



ALBERTA:

*Supporting farmers
and communities with
practical tools to implement
4R Nutrient Stewardship
(Right Source @ Right Rate,
Right Time, Right Place®)
Best Management Practices
that protect soil quality
and grow agriculture.*

Fertilizer Canada, in partnership with Alberta Innovates Bio Solutions and financial support from the Climate Change and Emissions Management (CCEMC) Corporation, has initiated 4R Nutrient Stewardship for Alberta's producers to demonstrate economic, social and environmental returns by implementing 4R Nutrient Stewardship.

4R Nutrient Stewardship is building a unique network of Alberta farmers, agronomy experts, scientists, fertilizer and agri-business industry leaders, community leaders, and government officials. Under this project, 4R Nutrient Stewardship provides Alberta producers with science-based information and advice on how to use beneficial management practices under the 4R Nutrient Stewardship to reduce emissions of greenhouse gases (GHGs) through the use of the Nitrous Oxide Emissions Reduction Protocol (NERP) when they apply fertilizer or other crop nutrients on their fields. Over 150 Alberta Producers representing 500,000+ acres and 50 agronomy experts and agri-business associates supporting 1 million additional acres are assessing agronomic packages for 4R Nutrient Stewardship extension activities.

The project is bringing knowledge of improved fertilizer practices into use on Alberta farms through collaboration and extension tools for Beneficial Management Practices based on the 4Rs of nutrient stewardship: using the Right source, at the Right rate, at the Right time, and in the Right place®. 4R Nutrient Stewardship is designed to protect soil quality, optimize fertilizer efficiency, and minimize nutrient loss.

Alberta's Farmers are implementing 4R Nutrient Stewardship BMPs

Producers who participated in a survey at FarmTech 2013 represented over a half a million acres with the following main crop types: wheat/canola/ barley (87%), Forages (4%), Potatoes (4%) or 'Other' (5%), with an average farm size of 4,500 acres with an even split identifying dryland and mixed livestock and crops.

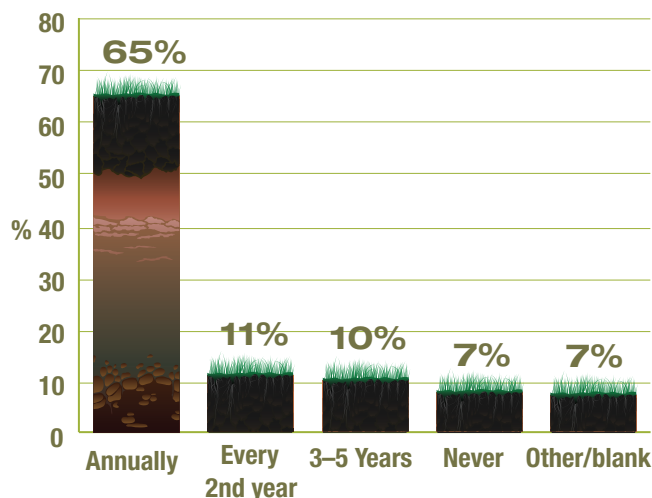
urea used together or urea alone. 14% responded UAN, 6% responded manure only and 15% responded 'other' including anhydrous ammonia, ammonium sulphate, etc.

Rate:

- 60% of Producers soil test annually. Those who are not annually soil testing stated economics, consistency of results with soil testing every 2-3 years and time management as the main reasons for testing less often.
- Producers were asked if they use in-season technologies to assess crop nutrient status 5% stated that they are currently using one of the practice listed.

83%

of respondents who apply their nitrogen fertilizer in the fall wait until the soil cools [10°C or lower] before applying.



Source:

5%

of respondents are currently applying controlled release or a similar type of advanced nitrogen.

How are Farmers implementing 4R BMPs:

- 80% of Participants would consider enhanced efficiency product at least one of: controlled release, nitrogen Inhibitor and stabilized nitrogen.
- Primary source of nitrogen applied, 65% stated manure &

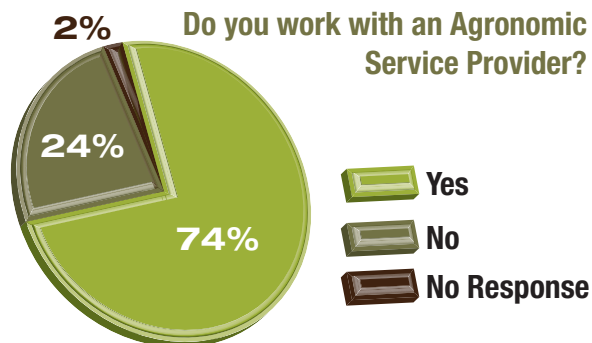
Tissue testing was not only the most common in-season technology that is currently employed on the farm it was also identified as the practice producers are most likely to implement in the future.

Of those respondents that are not currently using any of the identified practices 37% stated they would implement at least 1 practice. [Practices such as: leaf colour charts, chlorophyll meters, optical sensor, tissue testing or satellite/aerial imagery]

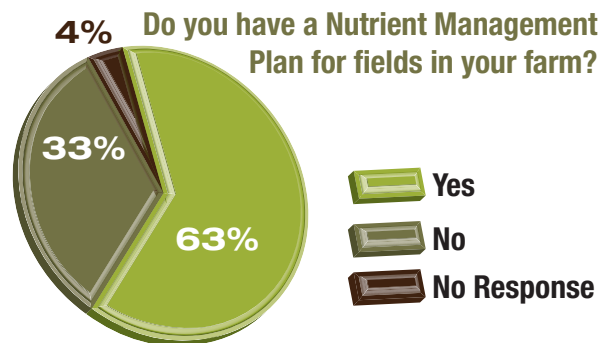
4R Nutrient Stewardship in Alberta



Do you work with an Agronomic Service Provider?



Do you have a Nutrient Management Plan for fields in your farm?



Time and Place:

- **Placement:** Majority are applying their fertilizer in side-band or mid-band. Of those that are currently not banding or injecting their fertilizer, 70% would consider doing so in the future.
- **Timing:** 80% of respondents are applying their fertilizer in the spring either at seeding or pre-planting and less than 5% are applying only in the fall.

The bottom Line on 4R Nutrient Stewardship to Alberta Producers

Alberta Producers — Majority of participating producers representing 500,000 acres are prepared to meet the requirements of 4R Nutrient Stewardship and their data management systems were NERP Ready. Already 4 progressive Alberta Producers have participated in Fertilizer Canada's 4R Farmer Advocate program for the 2013 growing season.

Agri-Business and agronomy professionals supporting over 1 million producer acres have participated in 4R and NERP training and workshops — they will assist Alberta's Producers to implement BMPs and 4R strategies.

Extension — Educational Support

Within this phase of the project, Fertilizer Canada has offered 4R training to Certified Crop Advisors to earn 1.5 CEUs and 50 CCA's have participated. 4R online training has been developed and readily available to earn 5.5 CEUs.

NERP training is also available online with 8.0 CEUs available to participants (5 for Nutrient Management and 3 for Soil and Water Management). Visit Fertilizer Canada's online eLearning training platform to start your training toady (eLearning.fertilizercanada.ca).

ECONOMICs of 4Rs

Alberta approved the use of NERP in its regulatory carbon marketplace in 2010, the first Canadian province to do so. NERP provides an opportunity for the agricultural community to become involved by earning offset credits. The implementation of NERP is directly linked to the uptake of 4Rs, providing both economic and environmental returns to farmers. In fact, the net benefit of adoption of NERP practices range from \$9/acre to about \$87/acre.

4R Environmental Benefits to the Alberta Producer

Dr. Alison Eagle from the University of Alberta investigated the environmental goods and services associated with implementing 4R Nutrient Stewardship in Alberta, highlighting the benefits to water quality, air quality and improved biodiversity. This report highlighted the importance farmers have on continuing to be stewards of the land and the mechanisms by which optimum environmental benefits can occur. 4R Nutrient Stewardship can influence the movement of agricultural — sourced nitrogen (N) into surface and groundwater and emissions into the air, with the possible benefits of healthy natural ecosystems, decreased clean-up costs for recreation purposes, improved fishery production,

reduced greenhouse gas emissions, improved air quality and reduced water treatment costs. These environmental benefits are valued by society which is reflected in the environmental market systems which reward improved practices on farm. 4R Nutrient Stewardship provides opportunity to not only to stay economically competitive but to also contribute positively to the environment.

Our Challenges are our Opportunities

We are all aware of the market and consumer pressures on our agricultural sector and 4Rs showcases our commitment to continuous improvement for economic and environmental returns for nitrogen use efficiency .

To achieve the 4R benefits for economic, environment and social benefits we will work together to provide the resources so that Alberta's producers, in partnership with agronomy experts, can measure and document the benefits of 4Rs on their farm.

Throughout the various engagement opportunities, stakeholders pointed to the need for consistent record keeping and an easy to use data management system as some of the most important challenges to adoption.

Path 4Rward: Building Sustainable Agriculture

The Canadian Fertilizer Institute supports the management of nutrients to ensure the protection of the environment and the production of safe food. This commitment holds true to this initiative; working together with our farmers, agronomy experts, scientists and agri-businesses to provide economic, environmental and social benefits to Alberta agricultural stakeholders. Fertilizer Canada and its partners will continue to work with Alberta's agricultural community under this project and continue to provide extension resources and awareness on the benefits of producer adoption of 4R Nutrient Stewardship.

Get Involved — Additional Resources

- Learn more about 4R Nutrient Stewardship by taking the Fertilizer Canada's eLearning courses: eLearning.fertilizercanada.ca
- Find out where there are other 4R Nutrient Stewardship projects happening across Canada: 4R.fertilizercanada.ca
- Have a question? Contact us: info@fertilizercanada.ca

The Canadian Fertilizer Institute wishes to recognize and acknowledge the contributions of the following organizations that have demonstrated their leadership in 4R Nutrient Stewardship:

