



How 4R Nutrient Stewardship Program Supports Soil Health

Fertilizer Canada



Overview of 4R Nutrient Stewardship

4 nutrient stewardship

4R Nutrient Stewardship can **help** grow crops sustainably

The 4Rs work to increase production/profitability for farmers while ensuring the future of the agricultural industry



Sustainable agriculture is supported by environmental, economic and social pillars:

ENVIRONMENTAL

Sustain or improve soil quality

Maintain nutrient levels within natural ecosystems

Preserve wildlife habitat



ECONOMIC

Produce revenue to sustain farm operations

Preserve quality of life

Make the most of dollars spent on fertilizer

SOCIAL

Produce nutritious, abundant and affordable food

Help meet global food needs

Provide ongoing employment opportunities in agriculture

4R Practices for Spring Cereal, Oilseed, and Pulse Rotations.

Right Source	Right Rate	Right Time	Right Place
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Suites of 4R N Management Practices

<ul style="list-style-type: none">» Ammonium-based formulations for fall (UAN excluded due to nitrate content).» Any N fertilizer in spring or in-season.» Inoculate pulse crops.	<ul style="list-style-type: none">» Set crop and field specific N rates using appropriate regional tools such as soil tests, nitrogen balance, response curves or provincial guidelines.» Consider field specific yield history and soil types in relation to yield potential of other fields on farm and in region and probabilities for weather variations when setting rates.	<ul style="list-style-type: none">» Apply N after soil cools in fall; or» Apply N in spring before or at seeding.» No N application on frozen soil and/or snow covered ground.	<ul style="list-style-type: none">» Apply in subsurface bands/ injection any acceptable time.» Broadcast and incorporate in spring.» Avoid fall broadcast of unprotected N.» Fall broadcast of enhanced efficiency N fertilizers are acceptable following label instructions regarding incorporation and timing.
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Basic 4R's for Fertilizer N



4R Practices for Spring Cereal, Oilseed, and Pulse Rotations.

Right Source

Right Rate

Right Time

Right Place

Suites of 4R N Management Practices

» Use P fertilizer with guaranteed analysis and known mode of action.

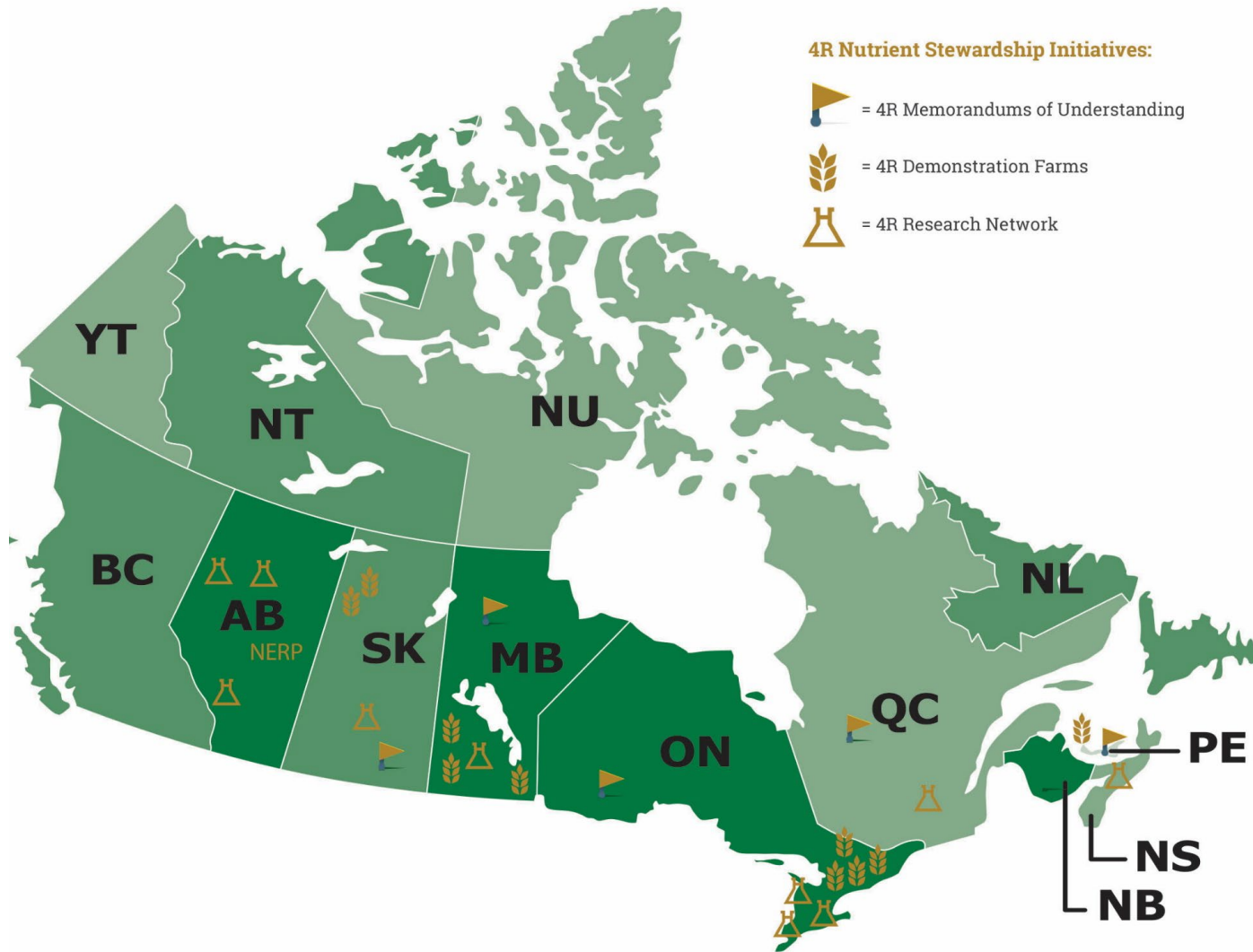
- » Use recent soil test (3 years or less) to establish P baseline.
- » Follow provincial guidelines based on soil and crop types to meet sufficiency levels.
- » Set field specific rates.
- » Adopt depletion strategy in fields that test very high in P (approaching or exceeding 60 ppm) by limiting P to starter rate.

- » Apply P in spring at or before seeding.
- » Apply P in fall with incorporation or band or co-band with other nutrients.

- » Place with seed at safe rates based on crop, seed bed utilization, and total product load.
- » Side-band at seeding.
- » Band or Co-band prior to seeding or mid-row band at seeding (with consideration for mobility issues if banded with high rates of N or in cool soils).

Basic 4R's for Fertilizer P

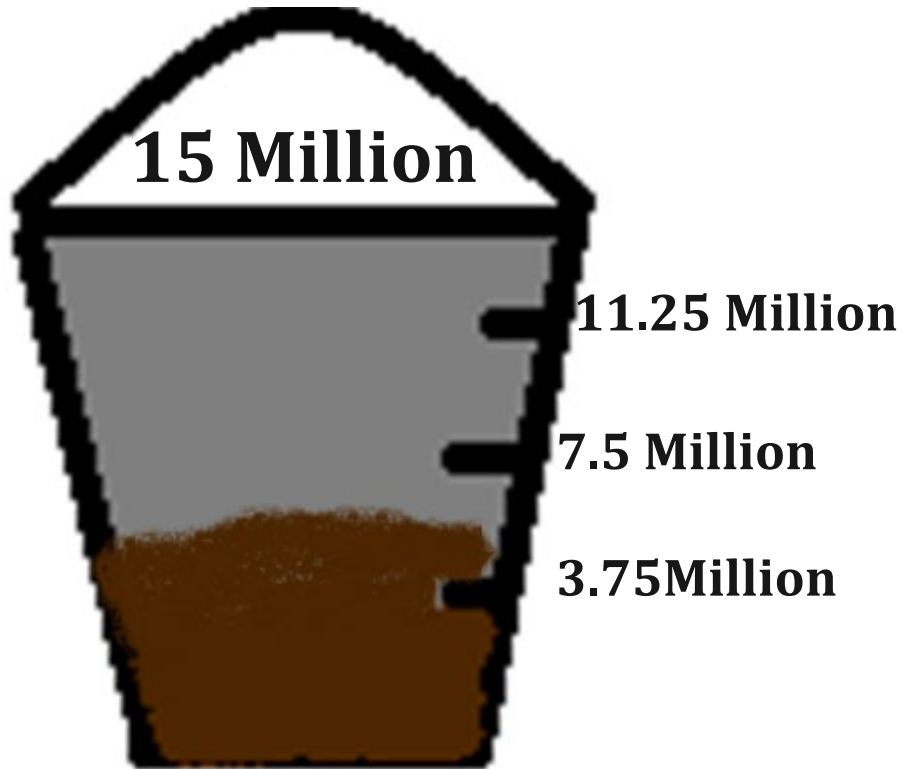
FERTILIZER CANADA: 4R NUTRIENT STEWARDSHIP ACROSS CANADA



4R Nutrient Stewardship across Canada

- » Provincial agreements in Saskatchewan, Manitoba, Ontario, Quebec, and PEI
- » 4R Research Network of 10-15 leading Canadian soil scientists
- » Grower Fertilizer Use Survey
- » 4R Agri Retailer/Agronomy Programming

4R Verified Acres (as of November 15 2021)



- » We currently have 5,760,809 4R acres that have been verified
- » 646,039 are from the Ontario Certification Program
- » 5,114,770 are from the Western Canada Designation Program.

4R Nutrient Stewardships Role in Soil Health



Soil Health

- » Soil Health often has many different definitions.
- » 4R Nutrient Stewardship framework enables nutrient to be applied in a method that supports Soil Health.
- » Implementing a 4R Framework on the farm can also encourage the adoption of many other soil health best management practices, such as;
 - » Subsurface banding of nutrients with no-till
 - » Implementing a diverse crop rotation
 - » Use of variable rate technologies



GROW MORE CROPS & PROTECT MORE WATER

Water Quality

The agriculture industry is committed to working towards the long-term improvement of Canadian water bodies and surrounding watersheds

93% of canola growers are applying their phosphorus in a band or seed placed, a 4R BMP shown to reduce phosphorus run-off by up to 75%

47% of growers in the Lake Erie Basin are working with a 4R Certified Retailer which validates practices shown to reduce run-off to waterways

The Climate-Smart Agriculture Action Plan:

Helping stakeholders around the world work together to implement climate-smart agriculture

Nitrogen is a highly effective agricultural fertilizer but contributes to 36% of agriculture's greenhouse gas (GHG) emissions.

36%

The Nitrous Oxide Emission Reduction Protocol (NERP) can help large and small farms reduce their emissions.

NERP is delivered through a 4R Nutrient Stewardship plan.

RIGHT SOURCE

RIGHT RATE



RIGHT TIME

RIGHT PLACE



Farmers also work with an advisor (an APA or CCA) to develop a tailor-made action plan for fertilizer efficiency.

With NERP, farmers' profits can increase up to \$87 per acre through carbon credits, maximize yields, improve return on fertilizer dollars...

...AND reduce nitrous oxide emissions by 35% – making NERP essential to tomorrow's sustainable farm.

35%

Greenhouse Gas (GHG) Reduction

- » The 4R Climate-Smart Protocol is a science-based protocol for improving nitrogen management in cropping systems
- » It is a robust protocol designed to meet international standards for estimation and verification of carbon offsets
- » Research shows the practices result in a reduction in greenhouse gas emissions by as much as 35% and increase profits by \$87/acre



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