



FERTILIZER CANADA

FERTILISANTS CANADA

907 – 350 Sparks, Ottawa ON K1R 7S8

T (613) 230-2600 | F (613) 230-5142

[info@fertilizercanada.ca](mailto:info@fertilizercanada.ca)

[fertilizercanada.ca](http://fertilizercanada.ca) | [fertilisantscanada.ca](http://fertilisantscanada.ca)

September 30, 2020

Submitted by email: [ec.creditscompensatoires-offsets.ec@canada.ca](mailto:ec.creditscompensatoires-offsets.ec@canada.ca)

**Re: Carbon Pollution Pricing: Considerations for Protocol Development in the Federal Greenhouse Gas Offset System discussion paper**

On behalf of our member companies, Fertilizer Canada welcomes the opportunity to respond to the Federal Government's *Carbon Pollution Pricing: Consideration for Protocol Development in the Federal Greenhouse Gas Offset System*. In particular, we are very pleased to specifically address the questions the government has raised as it relates to our 4R Climate Smart Protocol.

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.

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

**Fertilizer Canada is very concerned that Environment and Climate Change Canada (ECCC) has not included the 4R Climate Smart Protocol as a priority within the current federal offset system and that Canadian growers won't be eligible for carbon credits for their actions to reduce on-farm nitrous oxide (N<sub>2</sub>O) emissions.**

Due to Canada's climate goals, and its new promise to reach net-zero by 2050, it is essential for government to recognize and encourage actions that reduce on-farm N<sub>2</sub>O emissions; emissions from agricultural land in Canada accounts for 38 MT CO<sub>2</sub>e annually. Any offset system that does not include a specific protocol for N<sub>2</sub>O emission reductions is a missed opportunity for Canada and its agricultural sector.

The 4R Climate Smart Protocol has been designed to meet this need. For more than a decade, Fertilizer Canada has worked with Canadian farmers, the fertilizer industry, and the research community to develop and promote 4R Nutrient Stewardship (Right Source @ the Right Rate, Right Time, and Right Place®), the management practices that underlies our protocol. The aim of this effort is to incentivize better fertilizer management and reduce off-field impacts. Use of the 4Rs optimizes plant nutrient uptake, maximizes yield, and increases profitability, while also minimizing fertilizer runoff, leaching, and N<sub>2</sub>O emissions.

The 4R Climate Smart is a protocol proven to reduce N<sub>2</sub>O emissions and has been widely endorsed by our partners in the private sector. The Canadian Canola Growers Association (CCGA), Grain Growers of Canada, the Canadian Federation of Agriculture (CFA), and the Soil Conservation Council of Canada are key partners that actively support 4R Nutrient Stewardship and advocate for the inclusion of the 4R Climate Smart Protocol within the Federal Offset System.

Provincial governments and industry organizations have also implemented specific programs to drive adoption of 4R Nutrient Stewardship. For example,

- The Government of Saskatchewan has set a target of having 25% of their cropland acres under 4R Designation by 2025;
- The Canadian Canola Growers have set a target of having 90% of their acres implementing a basic level of 4R BMPs by 2025; and
- Both the Canada-Ontario Lake Erie Action Plan and the Manitoba's Climate and Green Plan reference 4R Nutrient Stewardship as a method of climate conservation.

### **The 4R Climate Smart Protocol**

The 4R Climate Smart Protocol is a science-based protocol for improving nitrogen management in cropping systems and estimating the N<sub>2</sub>O reduction resulting from better nitrogen management based on regionally adapted best practices. It is a robust protocol that is simple in concept and driven by data that producers could use to track improvements to their farm management system and overall production efficiency, while reducing N<sub>2</sub>O emission from their farms. Challenges remain however, and these will be discussed later in this document.

The protocol was originally developed using a consensus approach, following the ISO 14064:2 process standard with input and review from both government and industry. Canada's top scientists and agronomists, as well as scientists from the United States, working in the area of on-farm Greenhouse Gas (GHG) emission reductions collaborated to identify appropriate regional 4R Best Management Practices (BMPs) and validate reduction coefficients.

As the 4R Climate Smart Protocol uses a modification of Canada's Tier II inventory method to estimate N<sub>2</sub>O emissions at the farm level, it is readily applicable as a tool for improving nitrogen management and estimating on-farm emissions from cropping systems throughout Canada. In addition, as 4R has become the international framework for sustainable nutrient management, the 4R Climate Smart Protocol can be adapted and later used in international offset markets.

Our models demonstrate that implementation of 4R Nutrient Stewardship and the 4R Climate Smart Protocol in Prairie provinces could reduce total GHG emissions by 2-3 megatonnes CO<sub>2</sub>e annually. In addition, users would realize increased profit per acre from increased yields and/or reduced nitrogen costs. The margin on a 4R demonstration farm was shown to increase profits by up to \$87 per acre due to improved nitrogen utilization and better crop yield and quality<sup>1</sup>.

Adoption across Canada creates opportunity for further reductions that will bring Canada closer to its environmental targets, increase profits for Canadian growers, and help protect Canada's food supply.

**Canadian growers are asking ECCC to prioritize a 4R Climate Smart Protocol within the federal offset system. The CCGA and the CFA both included the following in their previously submitted responses to the *Carbon Pollution Pricing: Consideration for Protocol Development in the Federal Greenhouse Gas Offset System*.**

*"Our organization is committed to Fertilizer Canada's 4R Nutrient Stewardship Practices. The three levels of 4R practices (basic, intermediate, and advanced) each see increasing levels of associated emissions reductions, depending on which level is achieved in-field. The goals of the 4Rs make sense to canola farmers and are readily understood in the context of climate smart agriculture. Furthermore, farmers see economic value in implementing 4R practices on their farms. They are a*

---

<sup>1</sup> <https://fertilizercanada.ca/wp-content/uploads/2015/07/Nitrogen-Strategy-Report.pdf>

*suite of practices that help reduce fertilizer related costs, while helping drive yield increases. Most importantly, the 4Rs are adoptable at the field level and result in meaningful emissions reductions. This is why our organization believes a fertilizer emissions reduction protocol adapted from the 4Rs (fertilizer protocol) should be a priority for ECCC as the Department looks to develop offset protocols for agriculture. Canadian farmers want this protocol to be developed. The 4Rs have been vetted in Canada by Canadian industry, academia, and government. Farmers recognize the 4Rs and are implementing its various levels in their day-to-day operations.” – CCGA<sup>2</sup>*

*“Additionally, the ongoing requirement that protocols must be included within the National Inventory Report (NIR) is problematic, as innovative protocols resulting in tangible results are excluded. One such example is the 4R Climate Smart Protocol, which improves nitrogen management in cropping systems by estimating the nitrous oxide reduction associated with better nitrogen management. CFA recommends that the federal offset program develop a vetting process to consider protocols outside of the NIR, or that the Federal Government include the 4R Climate Smart Protocol within the NIR.” – CFA<sup>3</sup>*

## **Response to Identified Concerns within 4R Climate Smart Protocol**

### ***Economic Viability***

With low uptake in other offset markets, it has been questioned if the 4R Climate Smart Protocol is economically viable for growers. First, it is key to understand the difference in the economic viability of implementing 4R Nutrient Stewardship and the economic viability of participating in a 4R Climate Smart protocol. Implementing crop-specific suites of 4R BMPs has been shown to optimize nutrient uptake which results in increased yields per unit of fertilizer (nutrient use efficiency) and less nutrients being lost to air or water. Increased productivity would be a direct economic benefit of 4R Nutrient Stewardship for Canadian growers, but an additional, indirect benefit could be the economic return associated with carbon credits in an offset market. The design of any offset protocol must consider economic margins and ensure that project developers can design a program where the benefits of participating in the protocol outweigh any administrative burden for the farmer.

The 4R Climate Smart Protocol was designed to balance these needs and reward growers for reduced N<sub>2</sub>O emissions through the generation of offset credits. However, if the price or time required to participate in the offset protocol is higher than the value of the offset credits generated, uptake of the protocol will be limited. Specific verification constraints placed on the 4R Climate Smart Protocol in Alberta can be resolved by addressing complexity concerns associated with verification procedures (see below). An estimate of the economic benefits associated with the 4R Climate Smart Protocol (Appendix A) have been provided to outline the developed margins of the protocol required for economic viability.

Our Fertilizer Use Survey demonstrates that Canadian growers see 4R Nutrient Stewardship as economically beneficial. Growers implementing 4R Nutrient Stewardship reported their first perceived benefit of the 4R Nutrient Stewardship framework is economic return. This is further supported by survey data that shows Canadian canola growers who implement the 4Rs have a higher than average yielding crop. For example, high yield growers, compared to low yield growers, regularly soil sample to determine the Right Rate. In a University of Guelph study, growers yet to implement 4R Nutrient Stewardship and the precision agriculture, or ‘smart’ technologies that support implementation, note economics and farm income as the number one

---

<sup>2</sup> 2020 Sept 4 CCGA Submission ECCC re Offset Protocols - Sent

<sup>3</sup> Discussion on Federal GHG Offset Protocols\_\_CFA Consultation

barrier to adoption, but several other barriers exist<sup>4</sup>. For example, purchasing new equipment capable of banding fertilizer may require a large upfront economic investment which will be returned over the next 5-10 years. On the other hand, implementing a soil test program will only require small incremental costs that are likely paid back within the annual crop cycle.

### **Complexity**

The 4R Climate Smart Protocol is specifically designed to quantify and validate N<sub>2</sub>O emission reductions associated with implementation of 4R Nutrient Stewardship BMPs. Verification is site specific accounting for differences in soil, crops, and climates across Canada. Fertilizer Canada has summarized the complexity and verification concerns seen in Alberta and provided conceptual solutions that would improve uptake of the protocol in any jurisdiction across Canada.

- **Flexibility with development and adoption of a project specific dynamic baseline.** Fertilizer Canada supports the development of a project-specific, dynamic baseline that considers the N<sub>2</sub>O emissions resulting from a field not implementing 4R Nutrient Stewardship BMPs. Specific project types without available regional data, like the 4R Climate Smart Protocol, require the development of a project-specific baseline. In this situation, we recommend the development of an ecodistrict baseline. Crop Insurance could be used as a practical approach for baseline development as it collects the required data for this calculation such as crop yield, location, and nutrient application rate.
- **Protocol should be on a field-by-field basis.** For N<sub>2</sub>O emission reductions from agricultural soils, Fertilizer Canada recommends that deviations in fields that do not meet the protocol should result in the field being excluded from the protocol for that season, not the whole farm (as Alberta has done for perennial crops and summer fallow fields). The level of on-farm record keeping required by a farm to meet the verification standard can allow tracking of fertilizer use and yield by field. Therefore, nitrogen application rates and crop yield from non-applicable fields can be subtracted in the calculation to determine farm offset credits.
- **Landowner sign-off should be removed.** In the case of projects that only have emission reductions (i.e. N<sub>2</sub>O reductions from soils), we recommend that the person taking the action (land manager/lessee or the landowner) is the 'owner' of the reduction. Landowner sign-off for these project types needs to be excluded from the protocol requirement list. Implementation of the BMPs required to qualify for emission reductions under the 4R Climate Smart Protocol are entirely under the control of the grower. As carbon is not being stored in the soil there are no reversals to consider. The emission reductions are all accounted for in the crop vintage year, this ownership eliminates possible double counting and reduces the risk of leakage. Requiring landowner signoff increases the administrative burden for the grower without providing any material benefit for verification.

### **Additionality**

In our 2019 Fertilizer Use Survey, 51.6% of growers across Canada reported using some 4R principles in making nutrient management decisions for their operation. However, to qualify under 4R Climate Smart Protocol, growers must meet the minimum basic threshold for each 4R, develop a comprehensive 4R Plan, and have the plan reviewed and signed off by a professional advisor on an annual basis. As a result, the development of this framework in the

---

<sup>4</sup> <https://www.nrcresearchpress.com/doi/pdf/10.1139/cjps-2017-0342>

context of the 4R Climate Smart Protocol, should be considered additional.

Furthermore, we would like to highlight that the 4R Climate Smart Protocol has been developed to allow for incremental improvements. For the last 10 years, Fertilizer Canada has funded 4R Research that informed our [4R Guidance Documents](#) which outline basic, intermediate and advanced suites of 4R BMPs for various crop rotations across Canada. As part of the Ontario-Quebec WCI Protocol adaptation process, Fertilizer Canada supported the recent Science Review by Dr. David Burton, and the Climate Action Reserve Team facilitated an ISO 14064:2 guided process. In January 2018, the 4R Research Network conservatively summarized the N<sub>2</sub>O emission reductions associated with each level of implementation and updated the science that modifies the Tier II Inventory approach allowing for more recent improvements in 4R BMP performance levels and associated N<sub>2</sub>O emission reduction modifiers.

Although, our Fertilizer Use Survey suggests that over 50% of canola growers in western Canada and grain growers in Ontario are close to implementing a basic level of 4R BMPs, documentation of practices and implantation of advanced practices is much lower. For example, it is estimated that less than 5% of growers are currently implementing a fully integrated suite of advanced 4R practices.

There are socioeconomic and technological barriers to implementing the smart technologies that underpin 4R Nutrient Stewardship at the higher 4R BMP performance level. Dr. Alfons Weersink and his graduate students at the University of Guelph<sup>5</sup>, characterized these as (1) farm income; and 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. If a 4R Climate Smart Protocol is designed for optimal implementation, the revenue from the offset credits can stimulate the uptake into the higher 4R BMP performance level.

### ***Current Nutrient Regulations***

Regulations governing commercial nutrient application are under provincial jurisdiction and consequently vary by province. It is also important to note that these regulations typically focus on reducing movement of nutrients, particularly phosphorus, off-site into surface and ground water. They generally target application of animal manures from confined feeding operations in order to reduce nutrient run-off to surrounding watersheds

A recent additionality assessment for the Ontario and Quebec ministries as part of the Protocol adaptation process was completed in 2018<sup>6</sup>. Since the review was conducted according to the WCI offset criterion of regional additionality, California was included in the assessment. At a high-level the assessment found that at present there do not appear to be any state/provincial and/or local regulations that require the implementation of the integrated set of 4R BMPs (at any performance level) required by a complete 4R Nutrient Stewardship Plan and only a few that regulate nitrogen rate applications. The majority of regulations pertain to organic amendments (manure, biosolids) and focus on phosphorous. More specifically, the assessment found the following:

1. **Manure/organic fertilizers:** application of manure may not be additional, given the Ontario Nutrient Management Act (focused on phosphorous) and California Dairy General Order regulations. However, application rates that are lower than the most

---

<sup>5</sup> <https://www.nrcresearchpress.com/doi/pdf/10.1139/cjps-2017-0342>

<sup>6</sup> [https://j4a3r5a6.stackpathcdn.com/wp-content/uploads/2018/07/National-NERP-Carbon-Strategy-2018\\_vf-1.pdf](https://j4a3r5a6.stackpathcdn.com/wp-content/uploads/2018/07/National-NERP-Carbon-Strategy-2018_vf-1.pdf)

stringent of these requirements would be additional and this could be addressed in the protocol with the conventional baseline (see California Dairy Order threshold).

2. **Synthetic fertilizers:** at present no regulations directly control synthetic nitrogen applications; however, several programs allow for the regulator to act if problems are identified (e.g. British Columbia *Agricultural Waste Control Regulation* in the context of manure and California *Irrigated Lands Regulatory Program*), including directly regulating nitrogen rates. If a regulator stepped in to more closely regulate an individual farm, activities and associated reductions related to rate on the farm may no longer be additional. However, reductions associated with the other 3R's (timing, place and source) would still be additional and the quantification approach (conventional or dynamic) found in the protocol could be adjusted to reflect this. Currently, there are no regulations or pending regulations mandating timing, source or placement practices for synthetic nitrogen fertilizers.

The 4R Climate Smart Protocol is unique from these regulations as it prescribes a suite of 4R BMPs designed to optimize nitrogen use efficiency and reduce N<sub>2</sub>O emissions from nitrogen fertilizer applications. The 4R Climate Smart Protocol goes beyond prescribing single application times, rates or boundaries and not only outlines 4R BMPs to specifically reduce N<sub>2</sub>O emissions to air, but also encourages a holistic suite of practices at an advanced level to accomplish this goal.

### **Concluding Remarks**

Fertilizer Canada remains ready to work with ECCC to help take advantage of the advancements that have been made by the Canadian fertilizer sector to develop a 4R Climate Smart Protocol. Together, there is significant opportunity to reduce cropping system emissions in a major way, while increasing the competitiveness of Canadian farmers.

The 4R Climate Smart Protocol is an opportunity for Canada showcase its commitment to climate change solutions by significantly reducing agricultural emissions through sustainable nutrient management.

We ask that the federal government listen to the agricultural sector and work with our industry and grower organization partners to successfully include the 4R Climate Smart Protocol within the Federal Offset System.

Sincerely,



McKenzie Smith  
Director, Stewardship & Regulatory Affairs