

Soil Health Practices and Farm Profitability: Insights from Kansas Farms

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Why this matters: Farmers are under policy, market, and consumer-driven pressure to adopt soil health practices such as no-till, cover crops, and crop rotation, for environmental reasons, but the big question remains: *Do these practices pay?*

What this study did: Our study combined soil health practice data with financial records from 438 commercial crop farms based in Kansas to understand how adoption relates to farm profitability.

Key Findings

- **Adoption of soil health practices linked to higher profits**
 - Farms classified as “high adopters” based on agronomic principles earned, on average, a 5.6 percentage point higher net farm income ratio than low adopters. This difference is equivalent to about \$56,000 more net income per \$1 million in sales.
- **Lower costs help explain the difference**
 - High-adoption farms had a 4.7 percentage point lower operating expense ratio. The difference is about \$47,000 less in operating costs per \$1 million in gross revenue, suggesting that cost savings may drive the financial benefit. Expense reductions appear to be the main driver of financial benefits.
- **Yield relationships were mixed**
 - Small yield advantages were observed for soybeans and corn, but results varied by crop and were not always statistically different from zero. This finding may be due to data limitations.
- **Operator age is related to adoption, farm size is not**
 - Younger farmers in the sample tended to be more open to adopting soil health practices, highlighting the role of generational shifts in shaping future adoption. Farm size didn’t have a consistent relationship with adoption of soil health practices.
- **Not all measurement methods agree**
 - When we tested three different ways of defining “soil health practice adoption,” only the scoring system designed by K-State agronomy researchers and accounting for regional variation, such as water shortages in western Kansas, showed a consistent relationship with positive financial outcomes. This is likely due to classification of farms as high, medium, or low adopters differing substantially across measurement methods.



It's best to look at one study as part of the bigger picture, not on its own. The main advantage of this research relative to other studies is that it combines farm-level financial data with detailed information on current soil health practices. While this research expands the existing knowledge base, much is still unknown.

What we know about the measurement and profitability of soil health practices: Our findings are consistent with established agronomic findings that soil health outcomes and indicators of financial performance (yields and input use) have the strongest relationship [when multiple practices](#) are implemented as an [integrated system](#) rather than in isolation. The finding that different measurement methods led to different classifications of high, medium, and low adopters is consistent with the [lack of standardized methodologies](#) to classify conservation agriculture or soil health practices.

What we still don't know: While this study provides evidence that soil health practice adoption is *associated* with improved financial performance, important questions remain. Although high-adoption farms tend to be more profitable, it is unclear whether soil health practices cause higher profitability or whether more profitable farms simply have greater capacity to adopt these practices. Because our analysis is based on one production year, it does not capture transitional effects or the evolution of profitability over time, when short-term costs may precede long-term gains. Also, the lack of longitudinal, multi-year financial and biophysical data constrains our ability to evaluate cumulative, dynamic, or risk-related outcomes.

Next steps: Building on the current findings, future work should further examine the mechanisms linking soil health practice adoption to financial outcomes and clarify when financial benefits are most likely. Progress will depend on access to multi-year, farm-level datasets that integrate management practices, input use, soil and weather conditions, and detailed financial records. Such data is rarely available in a consistent, longitudinal format. Another barrier is the lack of standardized measures of soil health-related practice adoption, which limits comparability across operations and regions. Studies comparing practices to soil health outcomes may aid in the development of improved measures. Further, moving beyond case studies toward broader evidence will be essential for identifying whether the relationships observed in this study are generalizable.

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