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Gold Standard Foundation,
Chemin de Balexert 7-9
1219 Châtelaine
International Environment House 2
Geneva, Switzerland

June 25, 2021

Submitted by email to: standards@goldstandard.org

Re: Co-Development of Methodology for Avoided Nitrous Oxide (N₂O) Emissions from Management of N-Fertilisers in Agricultural Activities

On behalf of Fertilizer Canada, and our member companies, we welcome the opportunity to respond and provide feedback on the proposed scope for co-developing a methodology for reduced/avoided nitrous oxide (N₂O) emissions from the management of N-fertilizers in agricultural activities. We believe our organization is uniquely positioned to provide input on the development of this methodology as we have, and continue to, engage leading soil scientists and technical experts to develop an offset protocol system for on-farm N₂O emission reductions.

Fertilizer Canada represents manufacturers, wholesalers and retail distributors of nitrogen, phosphate, potash, and sulphur fertilizers – the backbone of Canada’s agri-food economy. Responsible for half of the world’s current food production, fertilizer is fundamental to the future of agriculture and farmers’ ability to feed a growing global population. Our members also contribute approximately \$24 billion annually to Canada’s economic activity and support the employment of over 76,000 individuals throughout the supply chain. Canadian fertilizer manufacturers produce about 12 million tonnes of nitrogen, potash and sulphur fertilizers annually in some of the most technologically advanced, energy-efficient and safest facilities in the world.

As the world seeks to sustainably intensify food production, farmers will rely on fertilizer to increase production efficiency while conserving our soil, water, and air. To meet the challenge, farmers will require more than just new and innovative technologies; they will require a framework for understanding and implementing the core principles and practices of sustainable agriculture.

4R Nutrient Stewardship has been designed for this purpose. For more than a decade, Fertilizer Canada has worked with Canadian farmers and the fertilizer industry to promote 4R Nutrient Stewardship - a science-based approach to fertilizer management that involves applying the Right Source @ Right Rate, Right Time, Right Place ®. Use of the 4Rs aims to maximize plant nutrient uptake, optimize yield, and increase profitability, while also minimizing nutrient runoff, nutrient leaching and nitrous oxide emissions.

The 4R Climate Smart Protocol

Building on the 4R Nutrient Stewardship framework, the 4R Climate Smart Protocol includes specific Best Management Practices (BMPs) for improved nitrogen management in cropping systems and estimates the N₂O emission reductions associated with better nitrogen management. It is a robust protocol designed to meet international standards for measurement and verification of carbon offsets but is simple in concept and is driven by data that producers are either already collecting or are interested in collecting to improve their overall farm management system.

The proposed methodology to reduce N₂O emissions from agriculture includes several relevant 4R Climate Smart activities such as use of enhanced efficiency fertilizers, and optimised nitrogen fertilizer management. The 4R Climate Smart Protocol is designed to be utilized by third party verifiers who work with growers to promote the implementation of BMPs known to reduce N₂O emissions on agricultural land. Furthermore, the protocol is scalable and based on a flexible framework meaning it can be applied to many different cropping systems and across a range of farm sizes.

The N₂O emission accounting is based upon the quantification methodology of the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories. This methodology accounts for the direct and indirect N₂O emissions associated with different production technologies.

The 4R Climate Smart protocol is currently functional at a provincial level in Alberta, Canada and has been built on the internationally recognized Western Climate Initiative process. In the Ontario-Quebec WCI Protocol adaptation process, Fertilizer Canada funded a scientific review authored by Dr. David Burton, which was facilitated by an ISO 14064:2 guided process led by Viresco Solutions¹. In January 2018, the 4R Research Network conservatively summarized the N₂O emission reductions coefficients associated with each level of implementation and updated the science that modifies the Tier II Inventory approach.

As we collectively work to develop a methodology or protocol to reduce agricultural N₂O emissions, we also need to recognize the socioeconomic and technological barriers to implementing these BMPs at a farm level. Dr. Alfons Weersink and his graduate students at the University of Guelph², characterized these barriers to adoption as (1) farm income; and (previous) low crop prices; (2) lack of expertise in interpreting the data and valuing the advanced technologies; (3) farmer perception of the cost being greater than the benefit (this is also a function of the average age of a farmer); and (4) time. The 4R Climate Smart Protocol can incentivize the adoption of more specific and advanced N₂O emission reduction practices that require agronomic expertise, advanced technologies, or capital investments in new equipment.

Recently, Dr. Brian McConkey, Viresco Solutions' Chief Scientist, published an article in Science Advances entitled *Natural climate solutions for Canada*³. Through a comprehensive

¹ https://fertilizercanada.ca/wp-content/uploads/2018/07/National-NERP-Carbon-Strategy-2018_vf-1.pdf

² <https://www.nrcresearchpress.com/doi/pdf/10.1139/cjps-2017-0342>

³ <https://advances.sciencemag.org/content/7/23/eabd6034>

review, this article estimates both direct and indirect emission reductions from 4R Climate Smart Protocol practices by applying the 4R-based emission reduction coefficients from the aforementioned scientific review conducted by Dr. David Burton.

In the *Natural Climate Solutions for Canada* review, Dr. McConkey estimates the potential emission reductions from a current *Business as Usual (BAU)* scenario and from implementation of advanced 4R Climate Smart BMPs. It is projected that annual mitigation in 2030, relative to the BAU scenario, will be 6.3 (5.0 to 7.6) Tg CO₂e/yr with maximum adoption of advanced 4R Climate Smart BMPs, entailing a cumulative emission reduction of 27.4 (21.9 to 32.9) Tg CO₂e by 2030. This work highlights the collective or global emission reduction potential of the developed 4R Climate Smart Protocol for reduced emissions from agricultural soils.

4R Research for N₂O Emission Reductions

For more than a decade, research scientists, consultants, and industry members have worked collaboratively to support research related to the 4R framework and 4R Climate Smart Protocol.

4R Nutrient Stewardship is science-based framework built on the research results from some of North America's top soil scientists. Notably in recent years, Fertilizer Canada, with leveraged funding from Agriculture and Agri-food Canada, supported the [4R Research Network](#), a group of leading soil scientists who examined 4R practices across Canada and their impacts on protecting water, air, and soil resources. The majority of the network scientists focused their work on nitrogen loss pathways to determine the right source, rate, time, or place for reduced N₂O emissions on Canadian cropland. Dr. Mario Tenuta, Natural Sciences and Engineering Research Council of Canada (NSERC) Senior Industrial Research Chair (SIRC) at University of Manitoba, Dr. Claudia Wagner-Riddle, Director of the North America regional chapter of the International Nitrogen Initiative (INI) at the University of Guelph, and Dr. David Burton at Dalhousie University, are leading soil scientists studying on-farm nitrogen management, specifically reductions in N₂O emissions according to the 4R Nutrient Stewardship framework. Their research work has, and continues to, support nitrogen management BMPs for Canadian growers and has significantly contributed to the development of conservative N₂O emission reduction modifiers used within the 4R Climate Smart Protocol.

Global Recognition and Implementation

The 4Rs have also been internationally recognized by International Agricultural associations. In the Food and Agriculture Organization's (FAO) *Code of Conduct for the sustainable use and management of fertilizers*⁴, it describes important roles for the fertilizer industry, farmers, and governments in the implementation of 4R practices and cites the International Plant Nutrition Institute's 4R Plant Nutrition Manual. The International Fertilizer Association (IFA) has also formally recognized 4R Nutrient Stewardship and currently provides 4R resources for growers and advisors around the world. In 2016, IFA along side World Farmers Organization and Global Alliance for Climate Smart Agriculture, published "*Nutrient Management Handbook*"⁵ which highlights 4R Nutrient Stewardship as key principle in sustainable nutrient management. IFA

⁴ <http://www.fao.org/documents/card/en/c/ca5253en>

⁵

https://www.fertilizer.org/images/Library_Downloads/2016_Nutrient_Management_Handbook.pdf

has also more recently recognized 4R Nutrient Stewardship in their article *5 Reason Why Nutrient Stewardship is crucial for sustainable food systems*⁶.

Field to Market, a sustainability assessment tool in North America, has also recognized the benefits of utilizing the 4R Nutrient Stewardship framework to reduce N₂O emissions. The sustainability tool is able to incorporate 4R Nutrient Stewardship to measure sustainable nutrient management based on a report developed by The Fertilizer Institute, Fertilizer Canada and the International Plant Nutrition Institute⁷. Field to Market represents a global opportunity, providing an internationally applicable framework for measuring and validating sustainable nutrient use and reduced N₂O emission from agricultural soils.

The agricultural industry in North America continues to demonstrate its commitment to the 4R Nutrient Stewardship framework by implementing voluntary 4R Agronomy programs to validate 4R Acres and measure success. These programs work to educate and certify Professional Agronomists and Certified Crop Advisors (CCA's), who serve as qualified, trust advisors to provide 4R nutrient recommendations.

Across North America, there are over 13,000 active CCA's. In Canada, over 160 CCA's have progressed to successfully complete a 4R Nutrient Management Specialty (4R NMS) certification - a course which validates an individual's knowledge of 4R Nutrient Management through an advanced professional exam. The majority of CCAs or 4R NMS CCAs are employed at retail companies who collectively reported over 3.8 million 4R Validated Acres across Canada in 2020. These certified professionals can become accredited professionals and serve to verify 4R Nutrient Management plans under the 4R Climate Smart Protocol. Similar certifications or agronomy programs are being applied across North America and, with international applicability, could be implemented in other countries across the world.

Next Steps Towards Developing a Methodology

Fertilizer Canada strongly recommends that the *Co-development of a Methodology for Avoided Nitrous Oxide (N₂O) Emissions from Management of N-Fertilizers in Agricultural Activities* be based on the internationally recognized and applicable 4R Climate Smart Protocol. As the development of this protocol was led by Viresco Solutions, Fertilizer Canada strongly encourages collaboration with Karen Haugen-Kozyra and her experienced team to successfully expand the development of the 4R Climate Smart Protocol on a global scale.

Fertilizer Canada stands ready to work with Gold Standard to co-develop a methodology for avoided N₂O emissions and would like to express our interest in becoming an active participant on a consortium to co-develop this methodology. We welcome any questions and would be happy to arrange a virtual meeting with our member companies, consultants, and scientific experts to discuss our response further.

Thank you again for the opportunity to participate in this consultation process.

6

https://www.fertilizer.org/Public/News_Events/IFA_Blog/2019_12_16_Nutrient_Stewardship_for_Sustainable_Food_Systems.aspx?WebsiteKey=08523834-accd-495f-b00b-f79e2820ae9d

⁷ <http://research.ipni.net/page/RGBL-2433>

Sincerely,

A handwritten signature in blue ink that reads "MSmith". The letters are cursive and connected, with a small dash above the 'i'.

McKenzie Smith,
Director of Stewardship and Regulatory Affairs