

Fertilizer Canada: Environment 101

Fertilizer Canada is dedicated to ensuring sustainability and profitability through implementing programs and initiatives to protect soil, air, and water quality. Increasing economic returns for Canadian growers and supporting a safe and healthy fertilizer industry is a core priority for the organization.

4R Nutrient Stewardship

For more than a decade, Fertilizer Canada has worked with Canadian farmers, the fertilizer industry, the research community, provincial governments, and conservation groups to promote 4R Nutrient Stewardship (Right Source @ Right Rate, Right Time, and Right Place). The framework is a suite of best management practices that optimize nutrient uptake and maximize crop production, while reducing environmental loss.

The concept is simple – apply the right source of nutrient, at the right rate, at the right time, and in the right place.



RIGHT SOURCE

Matches fertilizer type to crop needs.



RIGHT RATE

Matches amount of fertilizer to crop needs.



RIGHT TIME

Matches nutrients available when crops need them.



RIGHT PLACE

Keeps nutrients where crops can use them.

Fertilizer management practices need to balance economic, social and environmental dimensions of sustainability. Doing this requires a local decision-making approach that is flexible to different conditions across the country, and the world. Farmers need the flexibility to make plans that consider their unique circumstances; what works for an Albertan wheat farmer likely would not apply to someone growing potatoes in Prince Edward Island. Specific to emission reductions, the 4R Climate Smart Protocol practices can significantly reduce nitrous oxide (N₂O) emissions by up to 35 per cent.



4R Nutrient Stewardship is recognized in or endorsed by:

- ✔ Canada-Ontario's Lake Erie Action Plan
- ✔ Saskatchewan's Prairie Resilience Plan, which has a goal of 25% of acres under 4R Designation by 2025
- ✔ Manitoba's Climate and Green Plan
- ✔ Global Affairs Canada's Implementation of the 2030 Agenda for Sustainable Development Voluntary National Review
- ✔ The Canola Growers of Canada who have a goal of 90% of farmer acres under 4R management by 2025
- ✔ United Nation Food and Agriculture Organization

Reducing Emissions

4R Nutrient Stewardship is designed to sustainably intensify crop production.

The world's population is estimated to grow by approximately 2 billion people by 2050. The general consensus is that global agriculture production will need to increase by about 60-70 per cent in order to feed all these people. This will require sustainably intensifying production on existing cropland. Farmers will continue to 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 a framework for understanding and implementing the core principles and practices of sustainable agriculture.

4R Nutrient Stewardship has seen impressive growth and uptake with millions of acres now captured under the program, and a goal to hit 15 million verified 4R acres by 2025. Those in the fertilizer sector have worked, and continue to work, extensively, to reduce on-farm emissions. One step was creating the world leading 4R Climate Smart Protocol, also known as the Nitrous Oxide Emissions Reduction Protocol (NERP) in Alberta. This protocol is based on 4R Nutrient Stewardship, but works to incentivize specific nitrogen practices aimed at reducing N₂O emissions. The protocol generates saleable offset credits and income for farmers.

If these advanced practices were used in Prairie provinces, as the 4R Climate Smart Protocol incentivizes, Canada could see a reduction of 2-3 megatons of CO₂e in western Canada alone.

Studies have shown that without fertilizer there is a significant decrease in crop yield. Examples of long-term studies results include:



40 per cent decline
in wheat yield
without fertilizer



60 per cent decline
in corn yield
without fertilizer



57 per cent decline
in grain yield
without fertilizer

4R Solution Project

Fertilizer Canada leads the 4R Solution Project – a Canadian approach that will improve the socio-economic well-being and resilience of 80,000 smallholder farmers, particularly women in Ethiopia, Ghana, and Senegal.

This project, funded by Global Affairs Canada, aims to show how adopting more sustainable farming practices improves agricultural productivity and farm income. By incorporating 4R Nutrient Stewardship into fertilizer use management while incorporating important gender and environmental resilience strategies, we can increase food security, empower women, and reduce poverty for men, women, and children.



Protecting people. Protecting the economy. Protecting the environment.



The fertilizer industry is one of the **largest industrial users of natural gas in Canada.**



Canadian potash is the most sustainable in the world – It's made with 50 per cent fewer greenhouse gas emissions in comparison to its global competitors.



Canada's nitrogen production facilities upgrade Canadian natural gas, the most efficient and emission feedstock and fuel source, into nitrogen fertilizers which help **keep agricultural soils productive and contribute to the global food supply.**

FERTILIZER IS AN EITE INDUSTRY

Canadian fertilizer manufacturers produce about 33 million tonnes of nitrogen, phosphate, potash, and sulphur fertilizers annually in some of the most technologically advanced, energy efficient and safest facilities in the world. The fertilizer industry is one of Canada's most Energy-Intensive Trade Exposed (EITE) industries making it extremely sensitive to extra costs of production not borne by producers in competitive jurisdictions around the world including Brazil, Russia, China, and Belarus.

Accounting for more than 10 per cent of Canada's economy, Canada's EITE industries face higher compliance costs than peers in other countries. Complying with the proposed Canadian carbon pricing system at \$30/tonne CO₂e is estimated to cost the Canadian fertilizer industry at close to \$5 billion, which is not the case for global competitors.

Through collaboration with Fertilizer Canada and our member companies, the federal government addressed issues related to the Output-Based Pricing System by creating evidence driven industry standards that acknowledge the dangers of carbon leakage and reduced global competitiveness.

Individual initiatives are also being undertaken by Fertilizer Canada members including promising carbon capture programs and low emission technology roadmaps to generate offset credits for farmers. Carbon capture, utilization and storage technologies is an example of a technology that will be key in achieving Canada's net-zero by 2050 goal, as a proven emission-reducing technology.



Fertilizer has the power to feed the world and protect the environment.

Canadian fertilizer can help achieve the United Nations Sustainable Development Goals to end hunger, achieve food security and improved nutrition and promote sustainable agriculture around the world.