



DAIRY FARMING FORWARD TO 2050

Dairy Farmers of Canada's Net-Zero Strategy



TABLE OF CONTENTS

03 MESSAGE FROM THE PRESIDENT

04 NET ZERO BY 2050: BUILDING ON DECADES OF PROGRESS

06 OUR PLAN

08 OUR STRATEGIC APPROACHES

10 BEST MANAGEMENT PRACTICES TO MITIGATE EMISSIONS ON THE FARM

15 A SUSTAINABLE FUTURE



MESSAGE FROM THE PRESIDENT



I am pleased to present Dairy Farmers of Canada (DFC)'s plan to reach Net Zero by 2050, contributing to a sustainable future for our next generation of farmers, fellow Canadians and our planet.

From severe temperatures to drought, wildfires to flooding, farmers are increasingly bearing witness to the impacts of climate change first-hand - and the extreme weather patterns we have experienced in recent years are likely to continue.

The leadership of Canadian dairy farmers in sustainability is not new. Our practices are bearing fruit: the carbon footprint of our dairy production is amongst the lowest in the world, as confirmed by our most recent Life Cycle Assessment.

We are determined to continue maintaining our leadership. Net Zero by 2050 is an ambitious commitment, but generations of Canadian dairy farmers have adopted new practices based on science and innovation, so we're up to the challenge and we're confident that we can reach this goal.

Fortunately, much of the work needed to meet the net-zero target is already underway in one form or another.

For starters, the dairy sector's investments in research and efforts on farms across the nation are driving meaningful progress and are helping to put this goal within reach. DFC is also working with greenhouse gas reduction experts, federal and provincial governments, dairy stakeholders, and most importantly, farmers, to develop strategies that can be applied at the farm level to reduce and sequester emissions. In this way, we are not only preserving resources for future generations, but also working to meet the expectations of consumers.

Dairy farmers know they can continue to supply Canadians with safe and nutritious high-quality dairy products while remaining engaged towards sustainability. We are proud of our tradition of environmental stewardship and our ability to adapt to new realities. Climate change is one of the defining issues of our time, and we are more committed than ever to do our part to ensure a healthy and sustainable future for future generations.

Sincerely,

Pierre Lampron
President, Dairy Farmers of Canada



From 1990 to 2020, the carbon footprint of one litre of Canadian milk decreased by 25%.¹

NET ZERO BY 2050: **BUILDING ON DECADES OF PROGRESS**

Canadian dairy farmers have a long history as stewards of our natural resources. Their collective focus on sustainable practices contributes to the continued, long-term success of their farms and ensures that Canadians continue to have access to nutritious, locally produced dairy products made with 100% Canadian milk.

DFC's existing [proAction](#)[®] program is widely recognized for its high standards and is mandatory on all Canadian dairy farms. Under the program, farmers demonstrate excellence in six distinct areas: milk quality, food safety, animal care, livestock traceability, biosecurity, and environment. Each of these modules support sustainability, from increased milk quality, to improved animal health and disease prevention, to the entire Environment module.

Through proAction and farmers' individual initiatives, dairy farmers have and continue to adopt climate-friendly practices that reduce GHG emissions and increase resiliency to the effects of climate change. In 2020, emissions from milk production were estimated at approximately 1% of Canada's total.²

Canadian dairy farmers know how important it is to build on this progress. They believe in doing the right thing – for their farms, for their families, and for our planet.

That’s why, at DFC’s Annual Policy Conference in February 2021, farmer delegates challenged DFC to find ways to align some of these individual efforts under a common goal. Following a thorough assessment and exploration of possible targets, the DFC Board of Directors approved the **Net Zero by 2050** objective.

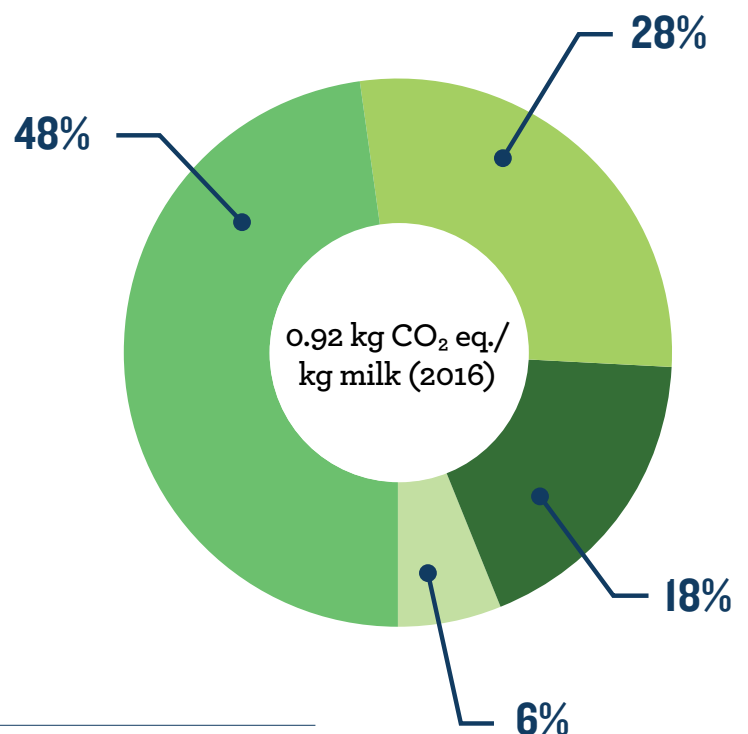
Setting a net-zero target is a natural next step in our commitment to continuous improvement and research shows that it’s possible. This type of leadership is a tangible way to demonstrate that dairy farmers will continue to be part of the solutions to tackle climate change, and ensure Canadians can continue enjoying dairy products made with 100% Canadian milk for generations to come.



LOWERING THE CARBON FOOTPRINT OF CANADIAN MILK PRODUCTION

Dairy Farmers of Canada conducts life cycle assessments (LCA) every 5 years to measure the carbon footprint of milk production and identify areas for continuous improvement. In 2016, emissions came from four key areas.³

- Livestock management (48%)
- Feed production (28%)
- Manure management (18%)
- Energy, infrastructure and transport (6%)



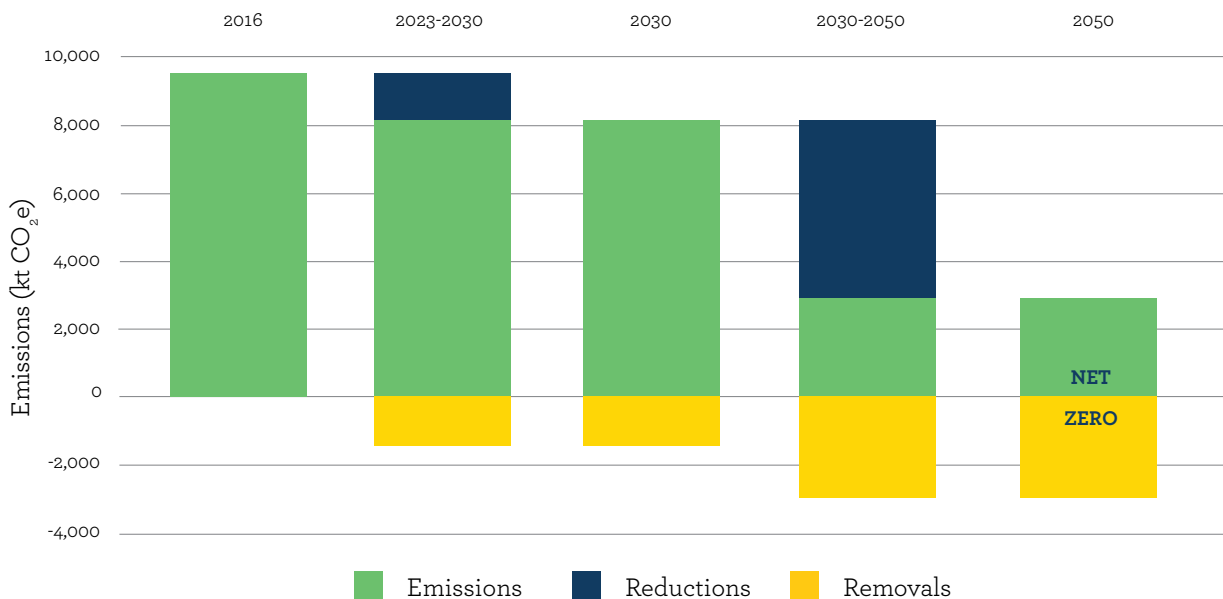
³ Groupe AGÉCO (2018). Environmental Life Cycle Assessment of Canadian Milk. (Report prepared for Dairy Farmers of Canada). Available at: <https://dairyfarmersofcanada.ca/en/dairy-in-canada/news-releases/ageco-study-results-reveal-improved-environmental-impact-and-efficiency-canadian-milk-production>

OUR PLAN



Net zero means achieving an overall balance between GHGs emitted, and the GHGs removed from the atmosphere.² To reach ‘net zero’ by 2050, farmers will adopt best management practices (BMPs) to reduce emissions as much as possible, as well as to increase carbon sequestration (capturing and storing emissions from the atmosphere) to remove what’s left. DFC worked with [Viresco Solutions](#), experts in low carbon and sustainable agriculture, to assess options to reduce GHG emissions on dairy farms. They evaluated available research to determine impact on GHG emissions, return on investment, and co-benefits. Dairy farmers in every region across Canada participated in focus groups to provide input on the BMPs and the feasibility of implementation. Viresco Solutions then consulted with experts and modeled the potential impact of the most feasible BMPs. The following graph demonstrates how reductions (blue) and removals (yellow) will bring the balance to net zero.

EMISSIONS TRAJECTORY



This graph demonstrates the emissions reduction and removals needed to achieve net zero relative to the dairy sector’s total emissions in 2016.



FOCUS AREAS

Many of the practices that reduce emissions have co-benefits that contribute to the health of local ecosystems, increase the use of renewable energy, and recycle more plastics. These are all important components of environmental sustainability and help to increase farms' resilience to the effects of climate change, as well as producing environmental benefits for surrounding communities. Five focus areas are addressed in our strategy:

The identified practices to reduce and remove emissions are at various stages of readiness for implementation. Many are already widespread on farms across Canada, such as improving feed efficiency and rotating crops, while others are showing promise in research but are not yet widely available, such as methane inhibitors and manure acidification. As new research and technologies become available, we will incorporate findings into this strategy and ensure knowledge is transferred to farmers to inform decision making.

Every farm is unique, and that means dairy farmers have the opportunity to implement strategies that make sense for their operations. Practices that are ready for adoption are outlined in more detail in the following pages, and in DFC's [Net Zero by 2050: Best Management Practices Guide to Mitigate Emissions on Dairy Farms](#).



CARBON FOOTPRINT

Reducing the greenhouse gas intensity of dairy production



REGENERATIVE AGRICULTURE

Improvements to soil health, land and water use, and quality



BIODIVERSITY

Safeguarding on-farm ecosystems through habitat conservation and restoration



ENERGY

Energy efficiency, conservation and renewable energy generation



PLASTICS

Increasing recycling and improving plastic waste management

OUR STRATEGIC APPROACHES

The year 2050 might seem like a long time from now, but dairy farmers are eager to continue on the progress they've been making for decades. DFC is working on a variety of initiatives to support farmers, as well streamline efforts across the industry.

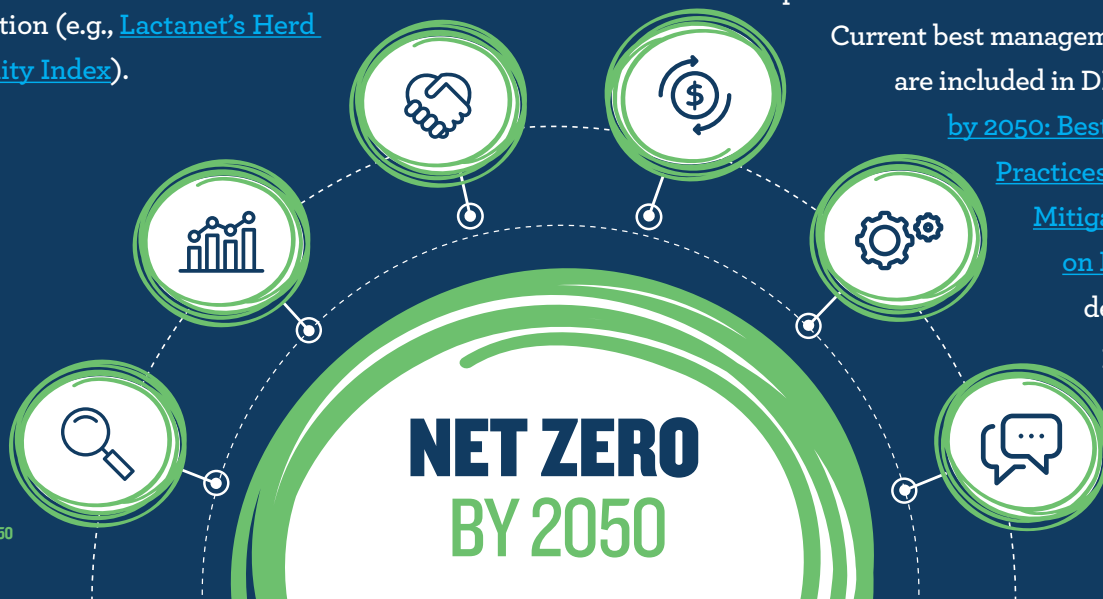
LEVERAGE AND ENHANCE MEASUREMENT TOOLS

Since 2011, DFC has been monitoring environmental progress through a Life Cycle Assessment (LCA), which quantifies the environmental performance of Canadian milk production, including its carbon footprint, water consumption and land use. DFC has committed to undertaking an LCA every five years, and the 2021 assessment is currently underway, with results expected in 2023. This year's study includes a new biodiversity assessment, and will also be supported by a coordinating carbon sequestration study. This will be complemented by other instruments, such as on-farm tools that farmers can use to assess their individual impact, which will support decision making and adoption of best practices for their operation (e.g., [Lactanet's Herd Sustainability Index](#)).

FOCUS RESEARCH, INNOVATION AND KNOWLEDGE AND TECHNOLOGY TRANSFER (KTT)

The Canadian dairy sector has always been a global leader in research and innovation. DFC has developed a new five-year [National Dairy Research Strategy](#), released in the fall of 2021, to guide the organization's investments in science. Under the Dairy Farm Sustainability priority area, key research objectives have been defined to sustain feed cropping system long-term productivity; reduce GHG emissions, maximise carbon sequestration and adapt to climate change; better use and conservation of water on dairy farms, and increase biodiversity. Also included under this area is the importance of factoring in social and economic implications of any practices studied. KTT efforts will keep farmers informed of the latest findings.

Current best management practices are included in DFC's [Net Zero by 2050: Best Management Practices Guide to Mitigate Emissions on Dairy Farms](#) detailed on pages 10-11.



BUILD STRATEGIC PARTNERSHIPS



Many environmental organizations have long-standing relationships with dairy farmers. DFC has established partnerships with leading environmental organizations to promote and advance sustainability in the dairy sector, and looks forward to partnering with additional stakeholders across the value chain. Interested parties are invited to contact sustainability-durabilite@dfc-plc.ca.

ENHANCE ECONOMIC OPPORTUNITIES



Sustainable solutions need to make economic sense for farmers. DFC will continue to work to make funding available to farmers, including conducting economic analysis and creating economic opportunity related to sustainable farm practices (e.g., funding for green technologies, carbon market participation). Additionally, DFC will leverage available programs and funding at the federal level, and we will inform farmers of ongoing economic opportunities that support them adopting best practices.

ADVOCATE FOR A POSITIVE REGULATORY ENVIRONMENT



DFC will continue efforts to align this strategy with initiatives across the value chain. DFC will also work to ensure that farmers can benefit from environmentally beneficial technologies, through expedient approval processes and reduced administrative barriers. As well, DFC will continue seeking opportunities for farmers to be recognized for their efforts.

COMMUNICATE ON THE SUSTAINABILITY JOURNEY



DFC's communication plan aims to keep key audiences informed on progress by providing regular updates and results through corporate communications, marketing efforts, and a new sustainability hub on the DFC website. This will provide Canadians with an opportunity to engage with farmers' sustainability journeys and reassure them that choosing dairy and the Blue Cow logo means choosing a sustainable future.

BEST MANAGEMENT PRACTICES TO MITIGATE EMISSIONS ON THE FARM

Canadian dairy farmers will achieve net-zero emissions through the uptake of BMPs in each of the four categories of emissions identified in the LCA, as well as a fifth category for Land Management, which includes practices aimed at carbon sequestration and building resiliency through increased biodiversity.



LIVESTOCK MANAGEMENT (48%)

BMPs:

- optimizing animal health
- enhancing herd genetics
- improving feed efficiency
- optimizing animal diets

Thanks to improvements in cow health and comfort, improved diets and genetics, and advances in technology, fewer cows are needed to produce the demand in milk – which means fewer GHG emissions per litre. Today, the average healthy Canadian dairy cow produces three times more milk than 50 years ago.



FEED PRODUCTION (28%)

BMPs:

- minimizing tillage
- cover cropping
- optimizing crop rotation
- incorporating perennials
- practicing 4R Nutrient Stewardship

In addition to reducing emissions, farms have amazing potential to capture carbon dioxide from the air and store it in their landscapes. This is called carbon sequestration. As plants grow, they consume atmospheric carbon and store it in their roots, stems and in the soil. When undisturbed, this carbon can remain in the soil for hundreds of years.



MANURE MANAGEMENT (18%)

BMPs:

- covering manure storage
- separating solids and liquids
- in-vessel manure composting
- reducing manure storage duration
- anaerobic digestion

Manure management represents one of the largest opportunities for GHG reductions, from separating and composting manure, to fully emptying manure storage, to installing a biodigester. For example, research shows that completely emptying a liquid manure storage tank in the spring can reduce the methane emissions from the newly loaded manure in the following months by up to 40%.⁴



ENERGY, INFRASTRUCTURE AND TRANSPORT (6%)

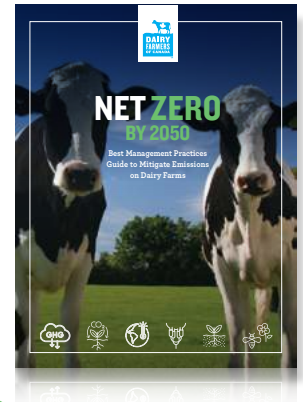
BMPs:

- improving energy efficiency
- producing solar energy
- producing wind energy
- purchasing renewable energy
- converting to alternatively powered machinery
- managing plastics responsibly

While energy makes up a small part of the carbon footprint of milk production, it offers an excellent opportunity for a farm to save on costs, increase revenue, and add renewable energy to their local grid. Additionally, farms contribute to a cleaner environment by reducing, reusing and recycling the plastics used on their farm.

For full details, download the *Net Zero by 2050: Best Management Practices Guide to Mitigate Emissions on Dairy Farms* at:

DOWNLOAD



LAND MANAGEMENT

(opportunities for carbon sequestration and biodiversity enhancement)



BMPs:

- rotational grazing
- practicing silvopasture (agroforestry)
- conserving wetlands
- protecting riparian buffer zones
- maintaining grasslands
- planting trees, hedgerows and shelterbelts

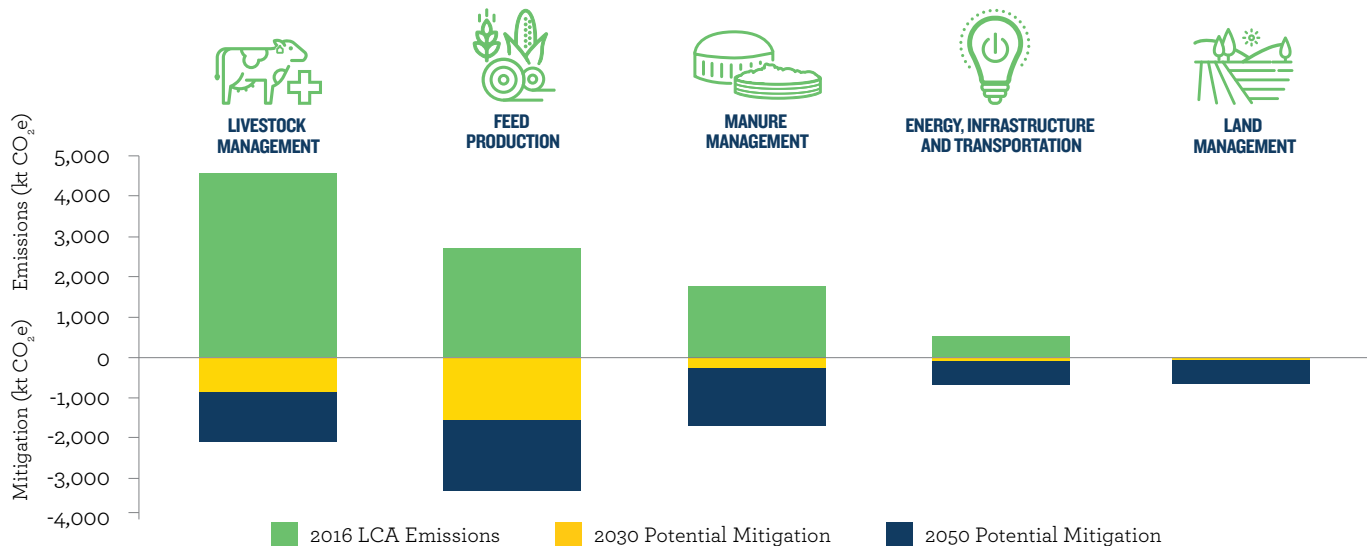
Healthy soils and

biodiverse areas help dairy

farms to sequester carbon and be more resilient to the effects of climate change. A recent study by Ducks Unlimited Canada and the University of Saskatchewan found that wetlands are a powerful climate mitigation tool that can cool the surrounding atmosphere by one to three degrees on summer days, which can reduce the impact of heatwaves.⁵

The following chart shows the emissions in 2016 (in green) as well as the potential mitigation (reductions and removals) for 2030 (yellow) and 2050 (blue). As you can see, the largest source of emissions comes from livestock management, but since emissions cannot be completely eliminated, mitigation in other categories will help to bring the balance to zero. Please note that this graph does not show carbon storage and sequestration in 2016, as it was not measured at that time. DFC is undertaking its first study in 2023.

CURRENT EMISSIONS AND POTENTIAL FOR MITIGATION



Source: Viresco Solutions, 2022

⁵ Ducks Unlimited Canada (2022). New research from Ducks Unlimited Canada and the University of Saskatchewan demonstrates climate-cooling effects of wetlands. Available at: <https://www.ducks.ca/news/national/new-research-demonstrates-climate-cooling/>



ON THE FARM

Dairy farms are as unique as the people that operate them, with different herd sizes, barn types, ecosystems, soil types, climatic conditions, and many other factors. That's why it's important to have a variety of approaches that will help the industry reach net zero. Many dairy farmers across Canada are already implementing some of the recommended BMPs.

It's important to note that implementing a practice often requires acquiring new information, a change in management style, time, and/or financial resources. In the long run, what's good for the environment is good for a farm's bottom line, but changes will take time. In their own words, here's how some farmers have started doing just that.



▶ IMPROVING FEED EFFICIENCY

Higher-producing cows typically generate less methane per unit of milk than lower-producing cows. **JP, a dairy farmer in Alberta**, has been improving feed efficiency by feeding his cows with a self-propelled feed wagon, which allows for continuous adaptation to feed dry matter variance and nutritional quality variance. *"This feed wagon allows for notably less feed shrink meaning less wasted feed, less fuel consumption due to the efficiency of the machine, and a more stable diet for our cows,"* he says. Working with herd improvement services, he is combining this practice with herd genetics to evaluate the genotypes and phenotypes of dairy animals in order to breed more feed-efficient animals.



◀ **JP, a dairy farmer in Alberta**



INCORPORATING PERENNIALS

Perennials maintain the soil cover and have deeper root systems than annuals, thus providing soil stability and enhanced soil health. They can also tap into available soil nutrients, enhance biodiversity, make more water available to plants, and sequester carbon. **Marianne, a dairy farmer in Manitoba**, is starting to plant in all perennials. She explains, *“The local watershed district has a cost-share program that allows us to plant alfalfa and grass in low-lying areas. We have some land beside an aquifer, so it’s better in perennials.”* Marianne is in the planning stage for her dairy cows to start grazing, so she has started planting some land in grazing feed. *“It can’t be done overnight,”* she says, *“but I have a plan in motion and it’s cutting down on costs, too.”*

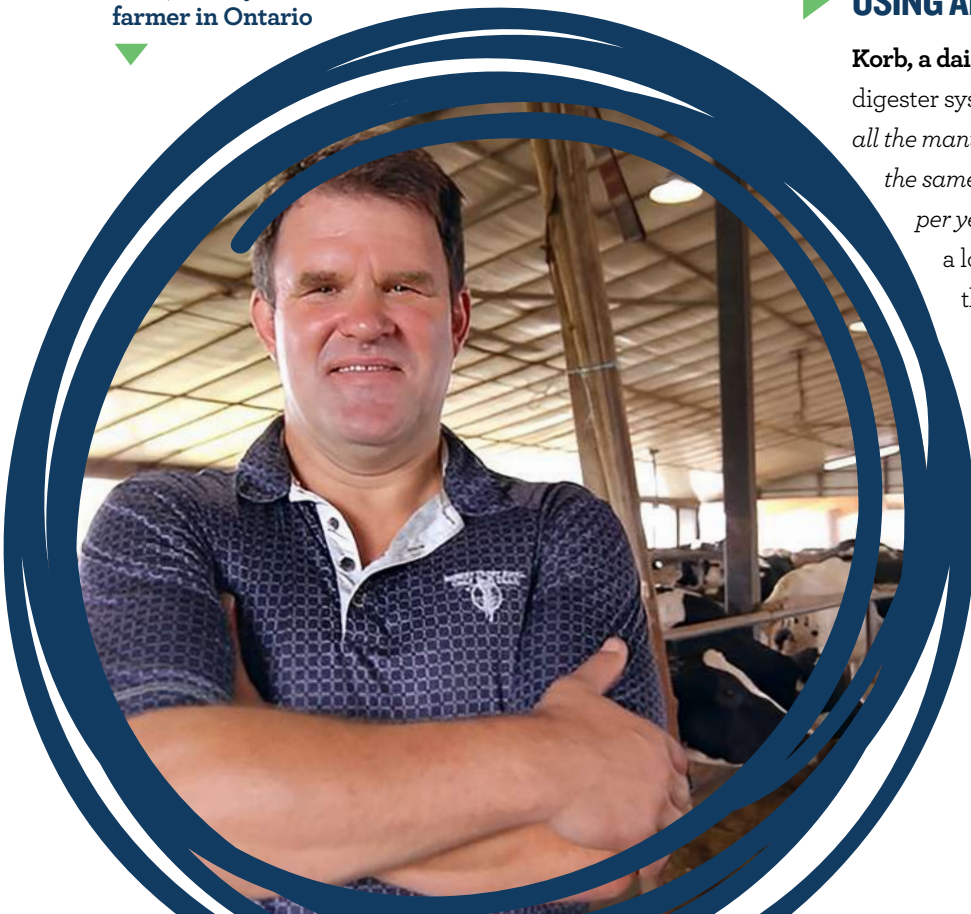


Marianne, a dairy farmer in Manitoba

Korb, a dairy farmer in Ontario

USING ANAEROBIC DIGESTION

Korb, a dairy farmer in Ontario, created his own anaerobic digester system in 2009. *“We milk about 150 cows, so we take all the manure from our farm into the mix tank and add in the same amount of off-farm waste; about 8,000 tonnes per year,”* he explains. He has a 250-kW contract with a local hydro company and uses about one-fifth of the energy produced to power his farm, as well as a portion of the heat generated from the digester. *“We noticed an increased fertilizer value from the digestate that comes out the back end – almost a 15% increase in crop yield by year three,”* he continues. Not only this, but researchers from the University of Guelph monitored the methane levels before, during, and for a few years after construction, and the digester was able to take out 90-97% of the emissions from the manure storage pit.





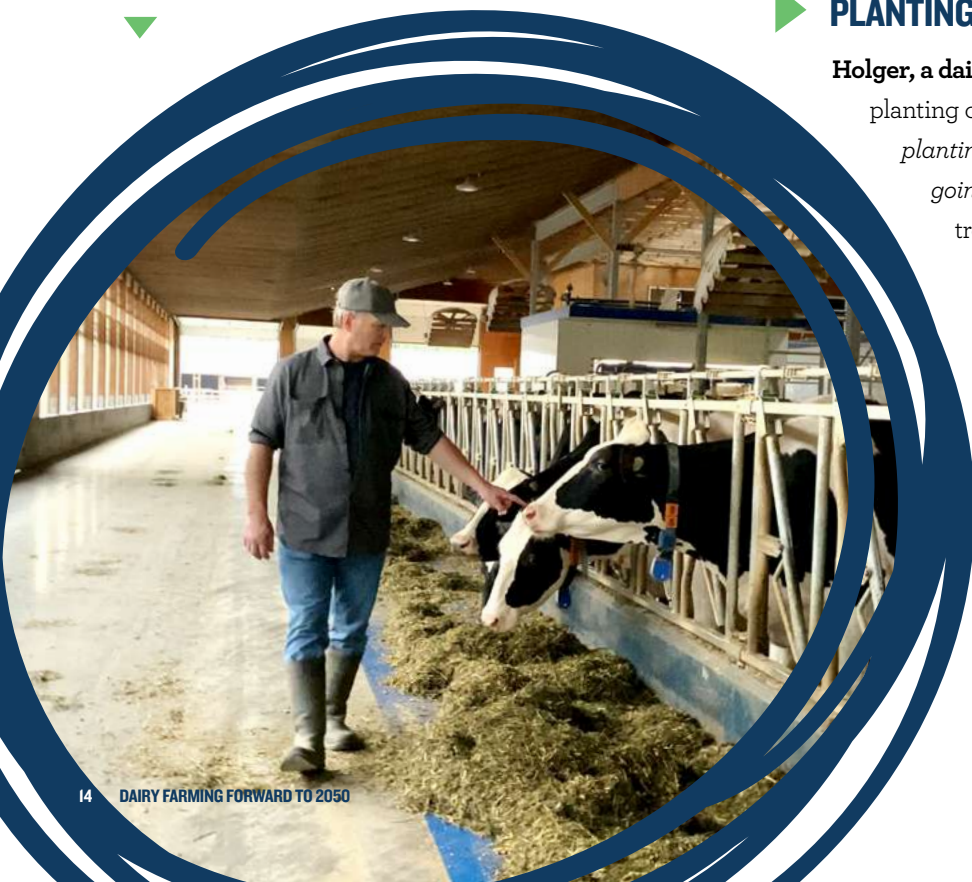
MANAGING PLASTICS RESPONSIBLY

Recycling and remanufacturing plastic saves at least 30% of the carbon emissions that original processing and manufacturing produces.⁶ DFC has established a partnership with Cleanfarms to provide increased opportunities for farmers to recycle the plastics used on their farms. **Christian, a dairy farmer in Quebec**, has been participating in one of these programs since 2020. *“Now, we recycle more plastics we use for things like feed storage,”* he says. *“Working with Cleanfarms, we’ve already reduced the volume of our plastic waste by more than half, and we’re able to recycle more of it than ever.”*



Christian, a dairy farmer in Quebec

Holger, a dairy farmer in BC



PLANTING TREES



Holger, a dairy farmer in BC, is continuing a legacy of tree-planting on his farm. *“In the 1960s, my parents started planting maple trees along our drive, and it’s just kept going from there,”* he says. The farm has two acres of trees, and three kilometres of walking trails which the family keeps open to the community. *“Now the trees, they do take a bit of maintenance,”* he says, *“but that’s how we support biodiversity, and it creates new habitat in our area.”* Establishing and maintaining forested areas will naturally protect soil, improve air and water quality, enhance wildlife habitat, and beautify the landscape. *“We, us, the farm, the family, we’re all part of a larger system. The farm isn’t separate from our environment. When we support it today, it supports us tomorrow.”*

⁶Stanford Magazine (2009). The Link Between Plastic Use and Climate Change: Nitty-gritty. Available at: <https://stanfordmag.org/contents/the-link-between-plastic-use-and-climate-change-nitty-gritty>



A SUSTAINABLE FUTURE

Dairy farmers are motivated to run their farms in the most efficient and sustainable way possible – to succeed as a business, and because it’s the right thing to do.

DFC’s net-zero goal aligns with the federal government’s legislative commitment to achieve net-zero GHG emissions across Canada by 2050, as well as those spearheaded by provincial and municipal governments. This commitment also aligns with Pathways to Dairy Net Zero, the Global Dairy Platform – sponsored international dairy sector commitment to net-zero GHG emissions.

Stakeholders in the Canadian dairy value chain – many whose products proudly carry the Blue Cow logo – are also making net-zero and other sustainability commitments that depend on involvement from all levels of the dairy industry, including farmers.

DFC looks forward to collaborating with these and other partners to provide opportunities for farmers to implement best management practices and support the global effort for a sustainable future.

Visit dairyfarmersofcanada.ca/sustainability or contact sustainability-durabilite@dfc-plc.ca for more information.



DAIRY FARMING FORWARD TO 2050

Dairy Farmers of Canada's Net-Zero Strategy

