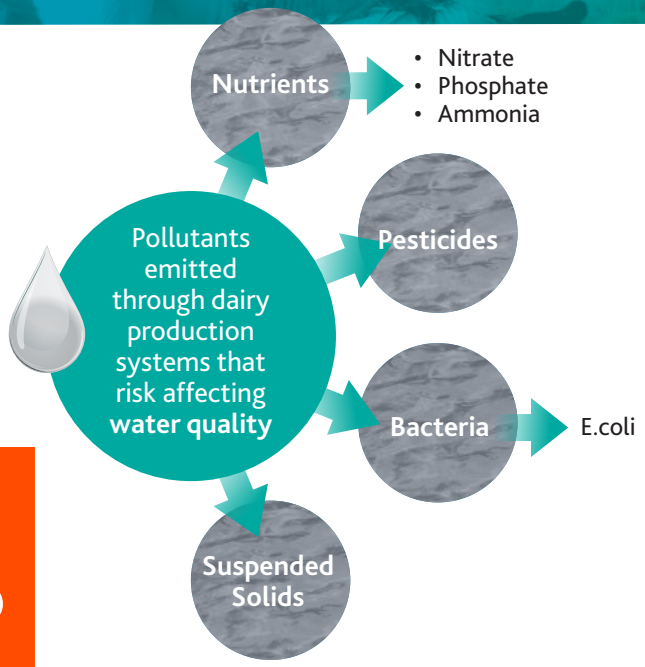
Preserving Water Quality

Water Quality

Farmers must manage nutrients in order to minimize or avoid the risk of contaminating water by:

1. Runoff and leaching of pollutants from organic and inorganic fertilizers in the production of livestock feed crops.
2. Farmstead effluents such as silage effluent runoff, wastewater generated from manure piles and milkhouse washwater.



Why is water quality important?

Farmers have a responsibility to produce milk that is safe and nutritious, while caring for the land and water. Not only does this impact the water that they and their animals drink, but also the environment that is shared with all of society.

There are different areas of concern that farmers can consider when taking steps to minimize their impact on water quality.

1 Pollution resulting from excess organic waste, suspended solids and nutrients is termed "eutrophication"

Eutrophication can lead to enhanced growth of plants and algae (algal blooms).

- Algal blooms deplete disolved oxygen in water.
- Algal blooms can also produce toxins that could directly harm fish, birds, mammals, and even contaminate drinking water.

2 Pollution resulting from pesticides through field runoff

- Residues can cause harm to aquatic and terrestrial life.
- They can also potentially affect human health.

3 Pollution with bacteria

Contamination of drinking water with bacteria can have serious public health implications.

Further, when not managed properly, milkhouse washwater can be a significant concern

Milking parlour washwater may contain:

- Milk solids
- Manure and grit from floor washing
- Acidified water, detergents, alkaline solutions from pipeline rinses/cleaning

The relative impact of dairy washwater effluent versus domestic sewage:

Management Practices to Minimize Water Quality Impacts of Dairy Farms

Researchers in Canada and abroad have devoted significant research effort to understand the ecological impact of dairy farming.

Below are a few important management practices that have been shown to reduce the level of pollutants reaching the environment.

Constructed Wetlands

Constructed wetlands can be used to reduce the pollutant load from milkhouse washwater. Wetlands are Mother Nature's Brita® filters … they serve as a buffer between land and water bodies, filtering out pollutants and various impurities.

Aside from harbouring important levels of biodiversity, wetlands also have highly productive vegetation and bacteria that remove solids, nutrients, and pollutants from incoming water, converting them into inactive forms and preventing contamination of downstream water bodies. Research in Eastern Canada has found that constructed wetlands can be highly effective in reducing nutrient loads from milkhouse washwater.

Constructed treatment wetlands are a relatively inexpensive, low-maintenance technology that mimic the function of natural wetlands - the key advantage being that they are man-made, therefore can be built in strategic locations to mitigate the impact of a variety of agricultural wastewater types. Construction typically involves excavating, backfilling, grading, diking, and installing water control systems to establish optimal water flow patterns. Subsequently, native wetland vegetation is planted.

Timing of Manure Spreading is Key

Nitrate leaching following manure application was halved when applying in SPRING instead of FALL, making springtime spreading more beneficial to the environment, to nutrient uptake by plants, and consequently, to farm finances.

Importance of Including Perennial Legumes in Crop Rotations

Alfalfa is a nitrogen-fixing perennial legume and plays an important role in mitigating the environmental impact of crop fertilization. Being a nitrogen-fixing plant, alfalfa scavenges nitrogen from the soil and incorporates it, in the form of protein, into the plant. Dairy farmers are in a great position – the use of alfalfa as a nutritional source is unique to ruminants and differentiates the dairy farm landscape from other cropping systems.

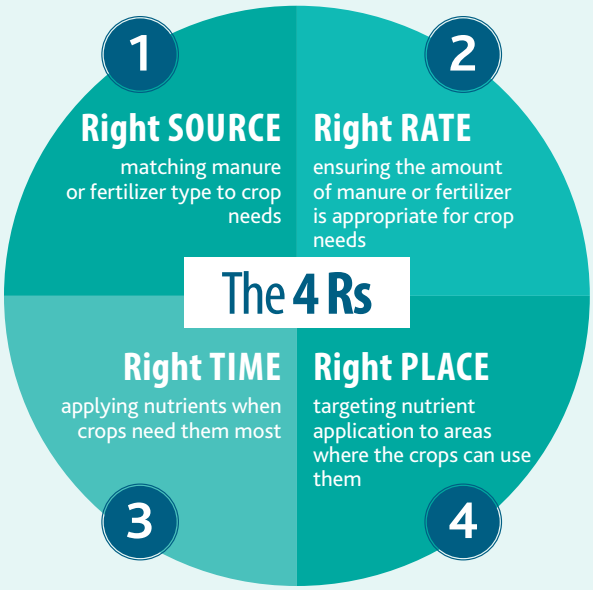
Including alfalfa in a crop rotation NOT ONLY reduces the need for nitrogen inputs, it also reduces the amount of nitrate leaching, and consequently, the water quality impacts of a farm.

Cropping practices to reduce nutrient losses

When planning nutrient applications, farmers can achieve their production goals at the same time as protecting the environment and improving industry sustainability.

The 4R Nutrient Stewardship framework (www.nutrientstewardship.com) is one tool that provides guidance to help maximize nutrient uptake by plants and minimize nutrient losses to the environment. Working with local crop advisors, farmers can tailor their nutrient applications to the realities of their own farm, soil type and climate.

Researchers in Eastern Canada have studied several aspects of nutrient management to minimize nutrient losses that will impact water quality, as well as to improve soil health and crop yields. Here are a few of their findings:



Type of Fertilizer Employed

Applying manure reduced nitrate leaching significantly compared to applications of urea-containing fertilizer.

Preferentially using manure is a win-win, not only are lower levels of N leached following application, the need to purchase synthetic fertilizer is reduced.

Dairy Research Cluster

Dairy Research for a Healthy World.