this acreage that he would have lost to erosion had he produced this crop with full tillage. Rodney did spend about \$21 per acre more on herbicide than his neighbor did.

It was a dry year, but had it been a rainy one, both farmers may have made additional passes for weed control, Rodney with herbicide and his neighbor with a cultivator. Rodney applies some of his fertilizer through his no-till drill at planting, which saves him 2 nutrient application passes compared to his neighbor.

Rodney's healthy soil microorganisms also allowed him to meet his yield goals while applying 50 pounds less nitrogen and 30 pounds less phosphorus per acre on his side of the fence than was applied to the adjacent conventional crop.

Due to these two factors, Rodney spent about \$40 per acre less on nutrients for the studied wheat crop than his neighbor did. Rodney's crop produced 5 bushels per acre more yield as well.

## Closing Thoughts

"You need to do what makes money, but it's gonna take time. You've got to invest in it," Rodney said, when asked what advice he has for other farmers.

What is Rodney's next step? "We're trying to reduce our dependency on chemicals and as much commercial fertilizer...I need to develop my compost to get my own extract so I will have all of my local biology, treat my seed, and actually put it on like an in-furrow fertilizer."

"I just wish I was thirty years younger, knowing what I know now!"

*Writer: Meg Greski, Oklahoma Conservation Commission, Soil Health Program Coordinator*

### Economic Effects of Soil Health Practices for Rodney Hern

Increases in Net Income				Decreases in Net Income			
Increase in Income				Decrease in Income			
Item	Per Acre	Acres	Total	Item	Per Acre	Acres	Total
Yield Impacts Due to Soil Health Practices	\$25.00	107	\$2,675	None			
<b>Total Increased Income</b>			<b>\$2,675</b>	<b>Total Decreased Income</b>			<b>\$0</b>
Decrease in Cost				Increase in Cost			
Item	Per Acre	Acres	Total	Item	Per Acre	Acres	Total
Change in Machinery Cost due to Change in Tillage	\$69.15	107	\$7,399	Impact of Change in Tillage on Pesticide Use	\$21.00	107	\$2,247
Value of Decreased Erosion due to Change in Tillage	\$1.42	107	\$152	Combined Practices Learning Activities	\$48.90	107	\$5,232
Change in Machinery Costs due to Change in Nutrient Mgt.	\$19.28	107	\$2,063				
Impact of Nutrient Management on Nutrients Used	\$28.36	107	\$3,035				
<b>Total Decreased Cost</b>			<b>\$12,648</b>	<b>Total Increased Cost</b>			<b>\$7,479</b>
<b>Annual Total Increased Net Income</b>			<b>\$15,323</b>	<b>Annual Total Decreased Net Income</b>			<b>\$7,479</b>
<b>Total Acres in this Study Area</b>		<b>107</b>		<b>Total Acres in this Study Area</b>		<b>107</b>	
<b>Annual Per Acre Increased Net Income</b>			<b>\$143</b>	<b>Annual Per Acre Decreased Net Income</b>			<b>\$70</b>
<b>Annual Change in Total Net Income = \$7,844</b>							
<b>Annual Change in Net Income Per Acre = \$73</b>							
<b>Return on Investment = 105%</b>							

• This table represents estimated average costs and benefits reported by the farmer, Rodney Hern, with his adoption of no-till and nutrient management over a 107-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](http://farmland.org/soilhealthcasestudies); (2) USDA's NTT, see [ntt.tiaer.tarleton.edu/](http://ntt.tiaer.tarleton.edu/); and (3) USDA's COMET-Farm Tool, see [comet-farm.com](http://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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To read more case studies, visit [farmland.org/soilhealthcasestudies](http://farmland.org/soilhealthcasestudies) and [conservation.ok.gov/wq-soil-health-program-soil-health-resources](http://conservation.ok.gov/wq-soil-health-program-soil-health-resources)

