

# Drainage water quality impacts of current and future agricultural management practices

## Abstract:

Researchers examined how crop tillage, rotation or crop residue removal can affect the chemical composition of water draining from farm fields.

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*A multi-year, replicated plot subsurface drainage study monitored drainage water and crop yield. Cover crops have the potential to reduce nitrate loss and increased application of nitrogen in a corn-soybean or continuous corn system has the potential to increase nitrate loss.*

## What was done and why?

New management practices that have the potential to significantly reduce nitrate losses at minimal cost are needed. One potential management practice is use of winter cover crops, but the effects on water quality are unclear. In addition, there is a need to better understand how crop rotation (corn-soybean or continuous corn), tillage, or crop residue removal may impact nutrient loss through drainage systems. Also, with the intensive use of liquid swine manure in Iowa, there is a need for evaluating  $\text{NO}_3\text{-N}$  losses when manure is applied to both corn and soybean in a corn-soybean rotation. The systems need to be studied to evaluate dissolved nutrient loss from drainage systems from these new or slightly different management practices.

The overall objectives of this study are to evaluate the drainage water quality impacts of various cropping and nutrient management systems. The treatments allowed for varied comparisons:

- Cropping practices through the use of a winter cover crop (treatment 1 vs. 5)
- Use of swine manure before corn and soybeans or just corn (treatments 2 vs. 3)
- Continuous corn systems with and without stover removal compared to a corn-soybean system (treatments 2 vs. 4)
- Use of a no-till corn-soybean system (treatments 2 vs. 6)

## What did we learn?

The results from this study have increased understanding about the potential for cover crops to reduce  $\text{NO}_3\text{-N}$  export from row-cropped lands. The work documented the increased risk of  $\text{NO}_3\text{-N}$  export when liquid swine manure is applied before both corn and soybeans. In addition, continuous corn showed some potential to increase  $\text{NO}_3\text{-N}$  export when compared to a corn-soybean system. The work on  $\text{NO}_3\text{-N}$  concentrations and loss from a system where liquid swine manure is applied before both corn and soybeans was reported to the Iowa Environmental Protection Commission (EPC) in fall 2012 when the EPC considered this practice.

(See [www.ag.iastate.edu/farms/11reports/Northeast/ImpactManure.pdf](http://www.ag.iastate.edu/farms/11reports/Northeast/ImpactManure.pdf))