Drill for cover crop seeding

Earthworms on a root ball

FEBRUARY 2020

Soil Health Case Study

Jim, Julie, and Josh Ifft, Ifft Yorkshires, IL

Introduction

Jim Ifft started farming in 1975 and currently farms with his wife, Julie, and son, Josh. The family grows corn and soybeans on 1,800 acres in northcentral Illinois, leasing over 1,600 them. They use soil health practices on all the acres, rented and owned.

Jim has always had an interest in conservation and employs an adaptive management approach. Jim wanted to diversify his corn-soybean rotation as part of this approach and knew he was on the right track when he discovered cover crops. He started by planting cereal rye after his corn harvest on 80 acres in 2014, and now does so on 825 acres. Jim and Josh were so pleased with the cover crops, they started their own cover crop seed dealership providing custom seed drilling services for surrounding farmers.

Jim credits cover crops for helping them try no-till corn. Although the Iffts transitioned to no-till on their soybean fields in the early 1990s, they continued with a vertical-tillage pass each fall and spring for their corn until 2018, when they planted no-till on corn for the first time. Jim said, "We wouldn't have attempted no-tilling corn if not for the improved soil structure we've noticed from our use of cover crops." Jim adds that, "Cover crops are the key to reducing our inputs." The Iffts have reduced their herbicide inputs because of ample weed control provided by the cereal rye. Jim notes his first attempts at covers in 2014 weren't very successful, but he continued to seek advice from producers using covers successfully and kept at it.

The Iffts have also applied their adaptive approach to nutrient management, having switched to variable rate technology (VRT) application of phosphorus (P) and potassium (K) in 2010. The Iffts haven't applied any nitrogen (N) in the fall for decades, but they have recently adapted their N program to include a starter application at planting in addition to a subsequent side-dress application, thus ensuring the N is available when the plant needs it.

Josh holding his daughter, Julie, and Jim

Soil Health, Economic, Water Quality, and Climate Benefits

Partial budgeting was used to analyze the marginal benefits and costs of adopting cover crops and nutrient management on the Ifft Farm. The study was limited to only those income and cost variables affected by the adoption of these practices. The table on page two presents a summary of these economic effects, revealing that due to the two soil health practices, Jim's net income increased by $22 per acre per year or by $35,685 annually on the 1,650-acre study area, achieving a 123% return on investment.

The study area is restricted to where Jim has planted covers the longest, thereby providing an accurate picture of the soil health practices he has successfully integrated into his operation. Additionally, although Jim's use of covers has allowed him to switch to no-till corn, we did not

Farm at a Glance

COUNTY: Livingston, IL

WATERSHED: Vermillion Headwaters

CROPS: Corn & soybeans

FARM SIZE: 1,800 acres cropland

SOILS: Silt loam & silty clay loam soils on flat to slightly rolling fields

SOIL HEALTH PRACTICES: Cover crops & nutrient management

USDA United States Department of Agriculture Natural Resources Conservation Service

American Farmland Trust

include the associated economic benefits of no-till, as he was only in his first year of this practice at the time of this report. Furthermore, the study excludes changes associated with no-till on soybeans, since they were first implemented in 1990 and thus have become a normal part of the farming operation.

Increased soybean yields account for the largest soil health benefit on the Iffts' farm. They attribute an average soybean yield increase of five bushels an acre to cover cropping over the six-year period since they started planting cereal rye ahead of soybeans. Their net income has increased by $44 per acre per year as a result, more than covering the $30 per acre annual cost of cover crop establishment and termination.

Jim and Josh were able to lower their P and K applications by 20% as a result of adopting VRT, leading to an annual cost savings of $20 an acre. Additionally, the Iffts are saving $15 per acre per year on reduced herbicide applications because of weed control provided by the cover crop. Lower nutrient applications and use of cover crops translate to less sediment and nutrient loss as well.*

In fact, USDA's Nutrient Tracking Tool (NTT) estimates that the Iffts reduced their N, P, and sediment losses by 23, 33, and 37% respectively by instituting nutrient management and cover crops on an 80-acre field selected for NTT analysis. USDA's COMET-Farm tool estimates that the Ifft's two soil health practices resulted in a 35% reduction in total greenhouse gas emissions from this same field offsetting the emissions from eight cars for one year.

In order to achieve their soil health goals, the Iffts spend a significant amount of time educating themselves to stay current with new developments, particularly for cover crops. They spend about 160 hours each year, or about $2 per acre, in learning costs annually. They also pay an annual upcharge of 50 cents an acre to implement VRT nutrient application.

Closing Thoughts

Jim and Josh host on-farm demonstrations to showcase the success they've had with cover crops and to provide a learning environment for other farmers. They have seen a drastic decrease in erosion on their farm after planting cereal rye, and there is noticeably less standing water in their fields compared to their neighbors. Jim attributes these improvements, namely increased infiltration, organic matter content, and aggregate stability, to his use of covers. The Iffts are now experimenting with using oats after soybeans. While managing for soil health continues to require adaptive strategies, the Iffts have succeeded in implementing a system of management changes over time that has proven to be successful in reducing their overall inputs while increasing their overall yields.

Economic Effects of Soil Health Practices on Ifft Yorkshires Farms, IL (2018)

Increases in Net Income

Increase in Income

ITEM	PER ACRE	ACRES	TOTAL
Increased soybean yield due to cover crops (5 bu/ac)	$43.86	825	$36,185
Total Increased Income			**$36,185**

Decrease in Cost

ITEM	PER ACRE	ACRES	TOTAL
Fertilizer savings due to nutrient mgt (20% less P & K)	$19.83	825	$16,360
Herbicide savings due to weed control from cover crops	$14.80	825	$12,210
Total Decreased Cost			**$28,570**
Annual Total Increased Net Income			**$64,754**
Total Acres in this Study Area			**1,650**
Annual Per Acre Increased Net Income			**$39**

Decreases in Net Income

Decrease in Income

ITEM	PER ACRE	ACRES	TOTAL
None Identified			$0
Total Decreased Income			**$0**

Increase in Cost

ITEM	PER ACRE	ACRES	TOTAL
Cover crop costs	$30.00	825	$24,750
Combined practice learning costs (160 hrs/yr)	$2.37	1,650	$3,907
Variable rate technology upcharge	$0.50	825	$413
Total Increased Cost			**$29,070**
Annual Total Decreased Net Income			**$29,070**
Total Acres in this Study Area			**1,650**
Annual Per Acre Decreased Net Income			**$18**

Annual Change in Total Net Income = $35,685

Annual Change in Per Acre Net Income = $22

Return on Investment = 123%

* Savings from erosion reduction was not included in the economic analysis because the Iffts did not make mechanical repairs to their fields. • This table represents costs & benefits attributed to cover crops & nutrient management over the 1,650-acre study area as reported by the farmer. • All values are in 2018 dollars. • Prices used: Corn: $3.55/bu, Soybeans: $8.60/bu (Crop Values 2018 Summary, USDA, NASS). Phosphate: $.39/lb, Potash: $.27/lb (Estimated Costs of Crop Production in Iowa—2018, ISU). • Return on Investment is the ratio of Annual Change in Total Net Income to Annual Total Decreased Net Income expressed as a percent (i.e., net profit/cost of investment). • For study methodology, see https://farmland.org/soilhealthcasestudies. For USDA's Nutrient Tracking Tool, see https://www.oem.usda.gov/nutrient-tracking-tool-ntt. For USDA's COMET-Farm Tool, see http://cometfarm.nrel.colostate.edu. • Rounding errors may result in minor discrepancies in calculated results. • This material is based on work supported by a 2018 USDA NRCS CIG grant: NR183A750008G008.

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

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