

GETTING 4R SUSTAINABILITY RIGHT



Fertilizer Canada: 4R Nutrient Stewardship Sustainability Report



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada



FERTILIZER CANADA

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INTRODUCTION

The global population is expected to reach **9.7 billion by 2050**. That's a lot of mouths to feed.

Smarter, more efficient fertilizer management practices will help growers meet the rising demand for food while minimizing pressure on the environment and meeting societal expectations for sustainable food sourcing.

By working with Canadian growers and the fertilizer industry to promote and implement 4R Nutrient Stewardship (**Right Source @ Right Rate, Right Time, Right Place**®), Fertilizer Canada is committed to getting sustainability right — and in doing so, reducing the agriculture sector's environmental impact while optimizing crop productivity and on-farm profits.

A MESSAGE FROM GARTH WHYTE

PRESIDENT & CEO

The efficient use of fertilizer is the key to intensifying crop production on existing farmland. In fact, fertilizer is responsible for half of the world's current food production, keeping soils productive while improving crop quantity and quality. That intensification is going to become increasingly important over the next 30 years as the world seeks to increase food production by 70 per cent — sustainably and with as little environmental impact as possible.

Sustainability has always been an integral part of our activities and initiatives at Fertilizer Canada. Our sustainability strategy is driven by our determination to get sustainability “right” — by supporting Canada's sustainable development goals, generating science-based information on innovative fertilizer management practices, providing a unified voice for our members and stakeholders and promoting the adoption and implementation of 4R Nutrient Stewardship across the country.

Numerous governments, agri-retailers and farmers have adopted 4R Nutrient Stewardship to achieve their cropping system goals, improving crop yields while helping maintain soil, air and water quality. 4R Nutrient Stewardship is the foundation of nearly everything we do and will remain our top priority in the years ahead, allowing us to take further action through improved nutrient application, efficiency and production.

We are fortunate in Canada that our fertilizer industry is well positioned to face the sustainability challenges of today and tomorrow. Through its vast network of manufacturers and agri-retailers, the industry is working to ensure Canadian growers can implement internationally recognized climate-smart agriculture practices and adopt new technologies that will help them achieve their environmental objectives without compromising food security.

This 4R Nutrient Stewardship sustainability report — the first ever for Fertilizer Canada — represents a step forward on our journey to set and document concrete sustainability goals in a quantifiable and verifiable manner, and to communicate the progress of our sustainability initiatives to our partners and stakeholders.

In this report, we have included 2016 milestones against an initial list of key performance indicators measuring the environmental, economic and social impact of our activities. Going forward, we will continue to target comprehensive performance indicators that encompass critical issues such as:

- reducing agricultural greenhouse gas emissions
- reducing nutrient runoff and leaching to freshwater
- aligning farm profitability with sustainability
- improving fertilizer stewardship in urban centres

We look forward to reporting further on the contribution of 4R Nutrient Stewardship to the health of Canada's ecosystems and economy as we empower more manufacturers, distributors, agri-retailers and farmers to adopt sustainable fertilizer management practices.

Going forward, we will strive to integrate 4R Nutrient Stewardship across Canada and will continue to accept new challenges in the areas of sustainable food production and nutrient management.



Garth Whyte
President & CEO



ABOUT FERTILIZER CANADA

Fertilizer Canada represents manufacturers, wholesalers and retail distributors of nitrogen, phosphate, potash and sulphur fertilizers. The fertilizer industry plays an essential role in Canada's economy. Fertilizer Canada's Vision 2020 action plan aligns core organizational priorities with the changing needs of the industry, laying the groundwork for maximizing member value over the next four years. We are committed to supporting the industry with innovative research and programming, and by working closely with growers to lead the adoption of international standards for on-farm nutrient application. By advocating for sustainability and stewardship in the agri-food sector, we continue to make changes that have a positive impact on the environment, economy and social fabric of Canadian life.

Fertilizer Canada has set a goal of securing a total of 20 million 4R Designated acres, or 25 per cent, of Canadian crop production by 2020. The fertilizer industry is taking serious action toward balanced environmental stewardship using 4R Nutrient Stewardship.

VISION**2020**

"We will advance the safe, secure and sustainable production and use of fertilizer through proactive science-based programs, innovation and advocacy — benefitting Canada and the world."

OUR SUSTAINABILITY PRINCIPLES

With the goal of reconciling sustainability and profitability, we work through our programs and initiatives to protect soil, air and water quality; increase economic returns for Canadian growers; and support a safe and healthy fertilizer industry. In everything we do, we strive to:

- base our decisions and actions on sound science
- promote best practices on-farm using 4R Nutrient Stewardship
- communicate openly and work in partnership with our stakeholders
- encourage transparency and performance reporting
- act with integrity

Our sustainability principles are strongly aligned with the Government of Canada's *Federal Sustainable Development Strategy* and parallel the United Nation's Sustainable Development Goals.

FEDERAL SUSTAINABLE DEVELOPMENT STRATEGY	FERTILIZER CANADA SUSTAINABILITY PRINCIPLES
Freshwater and oceans	<ul style="list-style-type: none"> • Safeguarding Canadian freshwater by reducing nutrient runoff
Clean technology, jobs and innovation	<ul style="list-style-type: none"> • Delivering science-based sustainability programs • Investing in research and development of sustainable nutrient management practices
Taking action on climate change	<ul style="list-style-type: none"> • Reducing greenhouse gas emissions
Human health, well-being and quality of life	<ul style="list-style-type: none"> • Providing access to training and education • Increasing on-farm profitability for growers

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS	FERTILIZER CANADA SUSTAINABILITY PRINCIPLES
No poverty	<ul style="list-style-type: none"> • Increasing food quality
Zero hunger	<ul style="list-style-type: none"> • Improving diets and health
Climate action	<ul style="list-style-type: none"> • Minimizing impacts of climate change • Reducing nutrient losses to air and water • Encouraging wider adoption of stewardship practices
Life below water	<ul style="list-style-type: none"> • Reducing nutrient losses to air and water • Educating growers, industry workers and students • Encouraging wider adoption of stewardship practices
Life on land	<ul style="list-style-type: none"> • Promoting agriculture intensification • Improving soil health • Minimizing conversion of land into cropland
Partnerships for the goals	<ul style="list-style-type: none"> • Forming global partnerships with governments, farm groups and conservation groups
Decent work and economic growth	<ul style="list-style-type: none"> • Promoting safe working conditions • Increasing on-farm profitability for growers
Responsible consumption and production	<ul style="list-style-type: none"> • Protecting the environment • Improving grower returns • Making food production safer

4R NUTRIENT STEWARDSHIP METRICS FOR SUSTAINABLE CROP NUTRITION:

A Framework for measuring sustainability on a North American scale

(Prepared in collaboration with The Fertilizer Institute and the International Plant Nutrition Institute)



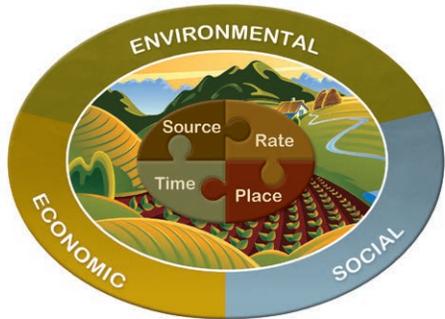
- EXTENSION & PROFESSIONALS**
- Number of agronomy professionals
 - Number of certified professionals
 - Farmer outreach and awareness
 - Training materials
 - Available continuing education

- RESEARCH & INNOVATION**
- Industry support for 4R Research
 - Number of university researchers supported by 4R Research
 - Amount spent on private and government crop nutrition research
 - Amount spent on product innovation

- STAKEHOLDER ENGAGEMENT**
- Formal Recognition of 4R Partnerships
 - Regional 4R Programs (Priority Setting, Certification, etc.)
 - Actions with supporting organizations
 - Awareness creation

- INFRASTRUCTURE**
- Enhanced Efficiency Fertilizer Sales
 - Warehouse Capacity
 - Number of Agri-Retailers / Distance to Retailer /Time
 - Fertilizer Consumption / Need
 - Number of Products / Custom Blends
 - Application Capacity / Infrastructure
 - Services available to growers

- Cropland under 4R Nutrient Stewardship (at various levels): By regional definition of site-specific 4R Nutrient Stewardship practices
- Participation in regional or national nutrient stewardship programs
- Equity of adoption (gender, scale, etc.)



- FARM LAND PRODUCTIVITY**
- Yield per unit area of crop area
 - Crop yield owing to each nutrient
 - Quality of crop products

- SOIL HEALTH (FERTILITY COMPONENT)**
- Proportion of soils in optimum range, by nutrient

- NUTRIENT USE EFFICIENCY**
- Partial nutrient balance
 - Partial factor productivity (within crops)

- WATER QUALITY**
- N & P loss, Edge of Field (modeled)
 - N & P tributary concentration (monitored)
 - Nitrate groundwater concentration (monitored)

- AIR QUALITY**
- Ammonia emissions reductions
 - Ambient ammonia, PM2.5

- GREENHOUSE GAS EMISSIONS**
- Nitrous oxide emission (modeled)
 - Ambient nitrous oxide concentrations

- FOOD & NUTRITION SECURITY**
- Percent of Undernourished Population
 - Food insecurity

- ECONOMIC VALUE**
- Farm revenue resulting from crop nutrients
 - Income equality
 - Downstream value of agri-products

- LAND CONSERVATION & HABITAT**
- Natural land spared from agriculture

Most Directly Related to 4R Nutrient Stewardship

GROWING SUSTAINABILITY WITH 4R NUTRIENT STEWARDSHIP

Fertilizer retailers and growers across Canada are adopting the top international standard for on-farm nutrient application: 4R Nutrient Stewardship (Right Source @ Right Rate, Right Time, Right Place®).

We believe 4R Nutrient Stewardship is the “right” approach to sustainability for the agri-food industry, leveraging its framework in most of our activities and initiatives. We lead a number of 4R Nutrient Stewardship programs across the country, working in close collaboration with federal and provincial government departments as well as key stakeholders such as watershed groups, conservation authorities and farm groups to research new fertilizer management practices and extend the 4R Nutrient Stewardship framework to more Canadian growers.

HOW 4R NUTRIENT STEWARDSHIP WORKS

4R Nutrient Stewardship is a science-based approach to fertilizer programs that applies best management practices (BMPs) to optimize plant nutrient availability so growers can sustainably increase yields and profitability on their farms. By implementing 4R Nutrient Stewardship, growers are better able to balance the environmental, economic and social goals of crop production.

HOW WE'RE GETTING IT RIGHT

Working together to help Canadian farmers

The fertilizer industry works closely with researchers and smallholder farms to develop regionally specific 4R Nutrient Stewardship BMPs and conduct on-farm demonstrations to provide growers with nutrient management knowledge. We then form shared-value partnerships with government, Non Government Organizations (NGOs) and the private sector to expand program capacity and increase the adoption of these BMPs. The end result? Increased yields and profits that local growers can use to expand their farming operations and increase access to a more sustainable, nutritious food supply.



RIGHT

SOURCE
Matches fertilizer type to crop needs



RIGHT

RATE
Matches amount of fertilizer to crop needs



RIGHT

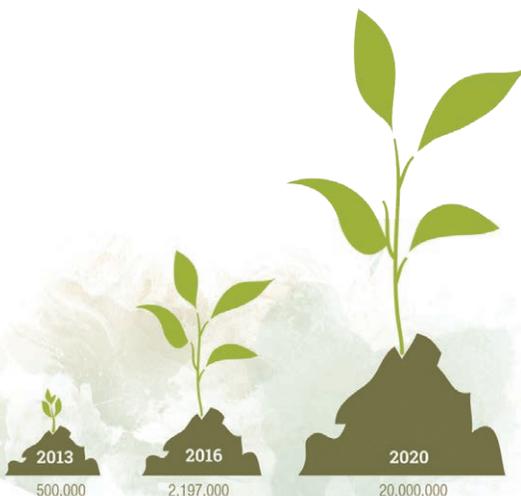
TIME
Makes nutrients available when crops need them



RIGHT

PLACE
Keeps nutrients where crops can use them

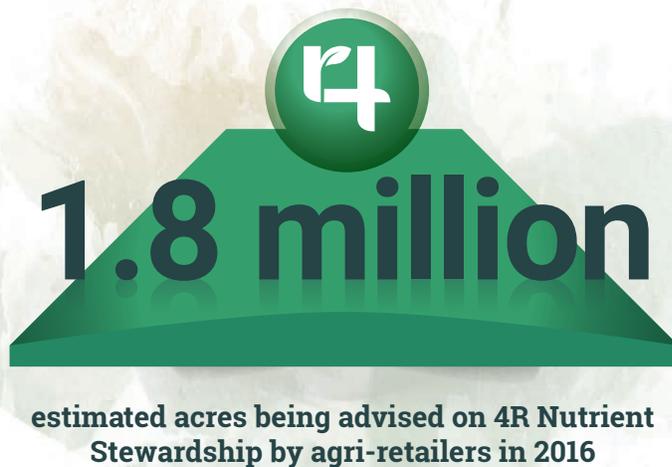
4R Nutrient Stewardship has seen impressive growth and uptake over the past year, with approximately 2.4 million acres now captured under the program — double the total of 2015.



TRACKING THE UPTAKE OF 4R NUTRIENT STEWARDSHIP

We work with the Canadian Field Print Initiative, Pulse Canada and other industry partners to conduct an annual national survey asking farmers across the country about their fertilizer management practices and familiarity with the 4R Nutrient Stewardship framework. With a better understanding of how growers use and make decisions about fertilizer, Canada will have a much clearer picture of the economic and environmental impacts of sustainable agriculture practices — leading to better-informed policy decisions in the future.

Data collected in 2015 and 2016 show that growers who are familiar with 4R Nutrient Stewardship are more likely to adopt BMPs to optimize the source, rate, time and place of fertilizer applications. They are also more likely to adopt BMPs that improve conservation and nutrient management, including zero tillage and the use of enhanced-efficiency fertilizers.



3.2 million
acres on farms that were surveyed in 2016

2.5 million
estimated acres grown with awareness of 4R Nutrient Stewardship in 2016

79%
of farmers aware of 4R Nutrient Stewardship during 2016 survey, +8% from 2015

56%
of farmers rely on agri-retailers for advice on 4R Nutrient Stewardship

ONTARIO

68%
of farmers practice some form of 4R Nutrient Stewardship

59%
of farmers say 4R Nutrient Stewardship helps in achieving their sustainability goals

HOW WE MEASURE SUSTAINABILITY

ENVIRONMENTAL IMPACT

Fertilizer is essential to meeting the food demands of a growing global population in a sustainable way. Yet inefficient or excessive fertilizer use can pose serious threats to the environment — from the eutrophication of freshwater and the leaching of nutrients into groundwater to an increase in greenhouse gas emissions.

Fertilizer Canada is at the forefront of the fertilizer industry's innovative thinking on environmental sustainability, leveraging the 4R Nutrient Stewardship framework and climate-smart agriculture practices to continually make the right changes that will have a positive impact on the environment.

ACTING ON CLIMATE CHANGE BY REDUCING EMISSIONS

Canada's fertilizer industry is one of the most efficient in the world — and for more than a decade, it has worked proactively with the federal government to further reduce greenhouse gas (GHG) emissions caused by the production and application of fertilizer and other crop nutrients.

Efficient fertilizer management is integral to any program that aims reduce agricultural GHG emissions. This is especially true for nitrogen, an essential crop nutrient that, if applied inefficiently, can contribute to nitrous oxide (N₂O) emissions which are 300 times more powerful than carbon dioxide.

The Canadian agriculture industry is working to reduce on-farm N₂O emissions under the world-leading Nitrous Oxide Emission Reduction Protocol (NERP), which allows growers to earn carbon offset credits for improving the way they manage nitrogen in their cropping systems. Delivered through the implementation of 4R Nutrient Stewardship, NERP can help growers better manage crop nutrition, maximize yields, minimize losses of nitrogen fertilizer and reduce GHG emissions up to 25 per cent.

Beginning in 2013, we partnered with Agriculture and Agri-Food Canada to jointly fund research to quantify the emission reductions achievable through NERP and to provide tangible, science-based information on the benefits of 4R Nutrient Stewardship BMPs for nitrogen use. After collaborating with 10 agri-retailers, 16 non-retail organizations, nine research institutions and select provincial governments, we released our final report on this research in 2016.

PRIORITY ISSUES

- Supporting Canada's Action Plan on Climate Change
- Reducing greenhouse gas emissions
- Safeguarding freshwater by minimizing nutrient runoff

KEY PERFORMANCE INDICATORS

- Acres under the Nitrous Oxide Emission Reduction Protocol
- Tonnes of carbon dioxide equivalent of potential nitrous oxide emissions reduced
- Acres under 4R Designation Program in identified environmentally sensitive regions
- Promoting healthy lawns and gardens for a greener world
- Research achievements in phosphorus and nitrogen best management practices
- Collaborations with conservation groups to protect groundwater and watersheds

586,180 acres / 106 farms
met the NERP requirements



46,892 tonnes CO₂e
potential N₂O emission reductions
achieved by NERP farms



Equivalent to the GHG emissions from
9,905 passenger vehicles driven for one year.



SAFEGUARDING CANADA'S FRESHWATER RESOURCES

Acknowledging the need to protect the ecological health of our freshwater resources, we collaborate with environmental conservation groups across the country on strategic programs to promote and implement 4R Nutrient Stewardship in regions with identified environmental pressures, including the Great Lakes, Lake Winnipeg and Prince Edward Island.

In February 2014, the Great Lakes Commission's Joint Action Plan endorsed the 4R Nutrient Stewardship framework as a means of reducing nutrient runoff and leaching to freshwater from fertilizer applications. That same year, the International Joint Commission recommended the use of 4R Nutrient Stewardship BMPs to protect the Lake Erie watershed from phosphorus runoff and harmful algae blooms.

In 2015, we signed a Memorandum of Cooperation with the Government of Ontario and the Ontario Agri Business Association to link the province's objectives for environmental action and agricultural sustainability with improved fertilizer use. As there is a continuing need to address water quality concerns in the Lake Erie basin (with agriculture among the many contributing factors), we must ensure as many organizations as possible recognize 4R Nutrient Stewardship as the leading standard for on-farm nutrient management and sustainable environmental performance.

Our commitment to achieving water quality standards through the application of more efficient nutrient management practices can also be seen in our 4R Retail Certification pilot program, which encourages the voluntary certification of Ontario's agri-retailers and Certified Crop Advisors (CCAs) based on auditable criteria such as their training practices, how they monitor the adoption and implementation of 4R Nutrient Stewardship, and their nutrient recommendations and applications. If fully established, this program would greatly improve the industry's capacity to document the crop acres managed under 4R Nutrient Stewardship, providing a benchmark for sustainable crop production across the province — while also encouraging education and innovation in nutrient stewardship that would deliver long-term positive impacts on the water bodies associated with Ontario's agricultural production areas.

HOW WE'RE GETTING IT RIGHT

Partnering for conservation

We work with many organizations to reduce nutrient offloading in Canada's lakes and watersheds and to deliver strategic communications on environmental conservation, including:

- Kensington North Watersheds Association (PEI)
- Lake Friendly Initiative (Manitoba)
- Grand River Conservation Authority (Ontario)
- Conservation Ontario
- Ducks Unlimited Canada
- Soil Conservation Council of Canada
- The Nature Conservancy

DIGGING DEEPER WITH THE 4R RESEARCH NETWORK

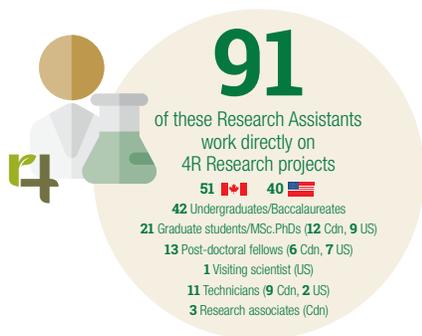
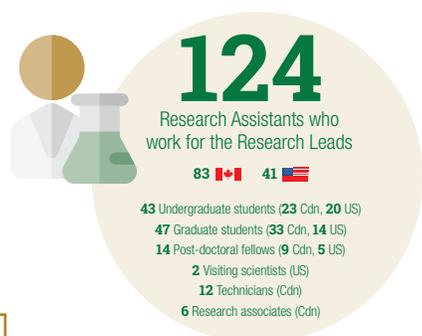
The Canadian 4R Research Network aims to advance the knowledge of science-based fertilizer BMPs that will benefit the environment and improve crop production in all major agricultural regions of Canada. Composed of leading researchers from across the country and the International Plant Nutrition Institute, the 4R Research Network engages in projects that span several environmental issues related to fertilizer management, including greenhouse gas and ammonia emissions, losses of phosphorous to surface water and nitrate leaching in groundwater.

In March 2015, Agriculture and Agri-Food Canada and Fertilizer Canada announced \$1.1 million in matched funding over three years to support the work of the 4R Research Network. As of 2017, 10 research projects are ongoing at nine research institutions to quantify the environmental, economic and social impacts of 4R Nutrient Stewardship BMPs. The major outcomes of these projects are expected to include the development of up to four new BMPs for phosphorous fertilizer and 10 new BMPs for nitrogen fertilizer — all backed by a more in-depth understanding of the mechanisms that can help reduce nutrient runoff in the Prairies and Great Lakes.

PROMOTING SUSTAINABILITY IN LAWN AND GARDEN CARE

Grass is crucial to our environment: it reduces pollution, absorbs GHGs and produces an abundant supply of clean oxygen. Lawns also clean water through filtration, reduce soil erosion and water runoff, and provide a soft and cool outdoor space for people and pets to rest and play.

Like any other plant, grass needs the proper balance of nutrients to stay healthy. Fertilizer ensures lawns have all the nutrients it needs, in the proper amounts, to grow, fight off weeds and withstand drought conditions. We encourage the sustainable use of lawn fertilizers to improve our climate and air quality, leveraging our Greener World program to educate consumers on how to choose the right fertilizer and apply the right amount at the right time.



11

Manuscripts in Academic Journals

5

Dissertations/Theses

1

Citation

108

Oral Presentations

8

Articles

19

Poster Presentations

25

Field Tours

24

Workshops/Meetings

20

videos and web resources developed

7,740

people reached on 4R Nutrient Stewardship research

ECONOMIC IMPACT

A green economy is driven by the research, development and adoption of sustainable practices. For Canadian growers, the economic incentives to adopt nutrient management practices such as 4R Nutrient Stewardship are many: higher average crop values, more efficient use of fertilizer and other crop nutrients, and new market opportunities arising from consumer demand for information on how food is grown.

Fertilizer Canada encourages the growth of science-based agriculture across Canada, offering programs to help growers implement more innovative, cost-effective and sustainable management practices.

THE RIGHT BALANCE BETWEEN PROFIT AND SUSTAINABILITY

As direct stewards of the land, Canada’s growers play a critical role in implementing the fertilizer industry’s sustainability initiatives. But if they are to willingly adopt new fertilizer management practices, those practices have to be both environmentally friendly and profitable for farms.

We engage directly with growers to understand their needs and expectations. Programs such as 4R Nutrient Stewardship encourage the voluntary adoption of innovative and economically viable BMPs for fertilizer use. We work closely with partners like the Canadian 4R Research Network and the International Plant Nutrition Institute to evaluate and customize BMPs that reconcile on-farm economic viability and sustainability, and to promote additional research into and the technology transfer of the latest fertilizer management practices across Canada.

PRIORITY ISSUES

- Reconciling farm profitability and sustainability
- Carbon offsets as a potential source of additional income for farmers

KEY PERFORMANCE INDICATORS

- Number of acres under 4R Nutrient Stewardship with the capacity to increase profitability for growers through the adoption of BMPs
- Increase in profit through the adoption of BMPs for nitrogen management in Alberta
- Increase in profit through the adoption of BMPs for nitrogen and phosphorus management on PEI potato crops in 4R demonstration farms

SHOWCASING POTENTIAL WITH 4R DEMONSTRATION FARMS

On-farm demonstrations are ideal for proving the potential of 4R Nutrient Stewardship to help farms sustainably increase their yields and profitability. The results of these demonstrations can also be used to develop customized, region-specific BMPs.

To help potato farmers in Prince Edward Island achieve greater economic and environmental sustainability, we have invested \$300,000 since 2012 to implement 4R Nutrient Stewardship in that province. Under a Memorandum of Understanding signed with the Government of PEI, the PEI Federation of Agriculture, the PEI Potato Board and the Kensington North Watersheds Association, we have established a series of 4R demonstration farms — a total of 10 in 2016 — where growers' standard practices are compared directly to 4R Nutrient Stewardship BMPs by evaluating crop grade, tuber yield and economic return.

Though there were variations from farm to farm, three years of results from the demonstration farms in PEI have shown that implementing the 4R Nutrient Stewardship BMPs can lead to:

- **Increased economic value** – The average crop value of the harvest from the 4R demonstration farms increased by \$80 to \$200 per acre compared to the standard practice plots due to better tuber yield and quality.

\$80 to \$200 per acre

increase in profit for PEI potato farms that adopted BMPs for nitrogen and phosphorus

- **More efficient phosphorus use** – Without any economic loss, most of the 4R demonstration farms required 10 to 30 per cent less phosphorus pentoxide (P_2O_5) compared to their corresponding standard practice sites. The cost savings from the more efficient use of phosphorus fertilizers were offset by the cost of additional potash or micronutrient fertilizers on the 4R demonstration farms.
- **Lower nitrate and phosphorus residual levels** – Most 4R demonstration farms were observed to have less post-harvest nitrate and phosphate accumulation in the soil. This implies more efficient nutrient uptake and lower environmental impact.

By showcasing the economic potential of the 4R Nutrient Stewardship BMPs, more growers across PEI are voluntarily adopting 4R Nutrient Stewardship on their farms.

HOW WE'RE GETTING IT RIGHT

Proving the economic effectiveness of NERP

As part of our work with Agriculture and Agri-Food Canada, we conducted a study on the economic effectiveness of 4R Nutrient Stewardship BMPs implemented under the Nitrous Oxide Emission Reduction Protocol.

18 to 29%
increase in profit per year when using BMPs for nitrogen management

Up to \$87 per acre
increase in profit compared to baseline crop value

\$22,611 per season
projected benefit from corn crop in a 320-acre farm in Ontario

\$34,516 to \$56,457 per season
projected benefit for a 960-acre farm growing canola, wheat and barley in Alberta

SOCIAL IMPACT

Fertilizer Canada is committed to developing opportunities and programs that will make the fertilizer industry a safer place to work and help generate more clean jobs, technologies and innovations for the agri-food sector.

The best way to achieve that goal is through training and education. That means helping growers learn how they can reduce their environmental impact, providing industry employees with a better understanding of the fertilizers they produce, giving agri-retailers the knowledge and tools they need to implement fertilizer BMPs, and supporting crop advisors in obtaining continuing education credits and preparing for accreditation exams.

BRINGING THE RIGHT INFORMATION TO INDUSTRY

Through our 4R Designation Program, we're building the capacity of our industry partners to rapidly implement 4R Nutrient Stewardship, develop sustainable nutrient management plans and demonstrate that Canadian growers are moving to the forefront of BMPs in commercial fertilizer use.

Through in-person and online training, this voluntary program gives industry stakeholders the skills they need to show growers the commitment being made by the Canadian agricultural industry to the economy, the environment and their communities. Since the national launch of the 4R Designation Program in 2015, 11 retail organizations and 16 non-retail organizations have been trained in 4R Nutrient Stewardship to become 4R Designated.

In addition to providing training, the 4R Designation Program measures and recognizes the accomplishments of agri-retailers, accredited professionals and farmers in areas such as the implementation of 4R Nutrient Stewardship and BMP performance outcomes.

We also offer a full suite of 4R Nutrient Stewardship eLearning courses that agriculture and agri-food professionals, farmers, agri-retailers, agronomists and crop advisors can use to learn how to adopt and promote sustainable nutrient management practices. Many courses also offer professional credits, helping students pursue careers within the fertilizer industry.

PRIORITY ISSUES
Safe and secure production, transportation and use of fertilizers
Generating clean jobs, technologies and innovation
Educating the industry across the supply chain

KEY PERFORMANCE INDICATORS
Building awareness for a safe, secure and efficient work environment
Delivering the Fertilizer Use Survey
Completed courses on 4R Nutrient Stewardship and NERP
Certified Crop Advisors (CCAs) trained on 4R Nutrient Stewardship and NERP
Number of continuing education units earned by CCAs through the completion of 4R Nutrient Stewardship courses

HOW WE'RE GETTING IT RIGHT

4R Solutions: Working with farmers around the world

Fertilizer Canada is working with stakeholders to develop the 4R Solution to help smallholder farmers sustainably increase yields and profitability on their farms. The Solution uses on-farm demonstrations and is scaled through shared-value partnerships which brings government, NGOs and the private sector together to expand extension capacity, while the fertilizer industry, researchers and smallholders develop regionally specific 4R Nutrient Management recommendations using Nutrient Expert®. The end result is increased yields and profits that smallholder farmers can use to expand their farming operations and increase access to education, health care and a more stable and nutritious food supply.

1,960

growers and other stakeholders educated on 4R Nutrient Stewardship

17

webinars delivered

48

in-person events or training programs

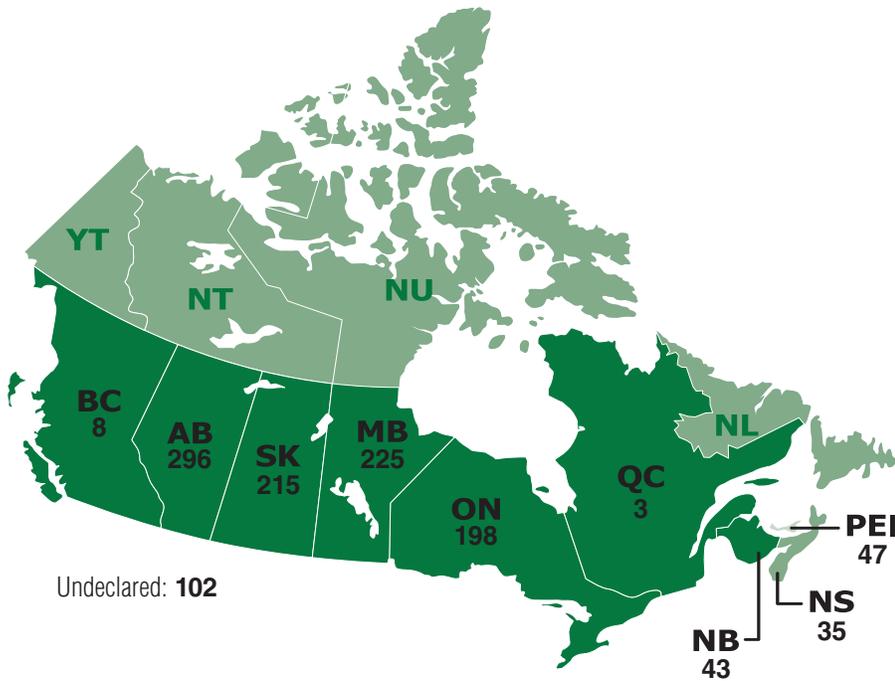
9

peer-reviewed publications, journal articles and presentations on GHG mitigation

1,000

continuing education units earned by certified crop advisors

NUMBER OF COURSE COMPLETIONS IN FERTILIZER CANADA ELEARNING COURSES



HOW WE'RE GETTING IT RIGHT

Bringing our stakeholders to the farm

Six farms in Ontario participated in the 4R demonstration farm project in 2016. To help them showcase how 4R Nutrient Stewardship BMPs are being applied in their farming operations in the Lake Erie basin, we coordinated a two-day tour that brought approximately 60 stakeholders from government, conservation authorities, farm organizations and the fertilizer retail sector to each of the six locations.

FORMAL TRAINING FOR CERTIFIED CROP ADVISORS

As part of Ontario's overarching commitment to sustainable agriculture, we collaborated with the Ontario Certified Crop Advisor Board to develop and launch the 4R Nutrient Management Specialty Certification for Certified Crop Advisors (CCAs) in that province. Designed for CCAs who work in nutrient management planning, this certification ensures they can receive formal training on how to acquire reliable resources and advice to assist in making on-farm decisions about 4R Nutrient Stewardship. To date, 89 Ontario CCAs have successfully passed the certification exam, which is offered to CCAs every year.

89

Ontario CCAs earned 4R Nutrient Management Specialty Certification

OUR STAKEHOLDERS

We engage with a vast range of partners across many different sectors to promote nutrient stewardship and sustainability:

FARMERS & CERTIFIED CROP ADVISORS

4R demonstration farms
Certified Crop Advisor Board (Prairie, Ontario, Atlantic)

GOVERNMENT

Agriculture and Agri-Food Canada (AAFC)
Saskatchewan Ministry of Agriculture
Manitoba Department of Agriculture
Manitoba Department of Sustainable Development
Ontario Ministry of Agriculture Food and Rural Affairs
Region of Waterloo
PEI Department of Communities Land and Environment
PEI Department of Agriculture and Fisheries

RETAILERS & MANUFACTURERS

Canadian Association of Agri-Retailers
Ontario Agri Business Association
Fertilizer Canada member companies

COMMODITY GROUPS & ORGANIZATIONS

Farm Management Canada
Pulse Canada
Canola Council of Canada
Alberta Wheat Commission
Manitoba Pulse & Soybean Growers
Keystone Agricultural Producers
Grain Farmers of Ontario
Ontario Pork
Ontario Fruit and Vegetable Growers' Association
Ontario Greenhouse Vegetable Growers
Farm & Food Care Ontario
Christian Farmers Federation of Ontario
Among other commodity groups and farm organizations

OUR STAKEHOLDERS

RESEARCHERS & UNIVERSITIES

AAFC Research and Development Centres (Saint-Jean-sur-Richelieu; Harrow)
University of Alberta
University of Saskatchewan
University of Manitoba
University of Guelph
The Water Institute (University of Waterloo)
McGill University
Dalhousie University
Duke University

NATIONAL & INTERNATIONAL ASSOCIATIONS

Canadian East Equipment Dealers Association
International Plant Nutrition Institute
The Fertilizer Institute
International Fertilizer Industry Association
International Joint Commission

ENVIRONMENTAL & CONSERVATION GROUPS

Ducks Unlimited Canada
The Nature Conservancy
Lake Friendly Initiative
Conservation Ontario
Grand River Conservation Authority
Ontario Soil and Crop Improvement Association
New Brunswick Soil & Crop Improvement Association
Kensington North Watersheds Association

OTHER

Canadian Cooperative Association
Ontario Forage Council
Atlantic Fertilizer Council
PEI Federation of Agriculture