Residue management after harvest

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Abstract
As we are in the harvest season, producers are searching for the best way to manage their residue cover, particularly with corn. Some farmers manage their residue by chopping, bailing, or grazing in livestock operations. But before planning to use any of these options or others, and reducing corn residue cover after this year's harvest, one of the first things to plan for is the remaining crop residue coverage. With that in mind, producers need to ask themselves a series of questions.

Keywords
Agronomy, Agricultural and Biosystems Engineering

Disciplines
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Is the current corn residue cover adequate?

Producers need to estimate the actual residue cover after harvest. This cover can vary significantly and is influenced by yield and management during the growing season. Residue removal or reduction by any means needs to be evaluated based on the risks that can be involved in removing it, such as potential soil erosion and violation of current conservation plans.

It is equally important to evaluate the economic returns of such a choice.
For instance, when bailing corn residue, there are fuel costs, labor and/or time in the field, the cost of equipment and supplies, maintenance, weather risks, storage, and related expenses that need to be considered. When using grazing as a mechanism for managing residue, consideration ought to be given to the impact of the animals. Animals can create significant soil compaction, especially in no-till systems, in addition to the management of livestock in the field.

It is also prudent to examine an alternative to using corn residue, such as a cover crop. If a need for crop residue within a farming operation is ongoing (year after year), perhaps a cover crop could be added to the farm rotation.

**How does residue management affect soil and water quality?**

Beyond the economic costs of using corn residue, there are agronomic and environmental costs as well. The heavy residues left behind by a corn crop can reduce the process of soil erosion, surface runoff, and sediment loss, due to the direct impact of raindrops. Subsequently, sediment and nutrient losses are significant, and contribute a great deal to soil and water quality deterioration.

The function of residue is to slow down surface runoff, and reduce its energy in transporting soil. When coupled with a no-till management system, the impact of corn residue on the soil's surface is even greater—increased rates of infiltration and other positive indicators of soil quality such soil organic matter, microbial diversity, and decrease in water runoff.

However, when soil quality declines, productivity may begin to decline as well. In other words, removing corn residue may be limiting the soil's proper function, which in turn could limit crop performance in subsequent years.

Also, residue removal can have a detrimental effect on wildlife habitat, which can be improved with higher residue levels, as it provides better cover and habitat conditions that contribute to their survival.

**Can soil carbon be improved by crop residue?**

Crop residue plays a significant part in improving soil carbon, in addition to the root system. The most significant benefits of increasing soil carbon are the improvement of soil tilth and soil structure, with surface structure becoming more stable and less prone to crusting and erosion. Water infiltration is another soil quality indicator that could improve (less surface runoff), as the soil-holding capacity for water and nutrients increases significantly.

What is the level of residue cover for a conservation system? Generally, for an effective soil conservation plan, the recommendation for Iowa soils is to leave no less than 30 percent residue cover on the soil's surface at planting. Therefore, any removal of corn residue should be limited to satisfy this recommendation or requirement to meet the conservation system target.

In conclusion, crop residue is a valuable source for soil sustainability and the environment. Any decision for manipulating the level of residue needs to be considered very carefully, because the consequences of removing residue cover can be very costly in the short as well as in the long term. Take your time and consult with trusted advisers, then make an educated decision.