

NUTRIENT MANAGEMENT: THE FOUR Rs

Nutrients belong on your fields, not in your waterways. When agricultural nutrients like phosphorus and nitrogen wash off fields, they can fertilize wetlands and lakes. This increases algae growth, suffocates fish and even poisons drinking water. As a food producer on the prairies, consider your role in limiting nutrient loss. The flat, fertile soils of the prairies are ideal for farming, but also highly vulnerable to dissolved nutrient loss. Most of our annual runoff occurs with spring snowmelt, and options that help trap nutrients in other landscapes often don't work here.

Managing nutrients is an incredible challenge. Producers need to input kilograms of fertilizers to support crop growth, but lakes are incredibly sensitive and even micrograms of nutrients -- or one billionth of a kilogram -- can cause environmental degradation. It's important to strike the right balance. The best option is careful management on prairie farms under the 4R principle: right rate, right source, right time, right place.

Right rate: Since nutrients accumulate in soil, annual fertilization may not be necessary. Before you fertilize, test your soil to measure its preexisting nutrient levels. Consider reducing your phosphorus inputs if your soil tests show high phosphorus levels. This will help reduce phosphorus concentrations in runoff, without affecting crop yield. Remember, when nutrient concentrations are high in soils, the concentration is high in runoff as well. Keep in mind that more nutrients doesn't always mean higher crop yield; a long-term study in Manitoba found no gain in crop yield when 6-9 kg of phosphorus per hectare was applied to soils that already had high phosphorus levels. To hear about soil test options and learn the nutrient recommendations for your crop varieties, contact your agronomist.

Right time: In the prairies, more than 80% of nutrient runoff occurs with snowmelt. That means if you apply nutrients in fall or winter, they're likely to wash away in spring. Fertilizing after the snow melts ensures nutrients remain in your fields and plants have access to nutrients at the start of the growing season.



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Right place: Careful placement of fertilizer is important. Broadcasting fertilizer may be an easy option, but it places nutrients at the surface where they're less beneficial to crops. However, pairing broadcast fertilizer with tillage reduces the risk of nutrient runoff. In reduced tillage systems, broadcasting prior to seeding will have some benefit. Where possible fertilizers should be seed-placed, side-banded, or deep-banded to increase efficiency and minimize loss. These processes concentrate nutrients at the root level where they are most easily absorbed and least likely to wash away into nearby streams.

Keep in mind that areas around wetlands and waterways are vulnerable to nutrient loss, so consider how water moves off your land and avoid applying nutrients in vulnerable areas. Reducing overlap in fertilizer application can also be a substantial benefit, both reducing costs and reducing nutrients in runoff.

Right source: Before applying nutrients to your fields, think critically about what your crops require this season. Each type of fertilizer causes a different series of chemical reactions, so it's important to know how your soils will react and how your crops will benefit from your choices. By applying the right fertilizer source, you can maximize nutrient uptake into crops and minimize the risk of excess nutrient runoff.

4Rs management minimizes nutrient loss and maximizes environmental benefit to your region. However, every crop and soil is different and the 4Rs will likely change from field to field. With careful management, you can reduce unnecessary nutrient inputs and improve water quality while still maintaining crop yields. These small changes can have big impacts on your region. Consider your land, your crops, and your goals. Then take steps to apply nutrients at the right source, right rate, right time, right place.

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