

A Business Case for Retail Ag to Engage in Deploying Soil Health and Conservation Focused Management Practices

BY DAVID J. MUTH JR.
PhD, VP Agronomic Planning
and Sustainability
EFC Systems, Inc.

Soil health has become a powerful tool to engage the conservation community and agribusinesses toward a common set of goals. There are several successful soil health initiatives currently bringing these groups together around a unified mission. The Soil Health Partnership [1] has grown to over 110 field trials across 12 states focused on rigorous data collection and practical demonstration of soil health management practices. The Soil Health Institute [2] is deploying resources toward applied and fundamental research on soil health measurement and practices. USDA's Natural Resources Conservation Service (NRCS) [3] has established a national division focused on providing the best available soil health science, training, guidance, and technical resources. Field to Market [4], a consortium of over 100 private sector, public sector, and non-profit organizations representing diverse agricultural interests has soil health as a centerpiece metric for its assessment algorithms.

Corporate sustainability reports for some of the largest businesses in the world, covering the agricultural supply chain from end to end, are increasingly referencing soil health as a key outcome for their various initiatives. These businesses include agriculture input providers Monsanto, Syngenta, Agrium, CF Industries, and many others.

At this other end of the supply chain, Walmart, McDonalds, General Mills, and Danone are among the many dozens of large corporations including soil health outcomes as a primary focus for their sustainability efforts. The momentum is

building, and soil health has become a proxy term for broader conservation and sustainability goals.

There is, however, a great deal of important work remaining to 1) understand the fundamentals of soil health, 2) develop improved methods and protocols for soil health assessment, 3) educate the agricultural community on how to successfully implement soil health practices, and 4) perhaps most importantly, clearly identify and articulate the business outcomes from the adoption of soil health and conservation focused management practices. Despite the uncertainty and challenges that remain, now is right time for retail agriculture and precision agriculture service providers to focus on soil health as a core component of the services they are delivering to their farmer customers.

Retail agriculture and precision agriculture service providers do face some challenges supporting their farmers in the adoption of soil health and conservation focused management practices.

The consortiums and initiatives discussed earlier are working hard to identify and communicate the right practices for different circumstances, and provide the informational resources to help implement practices successfully. These are critical outcomes for retail and precision agriculture service providers to be efficient and effective, but they face an additional burden: they must deliver immediate positive financial

outcomes for their farmer customers in the products and services they provide. Farmers, along with their product and service providers, continue to operate in a challenging economic environment. History has clearly shown that ignoring soil health and conservation will ultimately lead to agricultural failure, but as we hear often, a continuous improvement plan focused on 10-year soil health and conservation outcomes can't be successful if the farmer implementing it goes out of business next year.

The positive news is that environmental and economic performance don't have to be competitive [5]. Many of the

KEY TAKEAWAYS

- There are opportunities to use soil health and conservation practices to improve near-term financial results for farmers.
- Service providers, through their use of precision agriculture services, are uniquely positioned to the support soil health and conservation-focused management practices of farmer-customers.
- Many of the positive outcomes from these practices require long term commitments to become fully realized.
- Precision agriculture data is the key to finding and taking advantage of these opportunities, and service providers have the resources and data access to mobilize and support their farmers' efforts on this front.

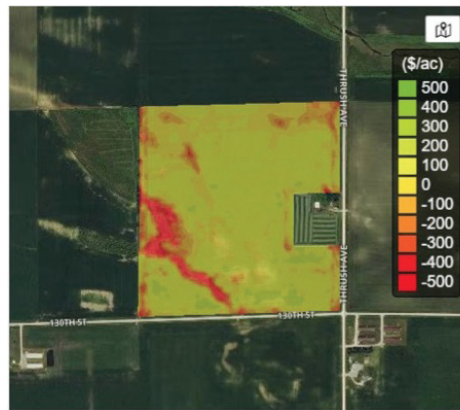
productivity benefits from adopting soil health and conservation practices take 5+ years to fully realize, but there are several opportunities for retail agriculture and precision agriculture service providers to engage their farmer customers in business focused conversations that deliver conservation and soil health outcomes.

Simply stated, we can achieve conservation goals by focusing on the make more money conversation through these opportunities. We see these direct business results emerge through analysis and examples in the following four categories: 1) improving annual cash flow, 2) improving land asset values, 3) diversification of revenue, and 4) market access. The following discussion describes how, through each of these four categories, retail agriculture and precision agriculture service providers can use data and services to simultaneously deliver positive business and conservation outcomes for their farmer customers.

IMPROVING ANNUAL CASH FLOW

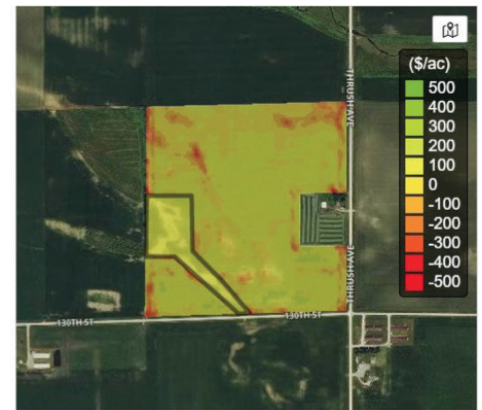
Any practice that improves profitability immediately is obviously going to be interesting to a farmer customer, and directly within the core mission of the service provider. Precision data is the key to connecting soil health and conservation practices with immediate profit impacts. It is well understood that significant subfield variability exists even in our most productive fields. We find that between 5%-20% of nearly every field we collect data on is consistently not profitable. The farmer operating the field is rarely surprised when zones within their fields show consistently negative ROI.

There are a few points here that are more surprising. First, the extent of the financial loss on certain zones within a field are often higher than the farmer realizes, in many cases \$500/ac or more annual loss. Second, this subfield pattern of variability in financial results tends to hold across geographic regions and different production systems. Third, when we apply conservation planning tools, like the models provided by NRCS for erosion and soil quality modeling, the zones within our fields that are losing money consistently also tend to have more environmental performance issues.



Scenario: Actual Production

Parameter	Value
Acreage	144.8 ac
Average Yield	170.6 bu/ac
Profit	\$17.12 /ac
ROI	2.7%
Production Efficiency	266.0 bu/\$1000
Acreage Opportunity Ratio	27%
Working Capital Opportunity	\$24,856.09
Breakeven Commodity Price	\$3.76
Total Field Expenses	\$92,871.26
Total Field Revenue	\$95,350.72
Total Field Profit	\$2,479.47



Scenario: Pollinator Zone

Parameter	Value
Acreage	144.8 ac
Average Yield	178.9 bu/ac
Profit	\$40.90 /ac
ROI	6.7%
Production Efficiency	293.0 bu/\$1000
Acreage Opportunity Ratio	22%
Working Capital Opportunity	\$20,464.53
Breakeven Commodity Price	\$3.24
Total Field Expenses	\$88,418.62
Total Field Revenue	\$94,340.28
Total Field Profit	\$5,921.66

Figure 1. Case study farm showing multiple years actual production history on the left compared to a conservation practice scenario on the right. The adoption of the conservation practice in this scenario results in improved profit of over \$23/ac for the whole field average.

Precision data resources allow us to quickly and easily identify the acres within our fields that demonstrate consistently poor financial performance. In many scenarios precision agriculture methods such as variable rate seeding and fertility management can improve the financial result. Many other situations provide an opportunity to deploy new conservation-focused practices simply because they improve the financial result.

The approach to these management changes will often depend on the opportunities at a highly local level. For example, in some cases there may be robust forage biomass markets that can be accessed. Often federal or state level conservation funding programs, such as the Conservation Reserve Program or Conservation Stewardship Program, can be utilized to provide alternative revenue that delivers a higher ROI than the standard cropping system. Other situations exist where financial performance is consistently so poor that placing a low-cost

cover on subfield zones and simply not farming those acres creates an improved financial outcome. It is common to improve whole field financial performance by \$20+ /ac and 3%+ improvement in ROI through strategic implementation of these options (Fig. 1). Every field, farming operation, and land owner/tenant relationship are unique; there is no universal solution. Precision agriculture service providers are often in the best position to help their farmer customers explore these opportunities because they manage the farmers' data resources and guide them through the decision processes.

IMPROVING LAND ASSET VALUES

Soil health advocates are working hard to engage soil health assessments in real estate transactions and land appraisal workflows. This would create clear signals that impact land asset valuations and directly impact many farmers' financials. The key principle here is that the soil health metrics are tightly correlated with improved

productivity, increased resilience under climate stress, and ultimately lower risk with the production system. Improving revenue through increased productivity and lower production risk are clear financial incentives, but as discussed previously these soil health outcomes can often take 5+ years to fully realize.

The previous discussion about improving annual revenue through precision focused soil health and conservation practice deployment can impact asset valuation immediately. Let's consider the land asset purely from an investment perspective. Row crop land investments right now are typically targeting a 3%-4% capitalization rate, meaning the annual revenue from the investment needs to be 3%-4% of the total capital deployed. A \$10,000/ac land acquisition would be expected to return \$300-\$400/ac in annual cash rent in this case. The impact of improving average annual cash flow, through the precision conservation approaches discussed previously, can quickly be evaluated for their impact on asset valuation using the capitalization rate approach.

Using the example provided in Fig. 1, a precision conservation practice that improves average profit \$23/ac across a field, a common result from our experience, evaluated at a 3.0% capitalization rate would have an impact of \$767/ac on the value of that land asset. Soil health metrics and improved annual cashflow can help a farmer landowner through improved valuation. Retail agriculture and precision agriculture service providers are uniquely positioned to support their farmer customers take advantage of this.

As soil health assessment protocols become more standardized the service providers will be able to include these protocols in their agronomic soil sampling services. Furthermore, the precision agriculture services that are often built upon soil sampling to deliver recommendations align with the precision conservation recommendations that can improve annual cashflow.

DIVERSIFICATION OF REVENUE

Alternative revenue sources represent a real, and potentially significant, opportunity for farmers to improve business results in the current challenging farm

economy. Soil health and conservation focused management practices offer potential for a variety of alternative revenue sources, including opportunities for long term fixed revenue.

One of the issues that farmers are facing right now is that for several years, the economic conditions have been depleting liquid working capital. Alternative revenue sources that require reduced, or even zero input costs can be a use tool to incorporate into a land management plan. Government conservation programs such as the Conservation Reserve Program (CRP) offered by USDA can be effective alternative strategies for acres that are consistently not profitable. These programs require long term commitments (10+ years) for enrolled acres to be converted into the conservation practices.

This can be a significant benefit during a weak farm economy but will be potentially limiting in an increasing commodity price environment. Retail agriculture and precision agriculture service providers delivering data resources to farmers can play a key role in helping their farmer-customers identify the acres where long term commitments to USDA programs are likely to provide long-term financial benefits. Market-based alternatives such as forage crops and alternative cropping systems can create improved financial performance, particularly on subfield zones that show consistently poor performance. These alternatives experience fluctuations in price, and subsequently revenue, but they typically require less input dollars and provide strength through diversification in markets.

Each of these practices are core strategies in soil health and conservation focused management. Retail agriculture and precision agriculture service providers have the data resources necessary to support proper deployment of these alternative revenue strategies to simultaneously improve financial performance for their farmer customers and deliver improved soil health and conservation results.

MARKET ACCESS

Consumers are putting pressure on food providers to deliver products that have improved sustainability profiles. The definition of sustainability is not fixed

or universal, but the agricultural supply chain recognizes that production systems implementing soil health and conservation focused practices are currently the standard for documenting sustainably produced commodities.

It is not clear yet whether food makers will provide significant premiums for commodities that are produced sustainably, or whether these end users will simply require certain environmental performance profiles for a commodity to get access to their market. The ADM/Unilever Soybean Sustainability Program [6] is an example where price premiums were provided for soybeans produced under specified criteria, but it is not clear that will be a standard market practice in the future.

Regardless of whether a farmer gets a price premium or just simply maintains access to a market, data driven documentation of soil health and conservation focused management practices will be standard practice in the future. Retail agriculture and precision agriculture service providers need to be positioned to support their farmer customers in deploying these practices and managing the data that documents sustainable production.

CONCLUSION

Retail agriculture, through their precision agriculture services, is uniquely positioned to support farmer-customers in implementing soil health and conservation-focused management practices. Many of the positive outcomes from these practices require long term commitments to become fully realized, and retail agriculture must also maintain a strong focus on near-term financial results for their farmer-customers.

As discussed in this paper, there are opportunities to use soil health and conservation practices to improve near term financial results for farmers. Precision agriculture data is the key to finding and taking advantage of these opportunities. Retail agriculture has the resources and data access to mobilize and support their farmers in taking advantage of these opportunities. Focusing on the specific business outcomes discussed in this paper will help retail agriculture simultaneously meet the near and long term needs of their farmer customers. □

REFERENCES

1. Goeser, Nick. *A project to make agriculture more productive and sustainable through improved soil health*. Soil Health Partnership. 2018, <http://soilhealthpartnership.org/about-us.html>.
2. Honeycutt, Wayne. *About the Soil Health Institute*. Soil Health Institute. 2016, <https://soilhealthinstitute.org/about-us/>.
3. United States Department of Agriculture. *Unlock the Secrets in the Soil – Soil Health*. Natural Resources Conservation Service. 2018, <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/>.
4. Snyder, Rod. *Field to Market: The Alliance for Sustainable Agriculture*. Field to Market. 2018, <https://fieldtomarket.org/the-alliance/>.
5. Muth, D. J. (2014). *Profitability versus environmental performance: Are they competing?*. Journal of Soil and Water Conservation. 69, 6, 203A-206A.
6. Anderson, Jackie. *ADM and Unilever Sign Joint Business Development Plan*. Archer Daniels Midland. 6 Jan. 2015, <https://www.adm.com/news/news-releases/adm-and-unilever-sign-joint-business-development-plan>.