IPNI
Plant Nutrition TODAY
Better Crops, Better Environment...through Science

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STEPPING UP TO THE PLATE

Agriculture is increasingly looked upon as a major contributor to environmental nutrient-related problems faced by our society.

- Water quality issues such as eutrophication in the Chesapeake Bay and hypoxia in the Gulf of Mexico have garnered regional to international attention.
- The U.S. Geological Survey, EPA, and state authorities have identified trends in increased groundwater nitrate-N contamination in some parts of the country.
- Most of us are becoming more familiar with global climate change threats and air quality challenges posed by elevated greenhouse gas emissions. Although agriculture contributes less than 7% of the total U.S. greenhouse gas emissions, agriculture is the dominant source of nitrous oxide emissions. (Nitrous oxide is a potent greenhouse gas with a global warming effect about 300 times that of carbon dioxide.) Agricultural soil management, which includes fertilizer and manure N applications, accounts for more than two-thirds (2/3) of the country's nitrous oxide emissions.
- Emissions of ammonia from livestock operations and from some urea-containing or ammonium-containing fertilizer applications are of concern because ammonia in the air is considered a factor in the formation of fine particulates ($PM_{2.5}$) that form smog, which threatens human health.
- Loss of biodiversity of plants and some animals has also been blamed on excessive loss of nutrients in the environment.

These environmental challenges have frequently been placed at agriculture's feet, and sometimes they have been thrown in our faces. Poorly understood by our urban cousins, the unfortunate truth is that all agricultural systems...because they are biological, dynamic, and dependent on soils...will "leak" some amount of nutrients, no matter what we do. For example, even in the very best crop management systems on our most productive soils, loss of N from the soil may exceed 7 to 10 lb/A/year in drainage water alone. Research has shown that uptake and recovery of applied N by most crops in the season of application is often less than 50%. This implies the remainder is held in the soil, or has been lost to the environment via several different loss pathways.

Whether we agree with all the blame "bestowed" on agriculture, we must recognize that any excessive loss of N and P from farm fields represents an economic loss to farmers and their communities, and an erosion of valuable natural resources. If not addressed, this could adversely affect long-term soil productivity and sustainability. With fertilizer and cropping system best management practices, and an understanding of the risks and pathways for nutrient loss, farmers and their advisers are in a position to improve crop nutrient recovery, increase yields, and reduce nutrient loss. As winter sets in, and spring cropping management plans are developed, determine what you will do differently in 2010 to improve your crop yield response and nutrient recovery efficiency. There are many opportunities and tools available to improve crop production efficiency and effectiveness, but most must be employed in a site-specific manner. When agronomic performance is optimized, benefits to the environment usually also result. Will you be "stepping up to the plate" with an eye on changes that can be made in 2010 through improved nutrient management decisions and actions?

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Abbreviations: N = nitrogen; P = phosphorus.

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