



**FERTILIZER CANADA**

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April 9, 2018

The Honourable Catherine McKenna, P.C., M.P.  
Minister of Environment and Climate Change  
200, Sacré-Coeur Boulevard  
Gatineau, Quebec K1A 0H3

RE: Fertilizer Canada's Comments on Offset Compliance under the Federal Output-Based Pricing System Framework

Dear Minister:

Thank you for the opportunity to comment on the federal government's proposed carbon pricing framework. This submission focuses on Fertilizer Canada's contribution to eligible offsets, helping the government to achieve its greenhouse gas reduction targets through agriculture. Additional comments on the framework and treatment of our manufacturing facilities will be made through the output-based pricing system consultations for potash (conventional, solution) and nitrogen (ammonia, nitric acid).

Fertilizer Canada represents manufacturers, wholesale and retail distributors of nitrogen, phosphate, potash and sulphur fertilizers. As the unified voice of the Canadian fertilizer industry, we strive to promote safe, responsible and sustainable, globally competitive fertilizer production, distribution and use.

Feeding the world with "climate-smart agriculture", as defined by the Food and Agriculture Organization of the United Nations (FAO), is a priority for the fertilizer industry. Global crop production must increase by 70 per cent to feed nine billion people by 2050. This must be accomplished in the context of a shrinking availability of arable land. Climate change makes this challenge all the more significant, as it threatens productivity and livelihoods and forces quicker adaptation in farming systems. Meeting the demand for nutritious food will require the efficient use of valuable resources.

Agriculture represents on average 30 per cent of the total greenhouse gas emissions and is the largest contributor of non-CO<sub>2</sub> greenhouse gas emissions. Without reduction in emission intensity, increases in productivity cannot be sustainable over the long term. It is therefore important to consider which technologies and practices can be applied that meet not only adaptation needs, but also mitigation needs. It has been estimated that one billion hectares of natural land has been preserved from crop production between 1961 and 2005 because of increases in yield and productivity. This has also led to carbon emissions savings of 317 to 590 Gt CO<sub>2</sub>e from conserving that land area as forest, wetland, and other habitat.



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Agriculture is the cornerstone of food and nutrition security. Reductions in emissions cannot come at the cost of reduced output of food. Reconciling the dual objectives of increased food production and reduced emissions requires increasing the efficiency of agricultural practices so farmers are able to get more out of all the inputs and resources they use – therefore reducing the relative footprint of agricultural production and maximizing the soil carbon sequestration potential of agriculture.

### **Reducing Emissions**

Identifying technologies and practices that can make fertilizer use more efficient can help significantly reduce emissions of nitrous oxide in agriculture. It can also help farmers grow more food by improving applications so crops benefit most from the fertilizer, while improving farmers' income through more effective spending on inputs and reducing waste. Responsible use of fertilizer plays a significant role in sustainable agricultural intensification. Fertilizer Canada, in collaboration with the International Plant Nutrition Institute (IPNI), The Fertilizer Institute, the International Fertilizer Industry Association (IFA), and other partners, developed a framework that enables better use of fertilizer: 4R Nutrient Stewardship (Right Source @ Right Rate, Right Time, Right Place ®).

Farmers in Canada are using the 4R framework to increase sustainable production of grains and oilseeds, while reducing releases of nitrogen and phosphorus to the air and water. In particular, 4R Nutrient Stewardship can be used to dramatically reduce nitrous oxide emissions while significantly improving productivity through adaptable and incremental implementation of best management practices (BMPs) in fertilizer management. 4R Nutrient Stewardship allows producers to grow abundant food using existing farmland and ensuring the protection of the environment.

### **What is 4R Nutrient Stewardship?**

4R Nutrient Stewardship is a science-based framework that promotes economic, social, and environmental sustainability on the farm by considering collectively the source, rate, time, and place practices for fertilizer and other crop nutrients. 4R Nutrient Stewardship is based on four key principles:

- Use the *Right Source* of fertilizers that are in – or are easily converted to – compounds best used by the target crop.
- Apply the *Right Rate* of fertilizer to match nutrient supply with crop requirements.
- Apply fertilizer at the *Right Time* so nutrients will be available when crop demand is high.
- Apply or maintain fertilizer in the *Right Place* where the crop can access the nutrients most effectively.



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4R Nutrient Stewardship requires the implementation of site-specific BMPs that optimize the efficiency of fertilizer use. The goal of fertilizer BMPs is to match nutrient supply with crop requirements and to minimize nutrient losses from fields. Selection of BMPs varies by location, depending on local soil and climatic conditions, crop, management conditions, and other site-specific factors.

Canadian farms which are currently implementing 4R Nutrient Stewardship demonstrate improved fertilizer efficiency while increasing the quantity produced per acre for each unit of nutrient applied, without sacrificing yield potential. Using 4R Nutrient Stewardship can substantially reduce the nitrous oxide emissions per unit of crop produced, in some cases by up to half. The Canadian 4R Research Network suggests there is the capacity to reduce greenhouse gas emissions from nitrogen fertilizer use by 15 to 25 per cent. Equally important, the practices that reduce nitrous oxide emissions also tend to increase nitrogen use efficiency and the economic return on fertilizer dollars.

#### **How can 4R Nutrient Stewardship be used to measure and reduce emissions while increasing productivity?**

The implementation of 4R Nutrient Stewardship can help farmers reduce greenhouse gas emissions and increase productivity by improving practices. For those who wish to go further, the Nitrous Oxide Emission Reduction Protocol (NERP) was developed to allow for specific measuring and reporting of emission reductions. Improved nitrogen management within NERP is delivered through the implementation of a 4R Nutrient Stewardship Plan at the farm level. Producers wanting to participate in a NERP project develop a 4R Nutrient Stewardship consistent plan with an accredited professional advisor (APA). The APA helps the producer develop a set of sustainability goals that incorporate greenhouse gas reduction measures, as well as other issues that are specific to the farm, into their nutrient management plan. Reducing greenhouse gas per unit of crop produced, generating carbon offsets to help society adapt to climate change, and improving the return on dollars spent on fertilizer are examples of environmental, social, and economic goals that might be included in a 4R Nutrient Stewardship consistent plan under a NERP project.

The APA also helps the farmer develop a suite of practices that integrate the right source at the right rate, time, and place. These BMPs must meet certain thresholds to be NERP eligible at basic, intermediate, or advanced levels. Requirements include site-specific nitrogen management with the field as the management unit at the basic level and subfield or zone management within fields at the intermediate and advanced levels. Practices are adjusted to meet the unique conditions of each field. Nitrous oxide emissions are notoriously difficult and costly to measure directly. In place of direct measurement, NERP uses a series of emission factors to estimate the nitrous oxide emissions associated with nitrogen additions to the cropping system. The emission factors were developed by Agriculture and Agri-Food Canada to operate at the eco district level. This ensures that emission estimates are based on local climate, soil types, and baseline management practices.



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Major quantitative data requirements are nitrogen inputs and crop outputs for each crop grown on the farm in each baseline and project year. Qualitative requirements include, for example location of fields enrolled in the project, 4R Nutrient Stewardship practices used on each field, and the configuration of banding equipment. NERP estimates take into account all sources of added nitrogen including fertilizer and manure; alternative sources like compost or other by-products; as well as the nitrogen recycled from crop residues. NERP's accounting of greenhouse gas emissions is comprehensive. Both direct emissions from the cropping system and indirect losses from nitrogen that has been lost from the cropping system through ammonia volatilization or leaching are included in the estimate. While NERP does not account for the complete lifecycle of fertilizer, it does account for parameters like increased (or decreased) fuel use on the farm that may be a result of practice change.

### **The Opportunity**

*“Every Farmer in Canada has the opportunity to implement the Nitrous Oxide Emission Reduction Protocol and play a role in reducing carbon emissions on their farm.”*

Fertilizer Canada and its members have invested significantly in the 4R Nutrient Stewardship Program; 4R Research Network; 4R Designation / 4R Certification programming for agri-retailers; and continued refinements to the NERP over the last half decade. The institutional platform necessary for a roll-out of this scale is in place – now the coordinated effort to unleash the potential must begin. Given that almost every province has identified an opportunity for the agriculture sector to participate voluntarily in generating carbon offsets under the Pan-Canadian Framework, the timing is right for agriculture to contribute to the low carbon economy and have the revenue from carbon pricing systems drive the needed implementation across the country.

Soon, Canada will have a nationally consistent NERP protocol, with common and comparable Canadian-based science, procedures, carbon accounting rules, data and supporting evidence driving its greenhouse gas metrics<sup>1</sup>. The Ontario-Quebec protocol adaptation process represents the best opportunity to have a Pan-Canadian NERP-based Offset Protocol which could be the flagship of the Pan-Canadian Framework Offset Harmonization Framework. Protocols adapted under the Ontario/Quebec process will be applicable to all provinces in Canada. 4R researchers, experts, 4R practitioners and stakeholders are currently being mobilized across the country to develop a Pan-Canadian NERP and update the science in

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<sup>1</sup> The Ontario-Quebec Cap and Trade Linked Initiative is adapting the Alberta NERP protocol with the intent to have it nationally applicable to every province in Canada.



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accordance with the most recent nitrous oxide research on 4R practices. This protocol will meet international standards for quantifying and verifying carbon offsets. In addition to reducing GHG emissions, broad-scale implementation of NERP could:

- Increase food security and prosperity for the country;
- Deploy precision farming in the agricultural supply chain by employing variable rate nitrogen fertilizer application, along with other inputs;
- Improve soil health and water quality through the application of regionally-specific BMPs; and
- Provide domestic emission reductions, contributing to Canada's Paris commitment as identified in the Pan-Canadian Framework.

Thank you for the opportunity to provide input. We look forward to continuing this discussion with your government, and welcome any of your questions.

Regards,

Clyde Graham  
Senior Vice President

cc     Jeremy Mann, Section Head, Mining and Processing Division, Environment and Climate Change Canada  
       Tanmay Praharaj, Head, Chemicals Production Division, Environment and Climate Change Canada  
       Kathleen Rich, Director, Carbon Pricing Bureau, Environment and Climate Change Canada