Sustainable Feed and Land Management Practices to Consider

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This past March 2024, Lactanet organized a series of 3 sustainability webinars funded by the Dairy Farmers of Canada. The feed and land management practices discussed in Webinar 3 are summarized in this article.

Almost all the land used for dairy farming is for feed production. Quality feed is crucial for thriving and productive dairy cattle. Therefore, dairy production is dependent on soil health, which is associated with carbon, nitrogen, and water cycles that enable life and biotic production. Notably, 22% of the milk carbon footprint comes from on-dairy farm feed production (Figure 1).



Figure 1: The breakdown of farm activities that contribute to the carbon footprint of Canadian milk (Groupe Agéco, 2018; Left).

Compared to concentrates, using forages reduces the amount of greenhouse gas (GHG) emissions associated with feed production. Regarding forage production, most of the emissions (45%) are N2O from soils (fertilizers and residues), followed by CO2 from machinery use (especially at harvesting), which accounts for about 25% (Maxime, 2013).

There are various recommended forage and crop production practices you can implement on your farm to operate more efficiently, subsequently moving the Canadian dairy industry closer to its target of reducing GHG to reach *Net Zero by 2050*. Read about them below!

Actions to lower the N2O emissions from soil and mineral fertilizer inputs include:

Action	Considerations	Environmental co-benefits
Have an adequate crop rotation	• Include hay crops and/or legumes for N input to the next crop	• Increase soil health and biodiversity
Calculate and use the right fertilizer application rate	• Conduct soil testing (N, P, K, and other attributes) • Test the nutrients of your organic inputs (for example, manure) • Review your test results with your field advisor	• Reduce N and P losses and associated issues (e.g., eutrophication)
Use enhanced efficiency fertilizers	• Ask your advisor about fertilizer forms with additives such as nitrification inhibitors, or with physical barriers to reduce nutrient losses	• Reduce N and P losses and associated issues (e.g., eutrophication)
Optimize organic inputs	• Test soil organic matter and carbon • Utilize your farm's manure for its fertilizing benefits • Use of composted manure is a very good practice for improving soil texture and returning carbon to the soil	• Reduce GHGs associated with manure management • Improve soil health (organic matter, structure, and associated ecosystem services) • Assess your soil health and how its carbon content changes over time
Fertilize at the right time	• Split application • Incorporate organic fertilizer quickly	• Reduce N (especially ammonia) and P losses and associated issues (e.g., eutrophication)
Use precision agriculture (e.g., GPS guidance and tools for vision-controlled operations)	• Helps to achieve getting the right dose at the right place in the field	• Reduce machinery and fuel use

Actions to lower the CO2 emissions from machinery use (harvest, loading and feed storage operations, and tillage) include:

Action	Considerations	Environmental co-benefits
Maximize fuel efficiency of machinery	• Do proper and frequent maintenance • Upgrade/replace equipment, as needed.	• Save energy and reduce depletion of fossil fuel resources
Use fuel alternatives	• Select source of electricity (especially in provinces where grid electricity is from renewables; e.g., electric tractors) • Select biodiesel or biomethane (especially in areas close to an anaerobic digestion facility)	• Reduce depletion of fossil fuel resources and impacts associated with their supply chain
Reduce the use of machinery	• Reduce tillage • Use precision agriculture (e.g., GPS guidance and tools for vision-controlled operations)	• Reduce soil compaction • Reduce soil carbon loss • Minimize inputs (fertilizer and pest control)

Importantly, every farm is unique! Soil and inputs analysis data is the first step to provide insight to your own situation. Your field advisors are key support, as they can help with data analysis and interpretation to advise on field and land management. Lastly, savings are directly associated with a reduction of costly nutrient inputs and fuel consumption, accelerating the return on investment and making your production more profitable in the long term.

To watch the full webinar recording please click on the button below

Click here

For an assessment tailored to your farm, contact an expert advisor!

References
Groupe Agéco (2018). Environmental life cycle assessment of Canadian milk production. Report for DFC.

Adapted and calculated from Maxime (2013): Maize silage production and alfalfa-grass silage life cycle inventory dataset, CA-QC, Allocation, cut-off by classification, Ecoinvent database version 3.8.

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