

Furthering 4R to Verify Sustainable Emissions Reduction

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Fertilizer use has been a key factor in boosting crop yields worldwide, feeding a growing population, and relieving pressure for land use change. At the same time, the global use of nitrogen fertilizer is associated with greenhouse gas emissions of around 720 million tonnes of carbon dioxide equivalents each year. Crop producers and their advisers are under pressure to reduce those emissions, while continuing to increase crop yields and soil health. The principles of 4R Nutrient Stewardship have much to offer toward this goal. The scope for reducing emissions from fertilizer is large but may require dramatic and costly changes.

In Canada a 30% reduction by 2030 was found possible only with unrealistically high rates of adoption of advanced 4R practices. Globally, a 70% reduction by 2050 could be achieved, again only with massive improvements in nitrogen use efficiency and 4R practice adoption. Farmers on their own do not have the resources to provide all the emission reductions possible. Farmers, industry, and government will need to work together to develop the monitoring, reporting, and verification needed to recognize and reward those adopting effective practices.

Biography: Tom Bruulsema is Chief Scientist with Plant Nutrition Canada, supporting the nutrient stewardship programs of the fertilizer industry. He chairs the International Fertilizer Association's Scientific Panel on Responsible Plant Nutrition. Based in Guelph, Ontario, he served for 25 years with the International Plant Nutrition Institute and the Potash & Phosphate Institute. Dr. Bruulsema has been recognized as a Fellow of the American Society of Agronomy, the Soil Science Society of America, and the Canadian Society of Agronomy. He has agronomic research experience with the University of Minnesota (1994), and with the Mennonite Central Committee in Bangladesh (1986-1990).