

Nitrogen Fertilizer Management to Mitigate Greenhouse Gas Emissions



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Abstract

Reduction in N₂O emissions from agriculture has been identified as a priority by government and industry. Nitrogen fertilizer use in Canada has doubled since 2006 and in 2020 resulted in 11 Mt CO₂e of direct N₂O emissions, representing 69% of direct N₂O emissions from agricultural. Improved nitrogen management provides the opportunity to reduce N₂O emissions without adversely effecting profitability.

The opportunity for robust implementation of the 4R nutrient management framework along with a fifth “R”, right rotation, will be discussed in the context of reducing N₂O emissions from Canadian agriculture. Examples will be drawn from the major crops grown in Canada including canola, corn, and potato production systems. The critical importance of determining the rate of N application will be discussed and tools and strategies for ensuring “right rate” will be considered. The need to capture and report on improved nitrogen management at national and international levels will also be discussed.

Biography

Dr. David Burton, a Soil Scientist, is a Dalhousie Distinguished Research Professor, Director of Dalhousie’s Centre for Sustainable Soil Management, and a Fellow of the Canadian Society of Soil Science.

Dr. Burton’s research examines the role of the soil environment in influencing the nature and extent of microbial metabolism in soil. His focus has been on processes in the cycling of nitrogen in soils and their implications for soil fertility and environmental impact. His current research programs involve an examination of the production and consumption of greenhouse gases in natural and agricultural landscapes, the development of tools for the measurement of soil nitrogen supply to plants, the influence of climate on soil biological processes, and the assessment of the quality of the soil biological environment and its influence on soil health. It is the aim of this work to better understand the factors that control soil microbial processes and to use this information to developing sustainable land management systems in a changing climate.