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NOTCHING UP YOUR NITROGEN KNOWLEDGE FOR THE NEW YEAR

The portion of the applied fertilizer N taken up by most cereal crops in the growing season in which it is applied may range from 40 to 50%, across the USA. In the very best, intensively managed scenarios, crops may take up 60 to 75% of the applied N. Does that mean the remainder of the applied N is lost to the environment? The quick answer is no, but it depends on how the fertilizer N was managed, the soil chemical, physical, and micro-biological properties, and the environmental conditions. Some of the applied N that is not directly recovered by the crop in the season N was applied, may be found as ammonium in the soil on cation exchange sites, trapped in the lattice of clay minerals, and in the soil organic matter pool.

Crop recovery of applied N can be enhanced in many fields by first recognizing the possible pathways for N loss. These loss pathways include: surface runoff, leaching below the root zone, ammonia volatilization, denitrification, and immobilization. Reducing the risks of N loss to these different pathways, especially when the crop's root system is not fully developed and the plants are not rapidly absorbing N, can enhance N use efficiency and effectiveness. Often, the greater the ratio of precipitation to evapotranspiration, and the warmer the soil and air temperatures, the greater the risks of loss via runoff, leaching, and/or denitrification.

As professionals who are committed to wise N management, we strongly encourage using science-based fertilizer BMPs (best management practices) or the four R's: right source, rate, timing, and placement. Choosing the right N sources for the specific circumstances, and managing them properly for each crop, with a knowledge of the prevailing soil and climatic conditions, will go a long way toward enhancing crop uptake and fertilizer N recovery.

Enhancing your knowledge and N management abilities will help make sure that every unit of N you apply is working to produce good crop yields and quality. Folks in the upper Midwest are painfully aware of the damage associated with excessive rainfall and waterlogging experienced in many fields in the spring of 2008. If one believes the climate change predictions, weather variability and uncertainty may become more the norm in the future than in the past.

There are many more tools and management options available to farmers and crop advisers today than in the previous decades. Costs associated with wrong decisions add up more quickly than in the past. If you have not completed your N management plans for the 2009 cropping year, approach your crop adviser, fertilizer dealer, or extension agent for science-based information and professional advice. Expand your knowledge, plan to make N management choices based not just on the price per unit of N, but also on how well you can manage the N source. There may be more ways than you realized to alter your management or to hedge your risks, to optimize crop recovery while minimizing the risks of N losses from your fields in 2009.

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Abbreviations for this article: N = nitrogen.