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A Web Based Real Time Nitrogen Leaching Calculator

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A Web Based Real Time Nitrogen Leaching Calculator
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Abstract
While nitrogen (N) is an essential nutrient for corn, its leaching to ground water is a serious environmental issue and a hazard to public health. N leaching is closely linked to weather factors, especially rainfall. Prediction of N leaching in cropping systems is critical to improvement of crop management and reduction of N leaching. The objective of this project is to develop a web app that predicts in real-time mode N leaching across Nebraska using real-time weather data.

Data layers: Cropland Boundaries and Soil Data
Cropland boundaries as a raster image are converted to the Geojson format (upper and right figures).

N Leaching Visualization
The web app will map weekly assessment of current N leaching across Nebraska.

The web app
The core of the Maize-N model will be used as the engine for simulation of N leaching. Key inputs to the model include: daily weather data, major soil properties and crop information. The model simulates, on daily basis, dynamics of soil organic matter mineralization, crop N uptake, soil N balance, soil water balance, and N leaching beyond crop rooting depth.

Cropland Data Layer
HPRCC weather network
Nitrogen Leaching Web app

SSURGO soil database
Maize-N model
Google Map API

Remarks
If desired, field specific assessment can be made. The user needs to specify a field on Google map and provides key information of the field.

We are in the processing of developing the web app and expect a prototype to be running in 2017 cropping season. Field research will be carried out to test and validate the app predictions. Once completed, the app can help farmers understand better the fate of soil N, improve fertilizer management, and reduce N leaching losses.

Reference

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