

# Optimizing Nitrogen Management under Conditions of Extreme Moisture

*Timi Ojo<sup>1,2</sup>, Ramona Mohr<sup>3</sup>, Trevor Fraser<sup>2</sup>, Paul Bullock<sup>2</sup>, John Heard<sup>1</sup>*

*<sup>1</sup> Land Use and Climate Resilience Branch, Manitoba Agriculture, Winnipeg, Manitoba*

*<sup>2</sup> Department of Soil Science, University of Manitoba, Winnipeg, Manitoba*

*<sup>3</sup> Agriculture and Agri-Food Canada, Brandon, Manitoba*

*Corresponding Author: [Timi.Ojo@gov.mb.ca](mailto:Timi.Ojo@gov.mb.ca)*

Soil moisture is at the nexus of, and plays an important role in many nitrogen form conversions and loss pathways. On a practical level, however, the inability to accurately forecast moisture conditions hampers our ability to decide if and when specific N management practices should be applied. The objective of this study was to develop a data-based decision support information to help farmers assess and manage the potential risks associated with fall nitrogen fertilizer management under extreme moisture conditions. Fall precipitation data from 1961 – 2012 were analyzed at sixty-six locations in Manitoba. The amount of water filled pore space (WFPS) at the top 30 cm was used to determine the risk of nitrification and denitrification and the WFPS for the entire 130 cm depth was used for the leaching loss risk. This represents a new approach for refining N management recommendations based on soil moisture conditions. This study provides a good proof-of-concept that the combination of historical precipitation and the use of soil physical properties with defined thresholds can be used to determine the risk of nitrification, denitrification and leaching based on the amount of additional precipitation.