



Reducing fugitive nutrients should start with improving our soils

Achieving Success Through A Conservation Cropping Systems Approach

THE ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY

Summary

American Farmland Trust strongly recommends that the Agricultural Water Quality Partnership Forum consider the promotion and voluntary use of Conservation Cropping Systems (CCS) as the primary approach to implementing Illinois' Nutrient Loss Reduction Strategy. CCS is an integrated, farm-specific system of management practices that help farmers replenish soil health and restore organic matter to their farmland soils. The improvements in soil biology resulting from CCS implementation help farmers increase nutrient efficiency and crop yields, reduce sediment and nutrient losses, and make farms more resilient to extreme weather conditions.

A Future-Oriented Implementation Approach for the NLRS

The Illinois Nutrient Loss Reduction Strategy (NLRS) harnesses the right array of outreach and education efforts to help Illinois farmers address nutrient loss and select the most appropriate individual best management practices or BMPs (e.g. nutrient management, cover crops, reduced tillage, saturated buffers, drainage water management, bioreactors and wetlands).

The successful long-term implementation of this strategy rests on the ability to: 1) persuade farmers to voluntarily adopt conservation and management practices to prevent a loss they can't readily observe; and 2) anticipate and adjust to the impacts of increasingly variable weather patterns. Unfortunately, the policy and production systems currently in place coupled with budgetary restrictions may make this an uphill battle.

Achieving significant water quality improvements in water bodies as large as the Mississippi River and Gulf of Mexico takes time, and the increasing impacts of climate change such as more frequent extreme weather events pose additional challenges.

NANCY STONER

U.S. EPA, SEPTEMBER 2013

If farmers use a CCS approach to reinvigorate soil biology and switch to year-around cover on farm fields, many will be able to curb erosion, increase nutrient-use efficiency and soak up excess nutrients without additional edge-of-field practices. But even with the widespread use of CCS, some farmers may also need edge-of-field practices—e.g. bioreactors, saturated buffers, filter strips, wetlands, etc.—to prevent enough nutrients from being lost to streams and rivers.

Although improving soil health can help address many of the problems with phosphorus (P) runoff, the situation with nitrogen (N) can be more complex. As farmers use cover crops to improve soil health, the crops have to be managed carefully to minimize potential losses of N from green manures. Since edge-of-field practices can be expensive and some may take portions of farmland out of production, it will be critical to find sustainable ways to fund their implementation.

The Weather Card: Weather Changes in Illinois

Projected changes in the climate for the Midwest include greater extreme precipitation events and seasonality shifts, longer and warmer growing seasons, and increased humidity. Probable impacts include a decrease in workable field days during the spring; increases in soil erosion from fields and stream banks; a need for more drainage and water management; more extreme heat events during summers; and excessive precipitation or warmer weather in late fall.

Climate researchers singled out Illinois as one of a handful of states with the highest potential mean vulnerability to erosion due to the effects of climate change-induced rainfall runoff. These climatic changes will most likely:

- Offset some benefits of the individual conservation practices promoted by the NLRs;
- Encourage installation of more drainage tile leading to greater N losses, all other factors being constant;
- Make the maintenance of implemented BMPs like filter strips and grassed waterways more difficult because of damage caused by prolonged sediment deposition and concentrated surface flows.

Why Conservation Cropping Systems?

Most farmers strive to increase crop yields. According to a recent survey by the Precision Ag Institute, 74 percent of farmers strongly agreed that they are motivated to see how high they can get their yields, and most are paying keen attention to potential limiting factors, including soils.

Improving soils is the first step to producing high yields.

Currently, Midwest corn and soybean farmers lose 20 percent of their potential yields 80 percent of the time due to short-term water stress. The primary factors that influence fertility and high yields are weather and soil quality. CCS focuses on improving soil quality by increasing the soil's biological activity and improving root development. The effectiveness of 4R nutrient stewardship is dependent on root development and soil biology.



Improving soil health will benefit landowners who rent farmland. By improving the land's productivity, the value of a landowner's investment is enhanced, whether it is for long-term financial gain or a family inheritance.

Farmers can manage soils to mitigate weather extremes in temperatures and precipitation through increased organic matter and associated biological activities. A one percent increase in organic matter equates to a 0.5-acre-inch increase in available soil water capacity or 13,577 gal/acre of additional water.

Individual BMPs are more likely to be maintained within CCS. Maintenance of individual BMPs is more likely to occur if the farmer is following an integrated farm management plan like CCS that incorporates both production and conservation goals. It provides a flexible framework in which farmers can adaptively manage change in their farming operations.

Prioritizing soil health and conservation cropping systems can work. The agricultural commodity groups in neighboring Indiana developed a 10-year nutrient management strategy in parallel with the Indiana Nutrient Reduction Strategy (NRS). They recommend implementing no-till, cover crops, advanced nutrient and pest management, crop rotations, buffers and smart drainage (where appropriate) together as a system and conclude, *“By adopting a strategy for soil health which is supported by the principles underlying the 4R approach, we can immediately work to achieve greater understanding and implementation of strategies by farmers.”*

Using similar reasoning, the Minnesota NRS concludes, *“By focusing attention on soil health and by providing education about the positive impact healthy soils can have on productivity and sustainability, Minnesota farmers will understand the multiple benefits of the BMPs to reduce nutrient losses to waters. This will increase the motivation for adopting these practices under the current policy framework.”*

A Pivotal Opportunity

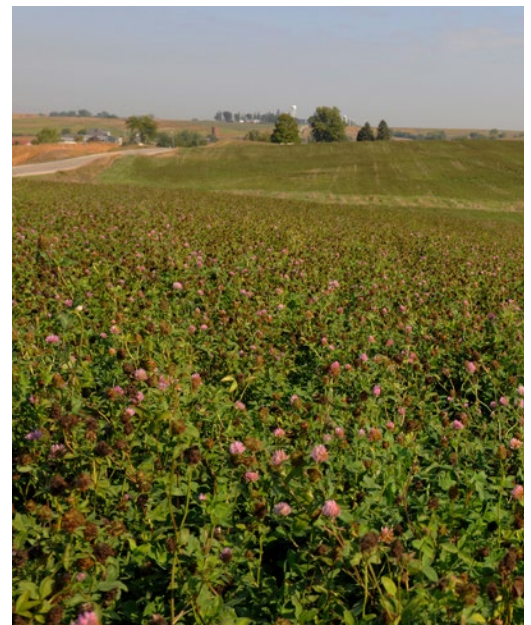
The current Illinois NLRS suggests several management practices that can individually improve soil characteristics, **but through a conservation cropping systems approach we have the opportunity to rebuild long-term capacity of Illinois crop production and significantly reduce nutrient losses.** Fugitive agricultural nutrients are wasted investment to producers and are water quality costs to society. Declining organic matter and soil erosion are costs to both farm landowners and society. A systems approach allows the flexibility to match the combination of appropriate conservation management practices to best address local conditions and resource concerns.

If we look at an individual conservation practice as a stand-alone management tool, it will likely fail. Many of our conservation practices are dependent on one another and on a healthy soil for their success. Therefore instead of looking at an individual conservation practice, we should look at a system of conservation practices. A conservation system considers soil quality factors such as adequate drainage, soil erosion, compaction, soil structure, nutrient management, surface crusting, water infiltration, and organic matter content....[It is] a system of practices that work together to improve soil health, water quality and crop production.

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How Can We Seize This Opportunity?

Building a comprehensive, long-term approach that results in the implementation of a **sustainable** NLRs for agriculture will take planning—unified messaging; fitting projects and initiatives into a broader systems framework that starts with building soil health; expanding training for technical service providers; adding new indicators or metrics; considering public support for long-term practices maintenance; supporting state and federal policy reforms; and identifying and securing resources to fully implement the NLRs.



Recommendations

American Farmland Trust suggests a series of recommendations that:

- Encourage a systems approach to improving soil health, including training in systems approaches for farmers, certified crop advisors (CCAs), NRCS and SWCD personnel.
- Help agricultural retailers expand fee-based services they can deliver to build soil health.
- Unify messaging that stresses the importance of improving soils; targets factors that motivate behavior change; and broadens the audience to include the agricultural industry, food chain and public.
- Support the long-term maintenance of BMPs by promoting a sense of ownership, supporting USDA NRCS compliance, and expanding the Precision Conservation Management Program.
- Encourage policies that include a systems approach in cost-share programs, discuss setting standards for potential certification options and ways to “incentivize” BMP adoption.
- Consider funding options, including tax credits for farmers and landowners who install select BMPs, reduced taxes for landowners who implement edge-of-field practices in high-yield watersheds, no sales tax on conservation equipment, a Conservation Trust Fund and a revolving loan fund for conservation practices.
- Support federal policy reforms that support the NLRs, including reform of the Federal Crop Insurance Program to encourage soil-building practices that reduce weather-related risks, and specific changes to federal crop insurance policy to support practices recommended for the NLRs such as cover crops.

For More Information:

American Farmland Trust. 2016. *Conservation Cropping Systems: An Impactful Long Term Strategy for Achieving Illinois' Nutrient Loss Reduction Strategy Goals*. 30 pp. April 4, 2016. Version 1.



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