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How Conservation Practices Influence Agricultural Economic Returns

Implications For the Farm Finance Community

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Cover photo credit: Edwin Remsberg and USDA-SARE.

Foreword

American farming is under unprecedented stress given extreme weather, supply chain disruption, and the rising cost of inputs. Traditionally used to improve environmental outcomes, evidence is mounting that conservation practices can also reduce risk and add financial value. Further, ecosystem services markets may provide farmers with new economic opportunities to diversify their income. These developments demonstrate exciting new prospects for producers to include conservation as a strategy to secure long-term economic stability for their farm.

AGree has sought to better understand the financial benefits of agricultural conservation practices and support the farm finance community in thinking through the implications for their lending practices. This report highlights a growing body of research that shows the financial and risk-reducing benefits of conservation practices like cover crops and conservation tillage. For example, one study showed that farmers using these soil health practices reported an 85% net income increase for corn and 88% for soy. Given the significant positive impact on farmers' bottom lines, this report provides valuable information to the farm finance community regarding how the impacts of conservation practice implementation may be financialized and, ultimately, considered in lending decisions.

Conservation practices have the potential to provide a triple-win for farm finances, risk-reduction, and the environment. As such, more research and financial benchmarking of farmer conservation practice implementation is needed to promote adoption of these practices.

Additional data would provide powerful insights both to farmers and the farm finance community about the costs and benefits of conservation adoption. AGree's work is intended to support and inform the work of USDA and other stakeholders to quantify and leverage the risk reducing and economic benefits of conservation practice implementation. We hope you find this paper to be a useful resource.

Todd Barker
CEO, Meridian Institute

Executive Summary

Conservation is one of the largest areas of investment in agriculture today from both the public and private sectors. Stakeholders are recognizing the significant potential of conservation practice implementation to create on-farm and off-farm value, including increasing profit margins, building resilience to extreme weather events, and accessing emerging markets. These investments are taking many forms, including conservation practice incentives from government, major partnership projects on climate-smart practices, private sector payments for soil carbon or regenerative agriculture, and investments by farmers and landowners.

While many different conservation practices are being utilized in various agricultural systems and regions, the two main practices currently receiving the most attention and investment in row crop agriculture are cover crops and no-till. With the increased interest of farmers in soil health and financial support from the public and private sector, both no-till and cover crop acreage has been surging.

This report aims to address questions the financial sector may have regarding the impacts of cover crops and no-till on short-term financial returns and long-term farm prosperity, including impacts on farmland value. More research and data is coming out each year to provide insights on these impacts, but already the picture is very favorable for use of these two practices, particularly in combination with each other.

Today, over 100 million acres of U.S. cropland are farmed in a no-till fashion, either continuous no-till or rotational no-till (where no-till is used before one crop but not all crops in the rotation). Over 20 million acres of cropland are currently planted to cover crops, which are plants used to protect and improve the soil when no cash crop is growing. Over 150,000 farm operations were using cover crops according to the last U.S. Department of Agriculture (USDA) Census of Agriculture (2017), with thousands of more farmers adopting cover crops every year.

Evidence shows that such practices increase profit while reducing risk. For example, in 2019, a major national report on cover crop economics issued by the USDA Sustainable Agriculture Research and Education (SARE) program presented data from the national cover crop farmer survey administered over several years by the Conservation Technology Information Center with financial support from SARE and the American Seed Trade Association. Those surveys provided several years of yield data from approximately 500 farmers per year on corn and soybean yields as impacted by cover crop use, along with other economic data. The economics assessment found that it took around three years for use of cover crops to break even, due to initial cost of purchasing and applying cover crop seed. However, yields gradually trended upwards with improving soil health following cover crops, with a resulting gradual decline in costs for key inputs such as fertilizers and herbicides. Thus, over the long-term, cover crops proved to be a profitable practice. The report further documented that certain management scenarios, like dealing with herbicide-resistant weeds, compacted soils or grazing cover crops, could speed up the time to the breakeven point, sometimes providing a net profit after just one or two years of cover crop use. Financial incentives available for cover crops also make this practice more likely to pay off in a year or two.

Another major study, by the Soil Health Institute, did a detailed case study assessment of 100 farmers from various states. Of the 100 farmers, 85% reported an increase in net income for corn and 88% of the farmers reported an increase in net income for soybeans from soil health practices. Other case studies have shown similar benefits of the use of cover crops and no-till, although results vary from farm to farm and field to field. Besides direct impact on profit, interest in whether farmland value is affected by cover crops and no-till is growing. Benefits are clear in terms of reduced erosion, better soil resiliency, and improved soil organic matter over time. Do these improved soil traits lead to better rental values or sale value for farmland? More trendline data is needed, but there is an expectation that the marketplace will overtime take into account better soil health in valuing cropland rental rates and sale values.

Another important consideration for soil health practices in terms of the farm finance sector is the impact of these management practices on risk. Cover crops and no-till, particularly when used in combination, have been shown to provide benefits for planting dates and yields in excessively dry years like 2012 and excessively wet years like 2019. A recent Meridian Institute project done cooperatively with USDA and University of Illinois examined data from thousands of fields and found that use of cover crops and no-till for even a single year resulted in a 24% reduction in the odds ratio of prevent-plant loss in 2019 (a year when $4.2 billion dollars was paid out for prevented planting insurance claims). The analysis also showed that cover crops and no-till allowed earlier planting of corn and soybeans during the critical late planting window of the spring when delays of a single day can have a big impact on eventual yields.

The data summarized in this paper provide a clear picture that cover crops and no-till are proving their worth for both direct economic returns to producers and overall benefits for rural communities and society as a whole. Like many investments, returns from cover crops and no-till sometimes take two to three years to fully pay for themselves, but over time prove to be a very worthy investment for farm operators. Furthermore, continued and expanding financial support from both the public and private sector for these practices is making it easier than ever before for farmers to implement these practices in a cost-effective way that reduces their overall risk and improves their long-term prosperity.

Cover crops (pictured left) and no-till (pictured right) have been two of the most popular conservation practices used on U.S. cropland, with growing adoption each year. Photo credit: Rob Myers.

Section I

Background

This paper is intended to help agricultural lenders and other members of the farm finance community better understand how soil health conservation practices, particularly conservation tillage and cover crops, affect both on-farm profitability and off-farm economics. In addition to lenders and loan underwriters, the information included should be of interest to farmland appraisers, farmland managers, and those working in risk management related to agriculture.

This background section provides information on cover crops and no-till as significant soil health practices gaining in usage across the U.S. Next, Section II provides summaries from major economic reports and case study assessments of actual farmer data on profitability impacts of cover crops and no-till. Section III provides a broader perspective on soil health management as a key approach to management of U.S. cropland, and how such management approaches relate to activities and interests of agriculture lenders, farmland managers, farmland appraisers, and others in the farm finance sector.

A review of how soil health conservation practices impact cropping system profitability can be of value to the agriculture lending community and others in the financial services sector. A number of recent case studies and farmer-based economic analyses provide insights on these topics and are summarized in this paper.

Cover crops and no-till are two key conservation practices valued for their potential to improve soil resiliency, sequester carbon, and reduce runoff, while remaining economically viable for farmers. These practices are well-known to farmers and have become increasingly adopted given the growing interest in improving soil health. While there are many other conservation practices that provide significant benefits, this paper focuses on cover crops and no-till because of their field-wide impact and well-documented impacts on yields, economics, and ecosystem services (Jasa, 2020). Indeed, a fertile area for further consideration by the financial community is how and when other practices, especially in combination, can raise producer profit margins while reducing risk.

Conservation tillage has become the norm on many farms, either continuous no-till, rotational no-till (no-till used with some crops in the rotation but not others), strip-till, or various types of reduced tillage. According to the 2017 Census of Agriculture, 37 percent of reported tillage acres used no-till (continuous or rotational no-till), 35 percent used reduced tillage, and 28 percent used conventional tillage, out of 282 million total reported cropped acres. Cover cropping is less common than no-till but is steadily increasing in adoption. Based on Census of Agriculture data, in 2017 cover crops were used on 153,402 farming operations, consisting of 15.4 million acres of cropland. By the fall of 2020, cover crop acreage was estimated to have increased to 20 million acres.[1] A national initiative called Farmers for Soil Health aims to push cover crop adoption to 30 million acres before the end of the decade. The initiative is a joint effort of the National Corn Growers Association, United Soybean Board, National Pork Producers, National Association of Conservation Districts, and other groups.[2]

1 Cover crops in the U.S.: Status and Trends. Center for Regenerative Agriculture, University of Missouri. www.cra.missouri.edu

2 Farmers for Soil Health Initiative. https://farmersforsoilhealth.com

Section II

Quantifying Benefits from Conservation Practices

An increasing amount of data has been published on profitability impacts of soil health conservation practices such as cover crops and no-till. Some studies have focused on university research trials based on yields and other results from small-scale research plots. Others have focused directly on farmer experiences, with some of these efforts incorporating data from large numbers of farmers. Two of the largest recent studies have been the national USDA-SARE Cover Crop Economic report (2019)[3] incorporating yield data from 500 farms and a Soil Health Institute report summarizing 100 farm case studies on soil health economics (2021).[4]

The USDA-SARE Cover Crop Economics report provided both baseline numbers on cover crop costs and returns as well as more specific economic impacts from common management scenarios. The baseline results were based conservatively on cover crop seed costs of $25 per acre and average cost of seeding at an additional $12 per acre, for a total cost of $37 per acre to establish cover crop seed. Cover crop termination costs may be additional on some farms, but most farmers either plant cover crops that winter kill or if using an overwintering cover crop will terminate them as part of their normal spring "burndown" control of early season weeds, with no extra costs. Many farmers with experience find they can establish cover crops at considerably lower cost, sometimes in the $15 to $20 per acre range, due to lower seeding costs and efficient seeding methods, but the SARE report used the $37 per acre cover crop establishment figure as a conservative baseline for costs.

Evaluating economic returns from cover crops is more complex. The first consideration is the cost of cover crop seeding and the impact on yields. Then over time, other factors start to affect the economics of cover crops as some inputs are cut back, such as fertilizers and herbicides, and farmers may even change other aspects of management in relation to cover crop use. For example, the use of cover crops may also contribute to a decision to go with no-till or a decision to start grazing cover crops. For the yield factor, the SARE report summarizes data from the 500 farms as showing yields improving over time, as documented in Table 1.

Table 1 Based on regression analysis of yield data from approximately 500 farmers who provided yield data in 2015 and 2016 for fields with and without cover crops, but otherwise comparable soils and management. The yield impacts shown for one, three, and five years are all statistically significant.

	One Year	Three Years	Five Years
Corn	0.52%	1.76%	3.00%
Soybeans	2.12%	3.54%	4.96%

Table 2 Net profit per acre for corn and soybeans following one, three, and five years of cover cropping, based on actual farm yield data (2015-16) and other data from SARE/CTIC National Cover Crop Survey.

	One Year	Three Years	Five Years
Corn	-$31.36	$1.42	$17.90
Soybeans	-$23.44	$0.42	$10.18

Above figures assume average weather and typical management conditions.

3 https://www.sare.org/wp-content/uploads/Cover-Crop-Economics.pdf

4 https://soilhealthinstitute.org/our-work/initiatives/economics-of-soil-health-systems/

The baseline approach with the national SARE Cover Crop Economics report showed it taking three years on average for cover crops to break even, with a net cost in years one and two and then a positive return starting in year four and beyond. This initial impact of cover crops being a negative cost in the first year of use is often cited as a reason more farmers have not tried cover crops. However, most farmers make other investments that take more than one year to pay off. This includes not only equipment purchases but certain agronomic practices like applying agricultural lime to fields, which is generally shown to take two to three years to pay off, in part due to the time it takes for the soil pH to respond to the application of lime (Mamo et al., 2009). Similarly, farmers and their lenders need to realize that use of cover crops is a multi-year investment that will pay long-term dividends but may not pay off in the first year of use.

The SARE Cover Crop Economics report outlined seven ways that cover crops can pay off more quickly depending on the particular management challenge or scenario applying to a given field or farm. Those scenarios and their impact on the time to achieve breakeven or positive net return for cover crops are outlined below and summarized in Table 3 below.

Table 3 Time to payoff for cover crop use under various management scenarios

Management challenge or scenario	Net profit impact per acre	Cover crop payoff time for soybeans	Cover crop payoff time for corn
Baseline economic scenario	—	3 years	3 years
Herbicide resistant weeds	$27	1 year	2 years
Compacted soils	$15	2 years	2 years
Addressing fertility needs/costs	$7 for soybean, $15 for corn	3 years	2 years
Converting to no-till	$24	1 year	2 years
Grazing	$49	1 year	1 year
Improving soil moisture in drought	$42 for soybean, $27 for corn	1 year	1 year
Receiving cover crop incentives	If ≥ $32	1 year	1 year

1 **Cover crops pay off faster when herbicide resistant weeds are a problem.** The SARE report showed an average expected economic benefit of $27 per acre when cover crops such as cereal rye are used to help manage challenging herbicide resistant weeds. The details of this (as with the scenarios below) are spelled out fully in the report, but in short, planting cover crops resulted in regular herbicide savings, such as using one post-emerge herbicide application instead of two rounds of application, and applying less expensive residual herbicides compared to when no cover crops are planted. As shown in the table, if herbicide resistant weeds are a significant problem (now found on over half of Corn Belt farms), cover crops can pay off in one year with soybeans and two years with corn.

2 **Cover crops pay off faster when dealing with soil compaction.** Here the SARE report showed a benefit of $15 per acre from using the cover crops, based on Ohio State University research comparing use of cover crops versus deep subsoiling on compacted soils, and University of Minnesota average machinery costs for subsoiling. Under this scenario, cover crops pay off a year faster for both corn and soybeans, in two years instead of three.

3 **Cover crops can pay off faster, particularly for corn, when addressing fertility needs.** At the time of the SARE analysis, fertilizer prices were considerably lower than present, but even then it was calculated that cover crops could reduce corn production costs by $15 an acre in early years (more later) and a modest $7 per acre for

Legume cover crops like this mix of crimson and balansa clover can reduce fertilizer costs. Photo credit: Rob Myers

soybeans. Fertilizer cost savings varied widely. A farmer willing to delay corn planting and let a cover crop grow longer would gain far more nitrogen credit from the legume cover crop than one terminating earlier, but might also suffer a modest yield penalty for delayed planting depending on the year. The SARE calculation assumed only a modest amount of nitrogen savings with corn planted on the standard schedule for a given area. Under this scenario, cover crops with corn would pay off a year faster than otherwise, so in two years. The phosphorous savings with soybeans was minor enough to not affect time to pay off.

4 **Cover crops pay off faster when combined with no-till conversion.** An interesting trend is that many cover crop users who are still using tillage will start to explore no-till more seriously after getting into cover crops. While more research is needed, growing evidence is that cover crops can help prevent the normal yield dip that occurs when adopting no-till in conventional systems. Normally, conversion from a tilled system to a no-till system causes some temporary soil compaction and potentially reduced distribution of nutrients that affects cash crop yields for a few years until the soil and system adjusts. By starting with a cover crop and then adding no-till, some of these negative temporary consequences appear to be reduced or avoided. For example, a farmer wanting to convert a field to no-till may start by planting cereal rye in the fall, then no-till plant soybeans into that cereal rye the following spring. The rye cover crop helps reduce the potential soil compaction by increased earthworm activity, better rainfall infiltration, and gradually improved soil aggregate structure and organic matter. The improved rainfall infiltration, more macropores, and earthworm activity all allow applied fertilizers to get more deeply into the soil without tillage. In turn, the no-till system has considerably reduced machinery, fuel, and labor costs. The SARE report estimated initial savings from a combined no-till/cover crop system at $24 per acre, which would allow cover crops on soybeans to payoff in one year and in two years with corn. With additional years of use, the positive net returns are even higher as soil health improves.

5 **Cover crops pay off faster when grazed.** Many farmers who have started grazing cover crops find it to be a highly profitable practice. This conservation practice can provide benefits from not only an improved rate of gain on livestock but also from a hay replacement standpoint. Using a hay replacement economic model, the SARE report identified savings of $49 per acre from grazing cover crops, which would make the cover crop pay off right away in year one for corn and soybeans. This assumes that electric fencing supplies and water access for grazing animals is already available or can be obtained at modest cost. If cost of fencing or water is higher, then of course it could take an extra year or possibly two for the grazing to pay off.

Grazing cover crops has been shown to be a very profitable system for many farmers. Photo credit: Brett Peshek.

6 **Cover crops pay off faster in challenging weather years, acting as a form of crop insurance.** In the drought of 2012, cover crops provided a sizable yield benefit for corn and soybeans, with an average 9.6% yield gain for corn after cover crops and 11.6% for soybeans. In areas hit hardest by the drought that year, cover crops had an even bigger impact on yield. Cover crops have also been shown to help in wet years, in many cases allowing earlier planting when used for multiple years in combination with no-till. Using the 2012 yield experience, the SARE report documented a $42 per acre extra return on soybeans and $27 per acre extra return on corn, making cover crops pay off in the first year of use under those drought weather conditions.

7 **Cover crops pay off quickly when incentive payments are incorporated.** The amount of cover crop incentive payments from federal, state, and private sector sources has expanded greatly in the past few years. The USDA Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP) has been the largest single source of cover crop incentive payments in recent years, providing hundreds of millions of dollars for cover crop adoption annually. Typical EQIP incentive rates for cover crops are around $50 per acre or more with three-year contracts provided. Beginning farmers and farmers in other special categories can get an even higher rate, depending on the state. Some states are less than $50 per acre, but even those are above $32 per acre, which would allow cover crops to pay off right away in year one. Other incentive programs from state or private sources may be a lower rate, but certainly help cover crops payoff more quickly.

Soil Health Institute Economic Case Studies

In 2021, the Soil Health Institute (SHI), an internationally known non-profit organization based in North Carolina, released results of 100 detailed case studies of commodity crop farmers from 9 represenative states in the Corn Belt (IA, IL, IN, MI, MN, NE, OH, SD, and TN). This was the most comprehensive set of case studies done to date of farmer experiences with soil health practices such as no-till and cover crops. The results of these case studies are summarized below; the full report on these case studies is available online at: https://soilhealthinstitute.org/our-work/initiatives/economics-of-soil-health-systems/.

The 100 farms were evaluated through a partial budget analysis. These farms averaged 1940 acres, with corn and soybeans being the dominant crops, although a number of the farms had additional crops, including several with wheat. This group of farmers were largely no-tillers, with 85% of the total farmland in no-till management (this compares to 37% of U.S. farmland in no-till). The remaining 15% of the

land was managed with reduced till. These farmers had 53% of their land in cover crops. Farmers were experienced with these practices, reporting an average of 19 years of experience with no-till and an average of 9 years of experience with cover cropping.

Of the 100 farmers, 85% reported an increase in net income for corn from use of soil health practices. For all farmers, average net benefit for corn from using soil health practices was $51.60 per acre. Similarly, 88% of the farmers reported an increase in net income for soybeans, and over all the farms, the average net economic benefit for soybeans from using soil health practices was $44.89 per acre.

These increases in net income were a combination of increased revenues, primarily from improved yields, and also reduced operating costs. Sixty-seven percent of the farmers had yield increases compared to conventionally managed fields. Overall, these yield increased averaged 7.7 bushels per acre for corn and 2.9 bushels per acre for soybeans. Corn production costs were $24.00 per acre less from using soil health practices, while soybean production costs were $16.57 per acre less. These cost savings resulted from a combination of reduced fertilizer use, reduced trips across the field (saving labor, fuel, and machinery costs), and other reduced inputs. Seed costs were higher for the farmers using cover crops but the extra cost of cover crop seed was more than offset by the other economic benefits.

Notably, 97% of the farmers reported increased crop resilience to extreme weather. Significantly, highest crop prices often occur when there is wide-spread weather challenges, such as drought years or excessively wet years like 2019 when many fields had planting delayed by several weeks or were not planted at all. Some of this resilience comes from increased soil organic matter, with 54% of the farmers documenting soil organic matter increasing an average 1.2%. Many farmers who have adopted soil health management systems comment on the resiliency aspects of the system being a reason to expand and stick with the approach, effectively resulting in a type of risk management helpful to both farmers and lenders.

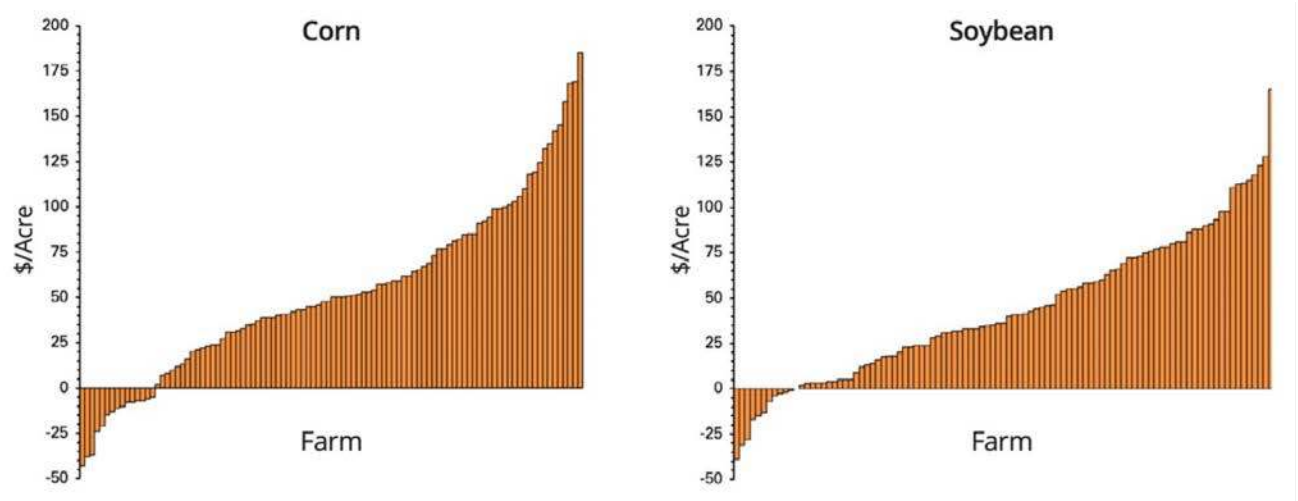

Figure 2 Change in net farm income from corn and soybeans for 100 farms after adopting a soil health management system compared to a conventional system. Figure courtesy of the Soil Health Institute from the 2021 report "Economics of Soil Health Systems on 100 Farms."

As shown in Figure 2 above, there was significant variation among the 100 farms in their net return impact from adopting soil health practices, but the overall pattern is clear that most had a net increase in income, and for the majority the increase in income was significant.

Other Sets of Case Studies on Farmer Experiences with Soil Health Practices

American Farmland Trust Case Studies

A set of 13 case studies on soil health management practices was done between 2019 to 2022 by American Farmland Trust. Of the 13 case studies, 10 were on row crop farms (IL, OH, OK, NY, and PA) and are summarized here. Most of the row crop farms had been implementing cover crops and no-till for several years, but two of the farms had just converted to these practices 2-3 years before analysis. The farms showed yield benefits with a total increase in net income from $14 to $151 per acre. Return on investment for the soil health practices was calculated as ranging from 7% to 343% depending on the farm.

Five of the ten farms had fertilizer savings ranging from $16 to $70 per acre. Nine of ten had savings on machinery operations, including fuel and labor, ranging from $14 to $77 per acre. Half of the farmers changed pesticide applications and half did not. Of those that did change pesticide applications, two had savings ranging from $16 to $20 per acre and three had increased costs ranging from $5 to $12 per acre. All ten of the farmers noted less soil loss and water runoff from their fields.

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Soil Health Partnership Case Studies

Another set of case studies on cover crops and conservation tillage was summarized for seven farms spanning five states (IA, IN, MN, MO, and WI) in 2020 by economists with the Soil Health Partnership (a program of the National Corn Growers Association) with assistance from accounting staff from K Coe Isom and Environmental Defense Fund staff. The report, titled "Conservation's Impact on the Farm Bottom Line" contained a number of relevant findings. Similar to the SHI report, farmers had a mix of practices, generally using cover crops on some but not all acres and generally having high adoption of conservation tillage approaches. One of the key findings from the case studies was the farmers with experience doing cover crops and conservation tillage had significantly better profitability than those that were just starting with cover crops. For corn, net profit by experienced cover crop users with conservation tillage was $376 per acre versus $324 per acre for conventional fields, but farmers who were recent adopters of cover crops were netting less at $266 per acre. Soybeans had a similar pattern, with $250 per acre for experienced cover crop users with conservation tillage versus $215 per acre for conventional management, while recent cover crop adopters had less profit on the cover cropped fields at $123 per acre. Notably, farmers participating in this study were members of the Soil Health Partnership on-farm testing program, where the farmers were asked to test cover crops on a given field. In the recent adopter cases, farmers were often using conventional equipment approaches for the cover crop fields without adjusting since it was a small part of acreage, but those with expanded use of the practice were optimizing their management for the cover crops and conservation tillage systems.

Section III

Considering Soil Health Management Implications for the Farm Finance Community

The information provided in sections I and II focused on cover crop and no-till/conservation till impacts on row crop production. Cover crops and no-till are the two most commonly cited and discussed soil health management practices for annual crops, but there are other important soil health management practices. For example, having diversified crop rotations is beneficial for soil health by promoting more diversity of soil organisms. A sound strategy for nutrient management, which can include applications of manure or compost, can be beneficial for soil health and organic matter. Integration of livestock into annual crop systems, such as through grazing cover crops, is also helpful due to the positive impact of manure, urine, and saliva in stimulating soil biological activity.

The USDA Natural Resources Conservation Service (NRCS) has defined soil health as **the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans.** NRCS key principles for soil health are:

- **Maximize Presence of Living Roots**
- **Minimize Disturbance**
- **Maximize Soil Cover**
- **Maximize Biodiversity**

Integration of livestock is often cited as a fifth principle. The above principles are more easily met with perennial cropping systems, such as pastures, vineyards and orchards, but even in perennial systems, considering a diversity of plants and keeping the ground fully covered with living roots year round is key. For example, many orchard and vineyard systems could benefit from eliminating tillage between the rows and keeping living cover in place.

While perennials can be a plus for soil health, recognizing that significant improvements in soil health can be achieved by applying the principles above to annual row crop systems such as corn and soybeans is important. As previously noted, cover crops and no-till or strip-till can be very effective ways to achieve a number of these soil health principles.

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Given the goals of soil health and typical practices used, how does soil health fit into management and consulting roles of agriculture lenders, farmland managers, appraisers and others involved in the farm financial community? Below, we address each of these categories.

Agriculture Lenders

For any lender considering an application, it is important to know that risk will be reasonably low and prospects for profit reasonably good. The risk factors include crop insurance availability for commodity crops and use of farming practices common to the area (considered "safe" approaches). In the case of cover crops and no-till, there is currently no restriction on use of these practices in terms of crop insurance eligibility as long as "Good Farming Practices" are met, same as with any other agronomic practice, including fertilizers, pesticides, and variety selection.[5] This is a change from past years, reflecting a growing understanding of the benefits of such practices, when certain restrictions existed related to cover crops in terms of crop insurance eligibility.

Every year, additional data is further documenting the value of soil health practices like cover crops and no-till for reducing risk with cash crops. A major study[6] undertaken by the Meridian Institute in partnership with USDA focused on six Midwestern states (SD, MN, IA, IL, IN, and MO) that had over 10 million acres of land that could not be planted at all in 2019 due to an extremely wet spring, and were declared "prevent plant" for crop insurance purposes. In that study, researchers examined data from thousands of fields and found that use of cover crops and no-till for even a single year:

- Resulted in a 24% reduction in the odds ratio of prevent-plant loss in 2019
- Allowed earlier planting of corn and soybeans during the critical late planting window of the spring when delays of a single day can have a big impact on eventual yields

Lenders should be aware that a lot of resources are available on cover crops as well as a tremendous amount of farmer expertise all across the country.

Other aspects of financial risk include evaluating whether the soil health practices are so different from traditional approaches that they are perceived as unproven. In the early days of no-till (and other conservation tillage approaches like strip-till), these tillage changes were viewed as risky. Some farmers and lenders may still perceive a degree of risk in changing tillage systems, but in fact, a wealth of experience, equipment, and knowledge on conservation tillage practices greatly minimizes any risk. Likewise, cover crops were viewed as risky a decade or more ago when they were much more uncommon, and even now may be perceived as risky in some areas. However, lenders should be aware that a lot of resources are available on cover crops as well as a tremendous amount of farmer expertise all across the country, as evidenced by the over 20 million acres of cover crops now being used on well over 150,000 farms. Key information resources include:

- Four non-profit regional cover crop councils—each has guidelines for cover crop use
- The USDA-SARE program has a large amount of cover crop resources[7]
- USDA-NRCS staff have information on cover crop management
- Many soil and water district staff and university extension staff have cover crop expertise
- An increasing number of cover crop seed companies can offer management tips
- Other farmers in the area experienced with cover crops and soil health management

Finally, lenders may also question how profitability will be impacted by adoption of soil health practices. As outlined in Section II of this paper, cover crops and no-till typically boost profitability in row crop systems, which has been extensively documented for corn and soybean systems. There is also evidence that these management practices can be helpful for other types of crops. A key consideration is that it may take two to three years for net returns to become profitable, depending on the particular management situation and whether incentive payments are part of the profitability equation. However, just as an ag lender would normally be supportive of other multi-year investments that will boost long-term profitability and risk reduction, so should the use of soil health management practices be a priority to increase long-term profitability.

5 https://www.rma.usda.gov/en/Fact-Sheets/National-Fact-Sheets/Cover-Crops-and-Crop-Insurance
6 Conservation and crop insurance pilot report. 2023. Meridian Institute, Washington, DC.
7 https://www.sare.org/resources/cover-crops/

Farmland Managers

Some of the same questions that agriculture lenders have about soil health management practices will apply to farmland managers, many of which work for lending institutions. Rather than viewing soil health practices as an impediment to working with producers, improving soil health is an opportunity for farmland managers to develop their own expertise on soil health management and use that as a selling point to maintain or gain new clients. After all, most landowners want their farms and soils to be taken care of, and implementation of soil health management practices is a sound strategy for insuring the long-term productivity and value of the land.

Some landowners may be hesitant to embrace what they view as significant changes in land management, particularly converting to no-till and/or cover crops. They may comment that they do not want their field to look "trashy" or different from traditional practices.[8] Encouraging those landowners to watch a relevant educational soil health video, such as the highly popular and award-winning Living Soil film from the Soil Health Institute,[9] or attend a soil health field tour in their area, will likely help reassure them. Discussing the long-term benefits to their land of soil health management is also a way to help address misperceptions.

Appraisers

Valuation approaches to farmland can vary depending on the region, with some regions making use of productivity indexes and others relying simply on relative values of recent comparable sales. The increased understanding of soil health indicators and soil health management creates an opportunity to take a more nuanced approach to helping clients evaluate the value of land parcels. For example, two adjacent fields of the same soil type would normally be valued the same, but if Field A has been farmed conventionally for many years and Field B has been in long-term no-till with cover cropping, we could expect some substantial differences between the productivity of those fields. The long-term soil health management on Field B may have raised soil organic matter by a percent or more, greatly improved rainfall infiltration and aggregate soil structure, reduced erosion (leaving more topsoil in place), and contributed to enhancement of soil properties making the field more resilient to challenging weather such as droughts or intense rainstorms. Taking those factors into account, should both fields be valued equally?

The increased understanding of soil health indicators and soil health management creates an opportunity to take a more nuanced approach to helping clients evaluate the value of land parcels.

Dr. Jim Hoorman[10] recently summarized some work on the impact of no-till on land values. He said:

> An organization called Rural Investment for Protecting our Environment (RIPE) came up with $112 per acre as the value associated with no-till farming. This included $7 for increased carbon sequestration, $16 for improved air quality and human health, $25 for better water quality and $44 for improved soil nutrient management—all on a per acre basis. No-Till Farmer has been documenting farmer benefits for 25 years with farmers indicating they saved $25-$90 per acre in reduced production costs. A conservative figure is $30 per acre on average for reduced fuel, equipment, labor and nutrient (fertilizer) costs and higher water use efficiency, especially for irrigated farmland. Altogether, no-till farmers gain at least $142 per acre in economic benefits. This value represents $16 billion dollars of value to the 110 million acres in the U.S. that are using no-till farming practices.

8 Kawa, N.C. 2021. A "win-win" for soil conservation. How Indiana row-crop farmers perceive the benefits and trade-ffs of no-till agriculture. Culture, Agriculture, Food and Environment. Published May 24, 2021.

9 Living Soil Film from the Soil Health Institute is available at https://www.youtube.com/watch?v=ntJouJhLM48

10 Hoorman, J. 2022. How no-till improves land values. No-Till Farmer. December 8, 2022.

Summary and Overall Considerations for Farm Finance Community

Members of the farm financial community have a vital role in helping guide and support farmers and landowners in management decisions that will enhance the value of their land and improve productivity and resiliency of the fields and pastures being managed. Sharing information on soil health management practices among all relevant parties is a good starting point to ensure that all parties are comfortable with management changes that meet overall goals for the land while reducing risk and providing for prosperous outcomes.

In addition to soil health practices like cover crops and no-till/strip-till, other conservation practices can also contribute economic and environmental benefits to farm operators, landowners, and rural communities. This includes practices like conservation buffers, diversified crop rotations (including perennials), pollinator and wildlife plantings, regenerative grazing systems, agroforestry, and many other relevant practices. As additional evidence builds on the economic value of these other conservation practices, that information should also be factored into farm management, appraisals, and other farm finance reviews.

Conservation buffers such as the prairie strips planted on the contour across the Iowa soybean field above can play a significant role in reducing runoff of soil, fertilizers, and pesticides while also providing habitat for wildlife, pollinators, and other beneficial insects. Photo credit: Rob Myers

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