

4R Nutrient Stewardship Greenhouse Gas Reduction



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada



FERTILIZER CANADA

Fertilizer Canada is continually working to make changes that positively impact the environment, the economy, and the social fabrics of Canadian life. Fertilizer Canada promotes the voluntary adoption of climate-smart agricultural practices such as 4R Nutrient Stewardship (Right Source @ Right Rate, Right Time, Right Place®) and the Nitrous Oxide Emissions Reduction Protocol (NERP).

Canada's agriculture industry is working extensively to reduce on-farm greenhouse gas (GHG) emissions under the world-leading NERP offset system, which aims to reduce regional, and ultimately global, nitrous oxide emissions from fertilizer use.

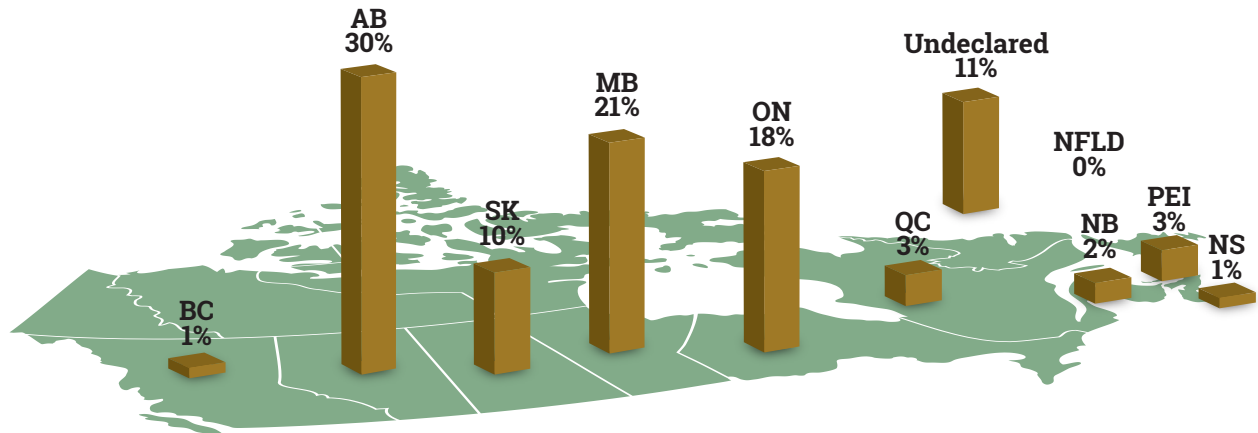
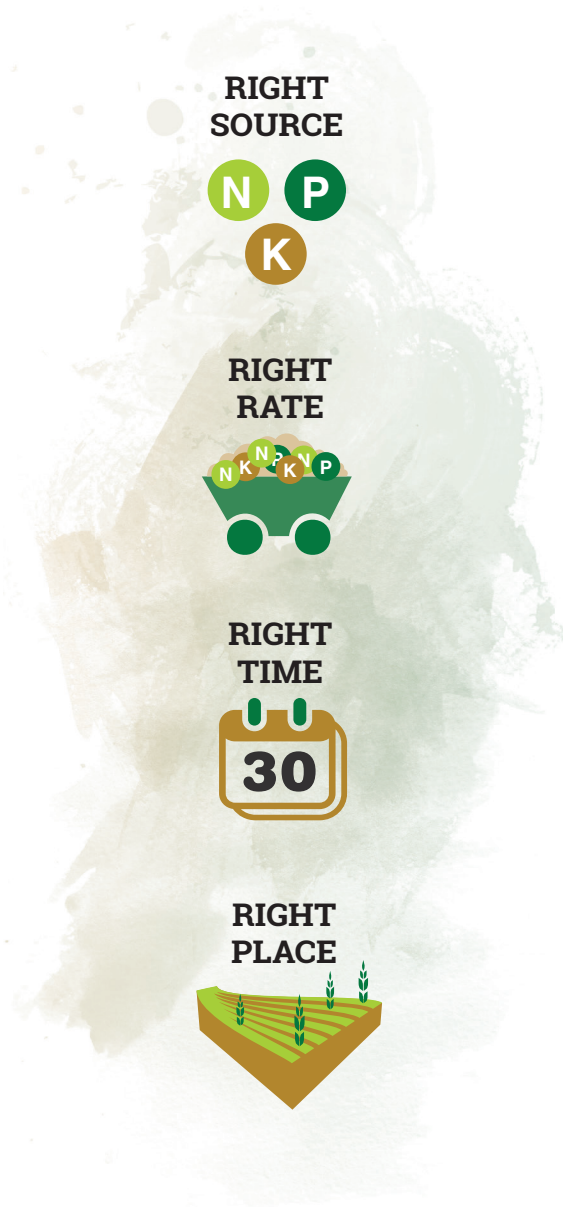
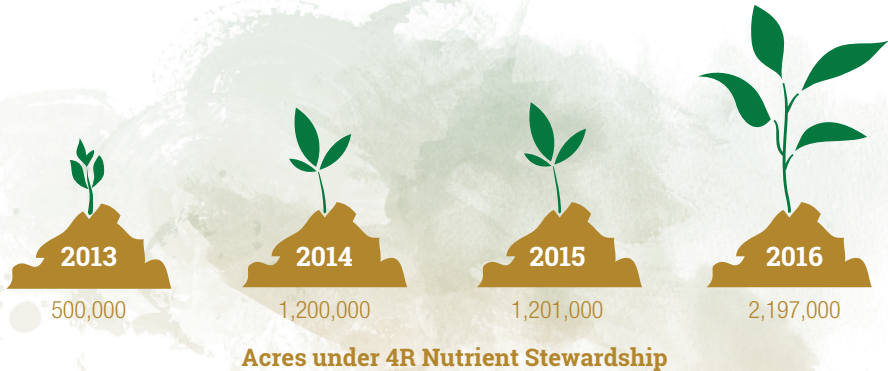
The NERP protocol, delivered through the implementation of 4R Nutrient Stewardship, allows stakeholders to implement the best suite of 4R Nutrient Stewardship consistent practices for their region to reduce losses and measure their environmental impact. This is done collaboratively, with farmers working with an expert — an Accredited Professional Advisor (APA) with agronomy experience — to develop a tailor-made action plan for nitrogen fertilizer efficiency and nutrient management decision-making.

Research demonstrates NERP can:

- Help producers better manage crop nutrition;
- Maximize yields;
- Reduce greenhouse gas emission by 25%;
- Meet international standards for carbon offsets; and,
- Increase their profits from between \$9 and \$87 per acre per year.

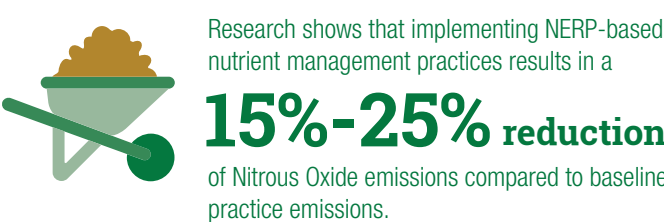
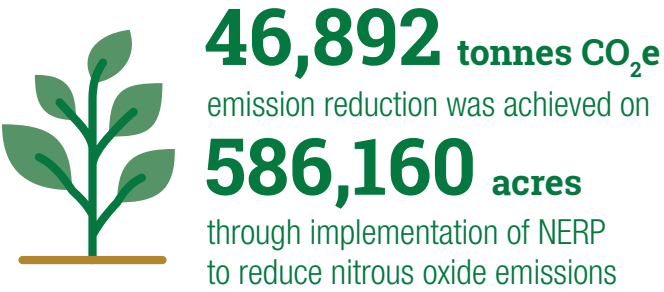
From 2012 to 2016, Agriculture and Agri-Food Canada (AAFC) funded Fertilizer Canada's project "Utilizing 4R Nutrient Stewardship to reduce Greenhouse Gas Emissions from the application of fertilizer and other Crop Nutrients" under the Agricultural Greenhouse Gases Program (AGGP), delivering research and extension of 4R Nutrient Stewardship as a framework to mitigate greenhouse gas emissions.

The project provided crop producers across Canada with science-based information and advice on how to use 4R Nutrient Stewardship best management practices to reduce emissions when applying fertilizer or other crop nutrients on fields. Another key element of the project was to provide information on the associated economic benefits of using 4R Nutrient Stewardship for the application of fertilizer and other crop nutrients. The project also explored the emerging international and domestic retail market pressures to quantify and reduce the carbon footprint of crop production.



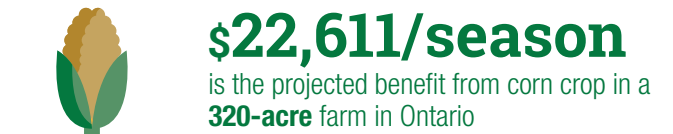
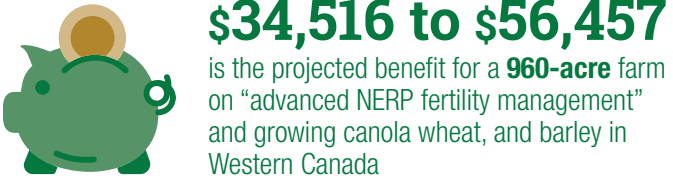
The Environment

Fertilizer retailers and farmers across Canada have adopted 4R Nutrient Stewardship to achieve cropping system goals and demonstrate enhanced environmental protection and improved sustainability, helping to maintain our soil, air, and water.



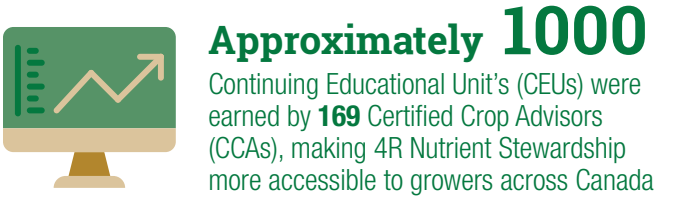
The Economy

The practices which form 4R Nutrient Stewardship allow farmers to reduce greenhouse gas emissions in cropping systems. These results suggest that while NERP practices are likely to increase per acre fertility costs, the benefits of adopting these practices exceed the additional costs - in terms of both economic return per yield and the downstream potential to produce saleable carbon credits through nitrous oxide emission reductions.



Our Society

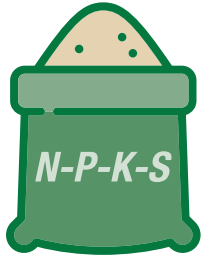
Providing growers and crop advisors with practical science-based information on 4R Nutrient Stewardship best management practices and their benefits for greenhouse gas emission reductions.



Percentage of online training engagements distribution among provinces

Advancing 4R Nutrient Stewardship through Science-Based Evidence

To advance the adoption of 4R Nutrient Stewardship required to reduce greenhouse gas emissions, agri-retailers and agronomy service providers were supported by research and extension initiatives under this project. Fertilizer Canada's 4R Designation program was initiated in collaboration with agri-retailers and agronomy service providers to train advisors, reach growers across Canada and track acres using 4R Nutrient Stewardship recommendations.



Agri-retailers:
44 CCA's trained*

Non-retail organizations:
47 CCA's trained*

**as of Spring 2016*

4R Nutrient Stewardship is Growing Across Canada: Focus on Western Canada

Achievements in 4R Nutrient Stewardship from Western Canadian agronomic service providers.



38 CCA's trained
trained in 4R Nutrient Stewardship, covering
2.4 million acres in Alberta, Manitoba and
Saskatchewan in **2014** and **2015**



Since 2014, approximately
1.6 million acres
and **7000** fields are being monitored to
document N fertilizer application trends

The Future of 4R Nutrient Stewardship

Trends in 4R Nutrient Stewardship in Young Farmers Across Canada.

Fertilizer Canada surveyed 298 young industry professionals, farmers, advisors and agronomists:

51% of respondents are considering changing farm practices to reduce greenhouse gas emission in future. The figure was consistent across the provinces.



86% Higher profitability was cited as the most influencing factor by 86% of respondents to adopt sustainable fertilizer management practices. 65% respondents also cited environmental stewardship as influencing aspect.



59% of respondents feel that 4R Nutrient Stewardship helps in achieving the economic, social and environmental goals of their operations.

