Modeling Inorganic Soil Nitrogen Status in Maize Agroecosystems

Nitrogen (N) management is an important economic and environmental concern in the North American Corn Belt. In a recent article in the *Soil Science Society of America Journal*, researchers developed a real-time modeling framework for simulating soil N availability in corn fields. Understanding how much soil N is available to support crop growth with different N application times or forms, or following periods of wet early spring weather, could help growers make informed N management decisions.

A public sector model, DSSAT, was calibrated and validated using soil inorganic N concentration data from six Illinois field experiments consisting of different combinations of N fertilizer source and timing. This project involved extensive soil sampling during vegetative corn growth with help from a number of collaborators (see photo). Model inputs were developed based on the Gridded Soil Survey Geographic Database (gSSURGO) and the Illinois Weather Network. As an additional validation step, simulations were compared against soil N concentration from 49 commercial corn fields.

Overall, the modeling framework had “fair” performance across sites with variable weather patterns and soil properties, which provided encouraging results. However, the researchers conclude that further work is needed to improve model accuracy and understand what level of confidence is required by farmers to utilize model-based decision support tools for N management.