Soil bank starting to get overdrawn

By **WILLIE VOGT**

Key Points

- New GIS-based maps show deficits of nutrients in cropland soil.
- County-by-county data can offer farmers a guide to amending their soil.
- More refinement is needed, but sample data are available for 2010.

INVESTING in great equipment and the best seeds are great ways to boost productivity on your farm, but neglecting soil fertility could be costly going into 2010. There's some interesting work showing that practices in the past few years could be challenging top yields next year, but there are ways to combat the problem with precision tools.

One way to look at the issue would be a "global" review of nutrients applied compared with crop yields on a county-by-county basis, to see if what farmers apply matches the nutrients used on that land. Sounds impossible, but the International Plant Nutrition Institute tackled that challenge. The group, which focuses on plant nutrition issues, has always watched that issue, but knew there was a need to measure nutrient use on a much more precise scale.

Turning Tech to Profit

"We've always been interested in watching nutrient budgets at the institute," says Paul Fixen, IPNI director of research. "And when I was in the university system, we talked about nutrient budgets." He notes that IPNI's last broad effort to measure nutrient applied versus crop use was back in 2002, which created what he calls "boring maps" that were just not up to speed.

Recognizing there was a need for dynamic information, and with the rise of Geographic Information Systems linking data to location, IPNI saw a need for a new way to break out the information. Teaming with PAQ Interactive, IPNI brought in GIS expertise and incorporate U.S. Census of Agriculture data to create a new data series. The census data is updated every five years, and the Nutrient GIS project went back 20 years to review crop production and nutrient-use data. "We used the census data to estimate manure nutrients too, included excreted and recoverable. We wanted to get down to a higher spatial scale than we have typically done," he says.

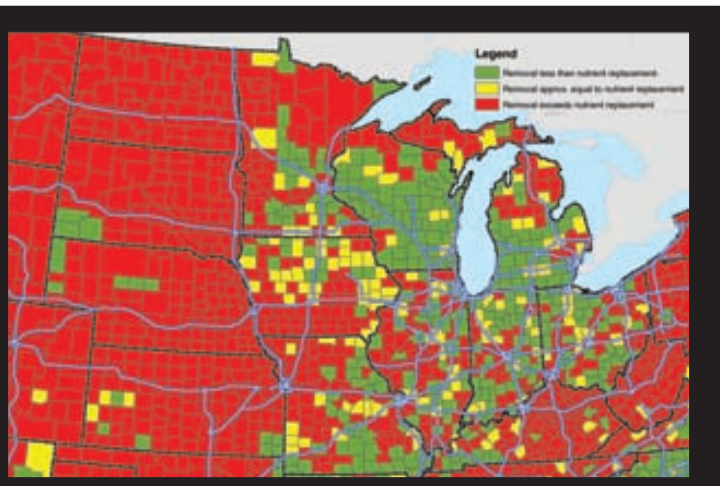
The resulting maps paint a picture of nutrient use in the U.S. Fixen is quick to note that the data still needs work and they're fine-tuning it all the time. But what they've created is information on nutrient uptake down to the county level. There's a lot of data included from census data on fertilizer sales to National Agricultural Statistics Service crop-yield information that went into the final data set.

Making a match

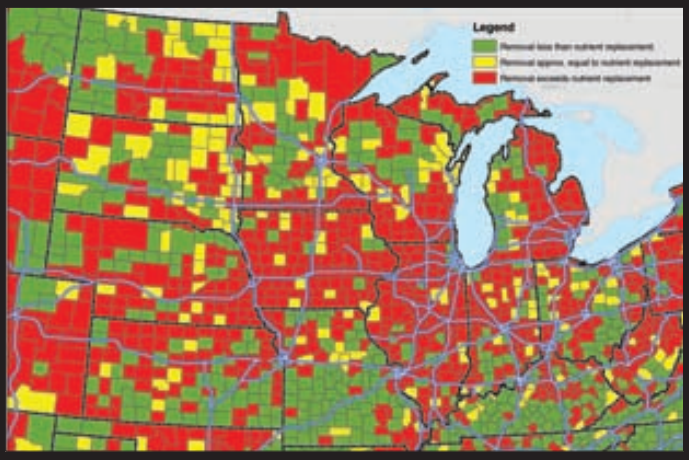
Fixen notes that the work also aimed to match the data created with other commonly used data models as well — including U.S. Geological Survey data on nitrogen loss to the Gulf. This "common-language" approach will help researchers in the future look at the data and make consistent conclusions.

As for now, Fixen says the data presented are comparative in nature. Like a lot of your own yield maps, sometimes the difference in field areas is more valuable than the actual measured yield. In the maps, like those on this page, the comparative differences are what is important. And red is a warning sign.

"When I write about this project, I try to convey that there is a considerable amount of uncertainty in the data, but the relative values are good," Fixen explains. "This information doesn't offer answers, but it points you toward the right questions."



A LITTLE MORE K: The red areas of the map show where the amount of potassium pulled out of the ground from high-yield crops is more than what farmers are putting back in, based on new data. *Map provided by Mosaic.*



SEEING RED: The scarlet areas of this map show the counties where higher crop yields may be drawing down the soil fertility bank for phosphorus ahead of the 2010 crop season. *Map provided by Mosaic.*

Planning for 2010

Dan Froehlich, director of agronomy, The Mosaic Co., looks at the data from Fixen's work and worries about 2010. In a conversation with Farm Progress, Froehlich says it makes sense that farmers economized on fertilizer in 2009 given the volatile pricing situation, but for 2010 that may not be a good move. He notes that potash removal in Iowa alone, based on Fixen's work, exceeded application by as much as 30%. "In Illinois that removal was ahead of application by 60%," he says. "Even though crop yields have increased significantly in recent years, many growers have not increased their fertilizer rates. With the higher yields, crops are pulling nutrients from the soil's nutrient bank and mining the soils."

Mosaic doesn't sell fertilizer to farmers; it sells through dealers and is a major supplier of phosphorus and potassium. Yet, Froehlich, an Iowa State grad, worries about farm profitability.

"To maintain crop yields and farm profitability, progressive growers and retailers will definitely want to soil test immediately after harvest to get a true picture of the soil nutrient levels within each field," he says. Mosaic's *back-to-basics.net* Web site offers more information on the topic.

Adds Fixen: "Ask yourself what you have to do to get your soils to a level to take advantage of the incredible genetic material that is available today."

Variable-rate planting offers farmers a healthy payback

THE combines have been rolling for awhile by the time you read this, and you're adding to that pile of yield maps you've been building for several years. Turns out that data can be put to good use at planting time next year. That's what Central Valley Ag Co-op, a Nebraska group, has discovered in a study conducted on more than 38,000 acres.

"With higher seed costs, variable-rate planting could offer a savings," says Glen Franzluebbers, technology director for the co-op. "We put more seed on the high-productive areas and less seed on the low-productive areas."

To build the planting prescription, Franzluebbers says you need at least three years of yield-map data, and the more the better. Also, you need some other spatial data such as a grid soil-sampling layer of information, or soil electroconductivity information.

"That's something to double-check in yield data, to make sure what's going on in that field," he says. "We want to be sure it's actually yield drag and not a fertility or other issue." In the study, the co-op varied corn populations. For irrigated ground, population ranged from 22,000 to 34,000, depending on soil type. For dryland corn, the range was 8,000 to 30,000.

The payoff for the program? For a $200 bag of seed, savings was about $8.50 per acre in the program, and yield increases averaged 8 to 10 bushels. With rising seed costs, variable-rate planting could become quite popular.

"I'd say about 10% of our customers are set up for variable rate seeding, and there will be more," Franzluebbers concludes.

HITTING THE FIELD: You could be planting into a fertilizer deficit in 2010 if you haven't matched nutrient applications with higher-yield crop performance. New data shows nutrient deficiencies across the country.