

# CAN WE DO AWAY WITH CHEMICAL FERTILIZERS?



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**Fertilization is a central component of farming that impacts both crop productivity and the quality of the environment. The goal is to ensure there are sufficient levels of nutrients based on crop requirements, peak harvest times, and the soil's natural ability to provide nutrients. Organic fertilizers have been used for millennia, while chemical fertilizers (also known as synthetic or mineral fertilizers) first made their appearance in the late 19th century, but their use is now more contentious than ever. Is it possible to simply abolish them?**

On the face of it, we cannot just shunt aside chemical fertilizers without affecting the current diet of Quebecers. After all, 80% of our cultivated lands, some of which are planted with fertilizer-needy crops, are used to grow fodder for farm animals, i.e., the livestock needed to produce the meat and dairy foods central to our Western diet. Without chemical fertilizers, we would never have seen the ever-increasing crop yields that we have since the early 1900s. And Western populations, whose lifestyle has gradually spread to all corners of the globe, would never have had access to the large quantities of animal products they are accustomed to today.

However, the use of chemical fertilizers is not without drawbacks for the environment. Over the past 100 years, nitrous oxide (N<sub>2</sub>O), a potent greenhouse gas, has accumulated in the Earth's atmosphere in proportion to the utilization of nitrogen fertilizers—the production of which requires significant consumption of natural gas. As for phosphate fertilizers, they are derived from a non-renewable resource and, when applied to fields in excess, contribute to the eutrophication of water bodies.

## OTHER WAYS TO REDUCE CHEMICAL FERTILIZER USE

While the complete and rapid eradication of chemical fertilizers worldwide is not in the cards for now, IRDA is working to help Quebec's farmers reduce their dependence on these fertilizers by introducing them to better agricultural practices. For example, by using leguminous green manures in their annual crop rotations, farmers are helping reintroduce reactive nitrogen into the soil-plant system. This is similar to how chemical fertilizers work, i.e., by capturing nitrogen present in the air but, in this case, without consuming natural gas or producing significant N<sub>2</sub>O emissions. In terms of eating habits, a French study<sup>1</sup> published in January 2019 emphasized the significant link between greenhouse gas emissions and diets in which meat and dairy consumption prevail.

According to this study, "a diet that reduces meat and dairy product consumption by approximately half in favour of an increase in the consumption of plant-based foods, together with a change in agricultural practices towards less inputs and a reallocation of agricultural land, would enable a halving of the carbon footprint of agriculture."

An increase in human consumption of legumes (e.g., soybeans, lentils, and chickpeas) over animal protein would reduce the pressure to grow animal feed crops and lead to improved soil biodiversity. It bears mentioning that Western Canada is currently the world's largest producer and exporter of lentils and chickpeas. Lastly, management chains for livestock effluents, composting, and biomethanation should also be examined closely to ensure they maximize the return of nitrogen to farmlands, thereby helping reduce the use of chemical fertilizers.

## CAN ORGANIC FARMING HELP CUT BACK ON CHEMICAL FERTILIZER USE?

IRDA is also involved in organic farming, a production method that prohibits chemical fertilizers. This forces farmers and researchers to double down on their efforts to come up with creative solutions and develop new practices. As the organic farming industry expands, it will be interesting to see whether it is able to sustain, on a broad scale, the Western dietary model. All things considered, unless Western diets undergo a sea change, we will likely remain dependent on chemical fertilizers, especially in areas where the soil is in poor health or where there are fertility issues.

<sup>1</sup> [Energy and carbon footprint of food in France - From production to consumption \(in French\)](#)

## FOR MORE INFORMATION

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