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CROP NITROGEN USE: A LOOK FROM THE REAR-VIEW MIRROR

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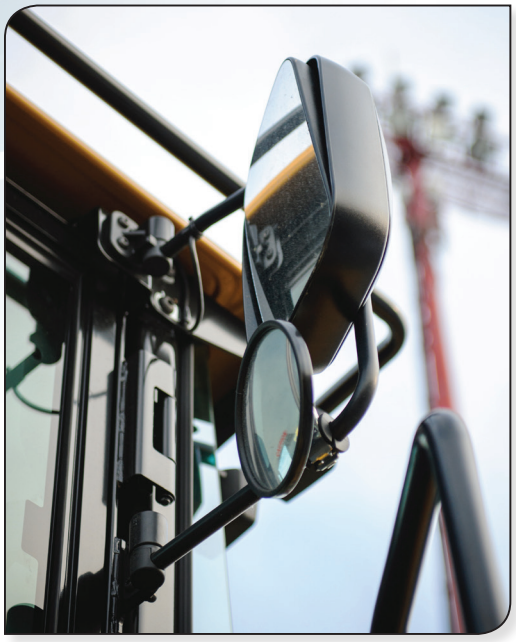
Many of us who are experiencing more gray hair (or less hair) enjoy a periodic glance backward, to see how straight … or crooked … our footsteps have been over the years. However, like footprints on the beach that are readily washed away by the tide and waves … the memories of our paths and records of our accomplishments can easily fade. The same is true, with crop and nutrient management performance records on the farm.

We all have learned that *"two points do not a line make", "no two years are exactly alike",* and that *"weather is not predictable from year to year, much less so from month to month."* That is why it is important to intentionally track the on-farm and in-field nutrient performance each year, or each season, to establish at least three nutrient performance data points over a 10-year period, and to evaluate the trend line. Long-term records are often quite revealing and can provide the most accurate indication of trends.

One relevant research example of long-term nutrient performance evaluation, is work by Dr. J.K Ladha (with the Consultative Group for International Agricultural Research; CGIAR) and others, who looked at 135 studies from 114 long-term (6 to 158 years) cropping system experiments throughout the world. They critically examined the effects of nitrogen management on changes in soil organic carbon and soil organic nitrogen. Their work published in abbreviated form in *Better Crops* clearly showed that optimal fertilizer nitrogen management helps slow any decrease of soil organic carbon caused by tillage and crop management, or may



cause a small increase in soil organic carbon depending on the amount of crop biomass produced and how crop residues are managed. Subsequent work published by Dr. Ladha and others in Nature constructed a 50-year (1961 to 2010) global cereal crop nitrogen budget. That long-term look indicated that: (1) 57%, 36%, and 48% of the fertilizer nitrogen applied to maize, rice, and wheat, respectively, was recovered by those crops in the year of application, (2) crop yields were continuing to increase, but (3) losses of soil nitrogen levels may be occurring in many places, causing potential threats to long-term system productivity. Such data collection and analyses reveal some concerns, that warrant more local examination of nutrient management and trends over time.

Sadly, long-term nutrient performance records for individual farmer fields are lacking; causing many to ask how to

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accurately assess their nutrient management impacts on sustainable soil fertility, crop yields, and soil health. In the absence of such records and trend evaluations, few farmers can defend themselves adequately when challenged with questions concerning their sustainability.

Professional nutrient management specialists are encouraging more farmers to keep records of their crop yields, nutrient inputs, soil fertility, and soil health measurements. IPNI has developed publications and tools to assist with some of that nutrient performance evaluation (e.g., *Issue Review on Performance Indicators* , *Plant Nutrient Removal Calculator* , *Crop Nutrient Response Tool* , *4R Plant Nutrition Manual* , and the *Nutrient Expert® Decision Support Tool* .

With the development of more tools, and the advent of record-keeping capabilities that can fit in the palm of the hand … will more farmers and crop advisers around the world (small holders and large holders) look in the rear-view mirror more systematically? … to evaluate trends in cropping system and nutrient performance? What will be your strategy and actions for your fields and farm this season and into the future? Will a rear-view look help you navigate your crop nitrogen management future with greater confidence?

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Suites of 4R Nitrogen Management Practices for Sustainable Crop Production and Environmental Protection

Impacts of crop production nitrogen (N) inputs and losses to the environment *are a growing public concern. A U.S. national N management and nitrous oxide emission science workshop, aided by science input from Canada scientists, resulted in seven crop- and region-sensitive N management frameworks. Each framework has three tiers or suites of 4R N management practices to improve economic, social, and environmental outcomes. Intelligent implementation of improved 4R suites of N management practices can result in greater crop recovery of applied N, sustained and improved soil fertility and health, and cleaner water and air; while reducing emissions of nitrous oxide.*

Dr. Cliff Snyder has recently written this IPNI Issue Review paper—a science-based effort to describe such practices for major commodity crops produced in North America.

Download your copy from http://www.ipni.net/issuereview

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