



FERTILIZER CANADA

FERTILISANTS CANADA

907 – 350 Sparks, Ottawa ON K1R 7S8

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

info@fertilizercanada.ca

fertilizercanada.ca | fertilisantscanada.ca

May 4, 2018

Attn: Sustainable Development Office

Environment and Climate Change Canada
200 Boul. Sacré-Coeur, 12th floor
Gatineau, QC, K1A 0H3

Re: Response to the Government of Canada's Voluntary National Review (VNR) on the 2030 Agenda for Sustainable Development

On behalf of Fertilizer Canada and our members, thank you for the opportunity to respond to the Government of Canada's *Voluntary National Review (VNR) of the 2030 Agenda for Sustainable Development*.

Fertilizer Canada is an industry association which represents manufacturers, wholesale and retail distributors of nitrogen, phosphate, potash and sulphur fertilizers used in the production of agricultural crops, residential lawns and gardens, and recreational parklands.

A sustainable agriculture industry is critical to meeting the Sustainable Development Goals (SDGs) set by the United Nations. Fertilizer is essential to meeting the need of intensifying crop production. Canada's agriculture industry implements Climate-Smart practices to ensure that increased crop production does not negatively impact the environment. Innovations in practices and technologies can help achieve these objectives without compromising productivity and food security, making agriculture sustainable, productive, and resilient.

Supporting the Sustainable Development Goals with 4R Nutrient Stewardship

Fertilizer Canada recognizes the importance of providing global farmers, regardless of their gender or farm size, with science-based information on the International 4R Nutrient Stewardship framework (Right Source @ Right Rate, Right Time, Right Place ®) for management of crop nutrients. This framework ensures the protection of the environment, the production of safe food for consumers, and the productivity of farmers. Global food security will never be realized without the use of commercial fertilizers, and the industry's 4R Nutrient Stewardship program provides the foundation for responsible use of these essential plant nutrients.



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The 4R Nutrient Stewardship framework is a science-based approach encompassing the four main principles of fertilizer application:

- The **Right Source** means ensuring a balanced supply of essential plant nutrients including granular or liquid fertilizers or manures.
- The **Right Rate** is applying just enough fertilizer to meet the needs of the plant while accounting for nutrients already in the soil. Farmers and homeowners can use soil tests to identify nutrient shortfalls.
- The **Right Time** means applying fertilizer when the plant will get the most benefit and avoiding times when fertilizer can be lost to the environment.
- The **Right Place** is applying fertilizer where the plants can easily access the fertilizer and where it is less likely to be lost to the water or air.

Reconciling the dual objectives of increased food production and reduced emissions is a major challenge faced by the global agriculture industry today. Fertilizer consumption in Canada has remained on the rise over the past two decades in support of increased crop yields required to feed nine billion people by 2050. However, agriculture is also the largest contributor of non-carbon dioxide greenhouse gas emissions (GHG) on the planet, accounting for 36 per cent globally.

Fertilizer Canada's Nitrous Oxide Emission Reduction Protocol (NERP) has the potential to change that.

Fertilizer Canada and its members lead and support the development of the world-leading NERP offset system as a tool to ensure the economically efficient and environmentally responsible use of fertilizer on farm. NERP was developed using a consensus approach with input and review from Canada's top scientists in GHG emissions as well as leading agronomists from government and industry.

NERP incorporates 4R Nutrient Stewardship, providing a framework for farmers to reduce on-farm GHG emissions from nitrogen fertilizer in a quantifiable and credible way, and in return allowing farmers to produce saleable carbon credits. The implementation of NERP will allow farmers to demonstrate GHG reductions by having a verifiable and quantifiable system in place.

Beyond reducing GHG emissions, 4R Nutrient Stewardship research demonstrates reductions in other environmental losses including nitrogen losses to surface water and aquifers and phosphorus losses to lakes, rivers and oceans. The 4R Nutrient Stewardship approach provides practices that maximize nutrient uptake by the plant, manage nutrient levels in soils and prevent them from being lost to surrounding water systems thereby improving productivity, efficiency and profitability of crop production.



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Advancing Gender Equality – global implementation of 4R Nutrient Stewardship

It is critical that countries implement technologies and practices that make fertilizer use more efficient such as 4R Nutrient Stewardship and NERP. This is critical to ensuring all countries control and adapt to climate change and move to a more economically and environmentally sustainable agriculture system.

However, meeting the Sustainable Development Goals cannot be achieved by one industry alone. Partnerships between governments, international organizations, foundations, not-for-profits, and the private sector will be critical to achieving these goals. Leveraging the expertise of partners will make greater strides in ensuring social, economic, and environmental goals are met in developing countries.

This is why Fertilizer Canada has signed a Memorandum of Understanding with the Cooperative Development Foundation of Canada (CDF). Working together, CDF and Fertilizer Canada will support food security and inclusive growth in developing countries by incorporating 4R Nutrient Stewardship with the co-operative business expertise of Canada's co-operative sector.

The partnership program will work with smallholder farmers who choose to organize as members in autonomous co-operative enterprises to meet their needs, through improved production and marketing of their produce. This approach has demonstrated improvement in the lives of farmers, in particular for women.

CDF and Fertilizer Canada have submitted a proposal to Global Affairs Canada for a six-year, three-country project to improve farm productivity and profitability of 120,000 smallholder farmers – 40 per cent of which are women. This project is an innovative partnership that will leverage Canadian expertise in co-operative enterprise development, through the CDF, with the technical expertise and networks of Canada's world class fertilizer industry through Fertilizer Canada and the International Plant Nutrition Institute (IPNI).

The project will focus on the adoption of sustainable climate-smart agriculture practices by smallholders, in particular for nutrient management practices informed by 4R Nutrient Stewardship. Supporting policy and program engagement with relevant stakeholders at the national, regional, and global levels will inform and promote the uptake and scaling of the 4R approach.

Activities will begin in year one with smallholder farmers and their agricultural enterprises in Ghana, Ethiopia and Senegal. By the end of the project, it is anticipated that co-operative and other smallholder farmer owned enterprises will increase the productivity and profitability of targeted cash and food crops, supported by a policy and extension environment where newly certified public and private



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agriculture extension agents have the knowledge and tools required to demonstrate and promote 4R principles.

Recommendations for Canada to improve efforts to advance the SDGs:

The Government of Canada has a unique opportunity to capitalize on advancements made by the global fertilizer industry, to help lead in the adoption of initiatives to help meet the Sustainable Development Goals of the United Nations. The Government of Canada should contemplate the following:

- Adoption of science-based decision-making on matters affecting agricultural productivity and food security;
- Adoption and promotion of the 4R Nutrient Stewardship program as a solution to help increase agricultural productivity, reduce greenhouse gas emissions, and improve the protection of freshwater;
- Recognition of the actions undertaken by the global fertilizer industry to promote the principles of 4R Nutrient Stewardship as a means to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture;
- Support and promote the Nitrous Oxide Emission Reduction Protocol (NERP) as a solution to help integrate climate change measures into national policies, strategies and planning;
- Promote public-private partnerships to expand International trade opportunities and capitalize on the expertise to bring innovation and new technologies to developing countries; and
- Support partnerships which have demonstrated potential to improve the lives of members, in particular women, by providing an income resulting in self-reliance and improved self-confidence.

The appended document further outlines how Fertilizer Canada's efforts are supporting the Sustainable Development Goals. Fertilizer Canada stands ready to work with the Government of Canada as the Sustainable Development Goals are implemented. I look forward to discussing these opportunities with you at your convenience.

Sincerely,

Clyde Graham
Sr. Vice President
Fertilizer Canada



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Fertilizer Canada's Contributions to Advancing Canada's Sustainable Development Goals

Fertilizer is essential to meeting the need to intensify crop production. Canada's agriculture industry has implemented Climate-Smart agricultural practices to ensure that increased agriculture production does not negatively impact the environment. A sustainable agriculture industry is critical to meeting the Sustainable Development Goals (SDGs) set by the United Nations. Innovations in practices and technologies can help achieve these objectives without compromising productivity and food security, making agriculture more sustainable, more productive, and more resilient.

The Canadian fertilizer industry has developed **sustainable nutrient management best management practices which are delivered through the incorporation of 4R Nutrient Stewardship (Right Source @ Right Rate, Right Time, Right Place®)**, which can help achieve the Sustainable Development Goals of the United Nations. This Canadian-made approach promotes application of the scientific principles of crop nutrition, in combination with best available regional evidence to improve the site-specific management of nutrients for the farm, lawn or garden. The 4R Nutrient Stewardship (4Rs) program seeks to balance nutrient management decisions within a framework of economic, social, and environmental goals.

The principles that underpin 4R Nutrient Stewardship can be applied by any farmer in any geography and in any farming system. Cost-effective and environmentally responsible soil management and enhancement is key to increased food production and sustainability for small-holder farmers as well as larger farms. In each setting, the 'Right' actions might differ but the flexibility of the 4R Nutrient Stewardship system allows adaptation to local needs and conditions.

It is estimated that approximately six million acres of Canadian crop land are currently implementing 4R Nutrient Stewardship Best Management Practices (BMPs), and in addition eight out of ten farmers have indicated an awareness of the 4Rs.

Canada's fertilizer industry's actions to support Sustainable Development Goals

GOAL 2: Zero Hunger

Global food security cannot be achieved without the use of commercial fertilizers. The fertilizer industry's 4R Nutrient Stewardship initiative provides a framework for the responsible use of essential plant nutrients. With use of this standardized science-based framework, industry stakeholders, including farm groups, homeowners, researchers, conservationists, governments, landscapers, horticulturalists, industry members and communities can continue to ensure that food is sustainably produced.



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By applying 4R Nutrient Stewardship, farmers can increase yields and produce abundant and quality food.

- Fertilizer Canada in partnership with Agriculture and Agri-Food Canada have invested \$2.2 million over three years in research programs to quantify the economic, social and environmental benefits of 4R Nutrient Stewardship. Results of this research indicate, for example, that applying the Right Source of fertilizer in the Right Place increases yields at the same time as reducing environmental losses.
- Fertilizer Canada in partnership with stakeholder groups have collaborated with provincial governments - Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, and Prince Edward Island - to deliver regionalized 4R Nutrient Stewardship programming.
- Implemented 36 provincial 4R Nutrient Stewardship Demonstration Farms representing thousands of acres, which demonstrate the effectiveness of science-based BMPs. These demonstration farms aim to showcase not only increased crop yields but multiple sustainable benefits of 4R Nutrient Stewardship application to the farmer.

GOAL 13: Climate Action

Reconciling the dual objectives of increased food production and reduced emissions is a major challenge faced by the global agriculture industry today. Fertilizer consumption in Canada has remained on the rise over the past two decades in support of increased crop yields required to feed nine billion people by 2050. However, agriculture is also the largest contributor of non-carbon dioxide greenhouse gas (GHG) emissions on the planet – 36 per cent globally.

Fertilizer Canada's effective action on climate change can be demonstrated using 4R Nutrient Stewardship.

- The 4R Designation program encourages a voluntary approach to sustainable nutrient management across Canada. With thousands of acres already being measured, 4R Designation recognizes that Canadian agri-retailers are a key influencer to assist and guide farmer customers in addressing environmental concerns while maintaining sustainable and productive systems. Once a farmer has completed a 4R Nutrient Stewardship plan with their agri-retailer, the 4R Designation program allows Fertilizer Canada to count their acres and demonstrate the tangible commitment being made by the Canadian agricultural industry to the environment.
- Nitrogen-based fertilizers are highly effective, but contribute to nitrous oxide emissions when applied on the farm. For the nitrogen manufacturing sector,



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extensive facility performance assessments including government and third-party benchmarking have concluded that Canadian facilities perform in the top quartile globally for energy efficiency and GHG emissions. Given the limited ability to reduce emissions at production, the sector has worked extensively to reduce on-farm emissions creating the world-leading Nitrous Oxide Emission Reduction Protocol (NERP). As another Canadian-made innovation, this offset system applies 4R Nutrient Stewardship practices so that farmers reduce on-farm GHG emissions from nitrogen fertilizer in a quantifiable, credible, and verifiable way, and in return allowing them to produce saleable carbon credits. Originally developed for use in Alberta's Specified Gas Emitters Regulations, NERP is currently being adapted in Ontario and Quebec. The protocol is well-positioned to become the gold standard offset protocol in Canada and around the world.

- Fertilizer Canada and Agriculture and Agri-Food Canada are jointly funding scientific field trials across Canada to quantify the nitrous oxide emission reductions from NERP and 4R Nutrient Stewardship practices. Current research shows how NERP can help to reduce on-farm GHG emissions from nitrogen by at least 35 per cent. The practices that reduce GHG emissions also tend to increase nitrogen use efficiency and the economic return on fertilizer dollars. It is estimated that increased profits per year range from \$9 to \$87 per acre.
- The principles of 4R Nutrient Stewardship are also applied to lawns and gardens. Fertilizer Canada's Greener World program teaches homeowners how best to fertilize lawns and gardens using the 4R principles. Healthy grass makes several important contributions to our environment. It reduces pollution, absorbs GHGs and supplies oxygen. Lawns also clean water through filtration, reduce soil erosion and reduce water runoff.

GOAL 6: Clean Drinking Water/Clean Water and Sanitation

Canada has many water bodies, including Lake Winnipeg and the Great Lakes, which are essential for Canada's economic prosperity and social well-being. Not only do these waterways contribute to the success of the agriculture industry, they supply drinking water to millions of Canadians.

While the primary nutrient found to cause the growth of algae and aquatic weeds in streams and lakes is phosphorus, it has many sources other than fertilizer. The environmental risk of applied phosphorus fertilizers stems from its ability to bind soils after application. The 4R Nutrient Stewardship approach provides practices that maximize nutrient uptake by the plant, manage phosphorus levels in soils and prevent it from being lost to surrounding water systems.



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Fertilizer Canada promotes the adoption and implementation of 4R Nutrient Stewardship in Ontario, Manitoba and across Canada by working with governments, watershed groups, scientists, agri-retailers and farmers to improve fertilizer application practices and reduce phosphorus losses to lakes and rivers. This is demonstrating through industry-led research that by using the 4R Nutrient Stewardship approach, the impact on water quality and losses in drainage water can be reduced. This work, which is focused on refining application practices and improving the health of the Canadian waters, is enhanced by the support of government and non-government stakeholders.

- In Manitoba, the Government of Manitoba, Keystone Agricultural Producers and Fertilizer Canada have committed to a shared goal of improving water quality by reducing nutrients in Lake Winnipeg and rivers. Manitoba's 2017 *Climate and Green Plan* proposes 4R Nutrient Stewardship acres as an indicator to support the plan's Water Quality measurement to ensure clean water is produced throughout Manitoba for drinking, habitat, recreation and economic development.

In Prince Edward Island, Fertilizer Canada has partnered with the PEI government, farmer groups, and watershed groups to promote sustainable nutrient use. Under the 4R Nutrient Stewardship MOU, trials were conducted on potato production. Overall, 4R practices reduced the post-harvest residual soil nitrates level, which reduces the risk of nitrate leaching into groundwater.

- 4R Nutrient Stewardship has been endorsed by the International Joint Commission who identifies Fertilizer Canada as a contributing partner to cross-border efforts. In the 2014 report on the Lake Erie ecosystem, *A Balanced Diet for Lake Erie: Reducing Phosphorus Loadings and Harmful Algal Blooms*, and 2016 Progress Report of the Parties, 4R Nutrient Stewardship was identified for accelerated implementation.
- The province of Ontario is a leader in encouraging farmers to use nutrient management plans in crop production. The province has embraced 4R Nutrient Stewardship as an important tool to meet the agricultural and environmental goals, referenced in the Canada-Ontario Domestic Action Plan, as well as government publications including *A Phosphorus Primer* and the *Soil Fertility Handbook* (OMAFRA Publication 611).

This support is amplified by our partners, who have undertaken extensive efforts to adopt and promote 4R Nutrient Stewardship in Ontario, specifically:

- The second joint action cited in the *Interim Joint Action Plan for Lake Erie* encourages adoption of the 4R Nutrient Stewardship Certification program or other comprehensive nutrient management programs. The Ontario 4R Nutrient Stewardship Certification Program encourages agricultural retailers, service providers and other certified professionals to adopt proven best practices through the 4Rs. Based on the Ohio 4R Certification model, the program has gathered collective knowledge and input from over 300 stakeholders to inform a set of 37 compliance standards reflective of the best available science, technology and



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regulatory requirements for Ontario conditions. The 4R Certification program is scheduled for launch in July 2018.

- Fertilizer Canada and the Ontario Certified Crop Adviser Board with the International Certified Crop Advisor Board collaborated on the development of a 4R Specialty designation in Ontario. To date, over 100 Ontario Certified Crop Advisors have been designated with the specialty, providing farmers with greater access to expertise and knowledgeable professionals on sustainable nutrient management.
- Fertilizer Canada, the Ontario Agri-Business Association and the Government of Ontario entered into a Memorandum of Cooperation partnership, recognizing that voluntary use of 4R Nutrient Stewardship, based on sound science and expert advice, is the best approach towards reducing the negative environmental impacts of unwanted nutrient loading in Lake Erie.

Fertilizer Canada supports the need to protect the ecological health of Canada's water bodies by continuing the industry's extensive research, programming and awareness-building efforts with our partners across Canada.

GOAL 5: Gender Equality

Fertilizer Canada has signed a Memorandum of Understanding with the Cooperative Development Foundation of Canada (CDF). Working together, CDF and Fertilizer Canada will support food security and inclusive growth in developing countries by incorporating 4R Nutrient Stewardship with the co-operative business expertise of Canada's co-operative sector.

The partnership program will work with small-holder farmers who choose to organize as members in autonomous co-operative enterprises to meet their needs, through improved production and marketing of their produce. This approach has demonstrated improvement the lives of farmers, in particular for women.

CDF and Fertilizer Canada have submitted a proposal, to Global Affairs Canada, for a six-year, three-country project to improve farm productivity and profitability of 120,000 smallholder farmers – 40 per cent of which are women. This project is an innovative partnership that will leverage Canadian expertise in co-operative enterprise development, through the CDF, with the technical expertise and networks of Canada's world class fertilizer industry through Fertilizer Canada and the International Plant Nutrition Institute (IPNI).

The project will focus on the adoption by smallholders of sustainable climate-smart agriculture practices, in particular nutrient management practices informed by the 4R Nutrient Stewardship. Supporting policy and program engagement with relevant



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stakeholders at the national, regional, and global levels will inform and promote the uptake and scaling of the 4R approach.

Activities will begin in year one with smallholder farmers and their agricultural enterprises in Ghana, Ethiopia and Senegal. By the end of the project, it is anticipated that co-operative and other smallholder farmer owned enterprises will increase the productivity and profitability of targeted cash and food crops, supported by a policy and extension environment where newly certified public and private agriculture extension agents have the knowledge and tools required to demonstrate and promote 4R principles.

Keys to Success on 4R Nutrient Stewardship

1. Shared-value partnerships uncover opportunities for implementation.

Working in partnership with stakeholders who play a role in better nutrient management – not just farmers but their advisors, environmental conservation authorities, and governments – has led to high awareness and support for 4R Nutrient Stewardship. In so doing, our partners have led us to even greater opportunities for expanding 4R Nutrient Stewardship implementation. For example, 4R Nutrient Stewardship is being integrated in national programs such as the National Environmental Farm Plan and the Canadian Roundtable for Sustainable Crops as the standard for measuring sustainable nutrient management.

2. Knowing what 4R Nutrient Stewardship means in each region.

The 4Rs are a universally applicable yet regionally-specific approach. Not only does having shared-value partnerships create support but it also generates a knowledge base for understanding what it means to implement the 4Rs from the Prairies to the East Coast. This consensus has resulted in a [4R Practice Guidance Document](#) – a resource for stakeholders that provides guiding examples of 4R practices at a basic, intermediate and advanced level, for the major cropping systems across the country. This is especially important for informing the measurement of acres adopting 4R Nutrient Stewardship and paves the way for identifying other sustainability metrics.

3. Farming under 4R Nutrient Stewardship across Canada requires continuous improvement.

As a farm operation grows and faces an ever-changing climate, full uptake of 4R Nutrient Stewardship in Canada will take time. But this does speak to one of the key advantages of 4R Nutrient Stewardship which is adaptive management. A farmer may start out with a suite of source, rate, time and place practices and find over a growing season that certain aspects worked well, while others may have performed less so. The idea of adaptive management in a 4R Nutrient Stewardship plan is that, practices are constantly monitored and adjusted on an annual basis until the farmer finds the ‘Right’ combination to improve profitability at the same time as improving environmental sustainability.



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Additionally, 4R Nutrient Stewardship accounts for the advancement of agronomic research generating new methods and technologies to improve nutrient management on-farm. It is important that we continue our efforts to ensure that key stakeholders, especially farmers, have the tools they need for successful implementation of 4R Nutrient Stewardship.

Recommendations for Canada to improve its efforts to advance the SDGs

The Government of Canada has a unique opportunity to capitalize on advancements made by the global fertilizer industry, to help lead in the adoption of initiatives to help meet the Sustainable Development Goals of the United Nations. The Government of Canada should contemplate the following:

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