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Common fertiliser tied to water quality decline in Canadian Prairies

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A commonly used agricultural fertiliser that was considered environmentally safe is now linked to

Significant water-quality deterioration across the Canadian Prairies

New research shows how urea, a nitrogen-rich **fertiliser** used globally, may be contributing to ecological damage in lakes, wetlands, and reservoirs when it escapes farmland and enters freshwater systems.

Algae growth and oxygen loss

The study, conducted by researchers from Canadian universities and published in **Nature**, examined the effects of urea runoff by simulating agricultural conditions in farm ponds.

The results showed an increase in algae growth, with levels reaching up to ten times higher than observed in already stressed ecosystems.

This surge in algae has serious consequences. **As algae multiply and eventually decompose, they consume large amounts of oxygen in the water.** This process leads to oxygen depletion, which can harm or kill fish and other aquatic life. Low-oxygen environments also tend to promote the growth of harmful algal blooms, some of which produce toxins that pose risks to both wildlife and human health.

Widespread impact across the Prairies

The findings suggest that the issue is not isolated. By comparing experimental results with data from hundreds of water bodies in southern Saskatchewan, researchers estimate that nearly half of the region's lakes, wetlands, and reservoirs may already be experiencing degradation linked to long-term fertiliser use.

This raises concerns about the cumulative effects of modern agricultural practices. The Prairie provinces are among the most productive farming regions in the world, relying heavily on fertilisers like urea to sustain crop yields. However, the environmental cost of this productivity is becoming increasingly evident in surrounding water systems.

Wetland loss amplifying the problem

Despite the connection between urea and water degradation, researchers sugges that the fertiliser itself is not inherently the main issue. Instead, the problem lies in how landscapes have been altered over time, particularly through the drainage of natural wetlands.

Wetlands act as natural filters, trapping nutrients and preventing them from flowing into rivers and lakes. When these ecosystems are drained to create more farmland, their filtering capacity is lost. As a result, fertilisers applied to fields are more likely to wash into nearby water bodies during rainfall or snowmelt.

In regions where wetland drainage has been actively encouraged, the effects appear to be more severe. Without these natural buffers, even standard farming practices can lead to significant environmental consequences.

While the study focuses on the Canadian Prairies, its implications extend far beyond the region. Urea accounts for more than half of global fertiliser use, supporting food production for a large portion of the world's population. Similar agricultural systems in countries such as the United States and China may face comparable risks.

The research shows that balancing the need for high agricultural productivity with the protection of freshwater ecosystems poses a challenge. As global food demand continues to grow, reliance on fertilisers such as urea is unlikely to decrease.

The findings point to potential solutions that do not require reducing fertiliser use. Instead, better land and water management practices could help mitigate the problem. Protecting and restoring wetlands, improving drainage systems, and adopting more precise fertiliser application techniques may reduce nutrient loads entering waterways.

Ensuring the long-term health of freshwater systems is critical not only for ecosystems but also for agriculture. Clean and sustainable water sources are essential for farming, and their decline could ultimately undermine the very productivity that fertilisers are meant to support.

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