

Nutri-Net Project Looks to Quantify the Impact of 4R Nutrient Stewardship Practices



Nutri-Net Team Members (pictured left to right) **Dr. Dan Jaynes**, Soil Scientist, USDA-ARS, **Dr. Laura Christianson**, Assistant Professor, University of Illinois, **Dr. Heidi Peterson**, Director, International Plant Nutrition Institute, **Dr. Alison Eagle**, Scientist, Environmental Defense Fund, **Dr. Jeffrey Volenec**, Professor, Purdue University, **Dr. Craig Drury**, Research Scientist, Agriculture and Agri-Food Canada, **Dr. John Kovar**, Soil Scientist, USDA-ARS, **Dr. Fabian Fernandez**, Associate Professor, University of Minnesota, **Dr. Sylvie Brouder**, Professor, Purdue University, **Dr. Matt Helmers**, Professor, Iowa State University, **Dr. Kelly Nelson**, Professor, University of Missouri, **Dr. Cameron Pittelkow**, Assistant Professor, University of Illinois, **Mr. Lowell Gentry**, Research Scientist, University of Illinois, **Dr. John Sawyer**, Professor, Iowa State University, **Dr. Cindy Cambardella**, Soil Scientist, USDA-ARS (not in picture), **Dr. Tom Moorman**, Microbiologist, USDA-ARS (not in picture).

There is a lack of research data linking agronomic and environmental performance across a wide variety of management conditions. This critical research gap is leading to high uncertainty regarding the efficiency of 4R practices for farmers, program managers, and policy- or decision-makers. Industry, universities, and state and federal action agencies have displayed a concerted effort to promote the 4R (Right Source, Right Rate, Right Time, and Right Place) on-farm nutrient management approach to using commercial fertilizer and organic materials (e.g., <http://www.nutrientstewardship.com>). However, our ability to quantify and track the impacts of 4R management on crop yield, P, K and nitrate loss to water, N loss to the atmosphere, and changes in soil health under a range of practices needs further improvement.

The Foundation for Agronomic Research (FAR) was selected this past summer to receive a US\$1 million research grant from the Foundation for Food and Agriculture (FFAR) to study the impact of 4R Nutrient Stewardship practices on the movement of nutrients in corn and soybean cropping systems in Canada and the US. This grant was matched with US\$1 million in funds from the North American fertilizer industry's 4R Research Fund. FAR will support 16 researchers in Illinois, Indiana, Iowa, Minnesota, Missouri, and Ontario. Their work will quantify the impact of 4R-based practices on crop yield, soil health, nutrient use efficiency, nutrient loss via leaching, and gaseous N loss across eight coordinated field sites. The project has been named the *Coordinated Site Network for Studying the Impacts of 4R Nutrient Management on Crop Produc-*

tion and Nutrient Loss, or Nutri-Net.

Although Nutri-Net sites will focus on N management, the consistent comparison across all sites will include, partial nutrient balances for N, P, and K. All field sites are capable of capturing nutrient leaching losses in subsurface tile drains. Locally relevant, current nutrient management practices will be compared to more advanced 4R management systems. In addition, several sites will investigate specific 4R variations including timing of N application and N placement by side-dress application.

The novelty of this networked approach is that existing investment in agronomic/drainage research sites across the corn-belt can be leveraged to answer additional questions about the effectiveness of 4R practices. Data generated in this three-year project will be combined into a centralized database that will grow over time. Future studies on N management will allow for continued improvement of knowledge that supports our management and policy recommendations. This effort will extend to help answer key questions about the impacts of nutrient management in corn-based cropping systems on water quality in the Mississippi River Basin and eutrophication in the Gulf of Mexico.

Current cooperating institutions include: Iowa State University, University of Illinois, Purdue University, University of Minnesota, National Laboratory for Agriculture and the Environment–Agricultural Research Service, Agriculture and Agri-Food Canada, and the Environmental Defense Fund. **BC**

Follow the Nutri-Net project at <http://research.ipni.net/project/IPNI-2017-USA-4RF01>