

IMPROVE LIFE.

Ontario Agri-Food Innovation Alliance Research Impact Case Study



Ontario 😵



Dairy |

The Ontario Agri-Food Innovation Alliance is a collaboration between the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), University of Guelph (U of G) and Agricultural Research Institute of Ontario.

Through the Alliance, the Government of Ontario invests in people, places, programs and partners to develop Ontario agri-food solutions with global impact.

Look for these symbols to learn how Alliance investments return value to Ontario.



O People

Our people are innovators, researchers, thought leaders and problem solvers. We work with partners across the dairy sector — from production to processing — to address challenges and meet emerging opportunities for the benefit of Ontario.

O Places

Our places enable research, innovation and laboratory testing. Alliance investment in research stations, including the Ontario Dairy Research Centre, provides Ontario's researchers with a critical platform for innovation.

Programs

Our programs support discovery, learning and outreach for the benefit of all Ontarians. Programs provide project operating funds to researchers who in turn deliver quality, impactful results, all while training the next generation of agri-food innovators.

Partners

Our investment in people, places and programs attracts partnerships from across the agri-food sector. Industry, government and academic partners collaborate with U of G researchers to deliver benefits to the entire agri-food sector.

Investing in Ontario's dairy sector

The Ontario Agri-Food Innovation Alliance invests in research to support Ontario's dairy sector. This investment leverages the University of Guelph's research expertise and attracts partners from across the dairy sector. Here's a summary of select investments from 2008 to 2019.



*7***€** 330

highly qualified personnel (HQP) trained

- 113 master's students
- 86 doctoral students
- 47 post-doctoral researchers
- 84 undergraduate and co-op students



unique faculty as project leads







Ontario's dairy sector: By the numbers



i 30 billion litres of milk produced in 2019



C 80 certified organic producers



\$5.8B value of Ontario's dairy processing sector in 2019

The centre of innovation

The Ontario Dairy Research Centre is a state-of-the-art, 175,000-squarefoot research facility. Opened in May 2015, the \$25-million facility is the result of a dynamic collaboration among the Agricultural Research Institute of Ontario, OMAFRA, U of G and the Ontario dairy industry, represented by Dairy Farmers of Ontario.

The facility's unique design allows researchers to conduct a wide range of research projects using adaptable, leading-edge technologies. The result is innovative research that supports Ontario's dairy sector.

The Ontario Dairy Research Centre is the "pride of the dairy sector."

 Guy Séguin, systems engineer, Dairy Farmers of Ontario





"My first and foremost reason for choosing to work within [the Ontario Dairy Research Centre] is the ability to be able to measure many physiological and behavioural parameters and control the variation that we need to in order to do rigorous research."

 Dr. Trevor DeVries, professor, Department of Animal Biosciences and Canada Research Chair in Dairy Cattle Behaviour and Welfare

Making an impact

Dairy

Investment in research returns value to Ontario's dairy sector.

New pain management protocol improves calf welfare

2 Novel genetic technology enhances dairy herd health and profitability

3 Improved on-farm practices reduce greenhouse gas emissions

Economic models inform agrifood risk management

Investing in people strengthens Ontario's dairy processing sector





Research Impact Case Study

Returning value to Ontario New pain management protocol improves calf welfare

Dairy calves are an integral part of Ontario's \$2.2-billion dairy industry. Research funded by the Ontario Agri-Food Innovation Alliance resulted in a better on-farm pain management practice during disbudding (the process of removing the horn bud in young calves, for the safety of other cows and farm staff). The new two-part pain management approach improves calf health and welfare, contributing to better herd health and productivity.

U of G researchers: Drs. Todd Duffield and Charlotte Winder

Ontario Agri-Food Innovation Alliance

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U of G researchers, research technicians, highly qualified personnel

Ontario Dairy Research Centre

Tier I, Tier II and KTT Alliance investment: \$182K* Third-party leverage: \$300K*

*From 2008 to 2019

Boehringer-Ingelheim, Dairy Farmers of Ontario, Saputo, Dairy Farmers of Canada





150 veterinary students and 43 dairy producers have completed the online training

Ontario Agri-Food Innovation Alliance

Research Impact Case Study

From idea to impact





Research Impact Case Study

Returning value to Ontario

Novel genetic technology enhances dairy herd health and profitability



Two decades of Alliance-funded foundational and applied research led to the development of High Immune Response (HIR) technology — a genetic test used to identify high, average and low immune responders in cattle. HIR technology was commercialized by Semex as Immunity+[®]. Genetics from certified high immune responding sires are now available in more than 80 countries.

U of G researcher: Dr. Bonnie Mallard

Ontario Agri-Food Innovation Alliance

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U of G research faculty, research technicians, highly qualified personnel

Ontario Dairy Research Centre

Ponsonby General Animal Facility

> Tier I, Tier II, KTT, Gryphon's LAAIR

Alliance investment (project funding): \$480K* Third-party leverage: \$3M* *From 2008 to 2019

> Semex, Canadian iry Network, NSEF

Dairy Network, NSERC, Genome Canada

Novel genetic technology enhances dairy herd health and profitability

\$130M+

Value of bull semen from Immunity+[®] line marketed around the world by Semex in the first six years on the market

30%

Daughters of sires with a high immune response have 30% fewer incidences of disease compared to daughters of average or low immune responders



HIR technology expanded to the beef sector

Elevate[™]—a new HIR test farmers can do themselves launched in 2017





80+

Immunity+® genetics available in more than 80 countries

\$100

Breeding with Immunity+[®] genetics produces savings of \$100 per cow in the first two years of life thanks to reduced incidence of disease and antibiotic use

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Research Impact Case Study

From idea to impact





Research Impact Case Study

Returning value to Ontario Improved on-farm practices reduce greenhouse gas emissions



Ontario Agri-Food Innovation Alliance research leads to science-based, on-farm best practices to improve the sustainability and competitiveness of the dairy sector.

New best management practices in manure, crop and animal management are helping reduce greenhouse gas (GHG) emissions on dairy farms in Ontario and across Canada.

U of G researchers: Drs. Claudia Wagner-Riddle, Alfons Weersink, Flavio Schenkel and Christine Baes

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U of G research faculty, research technicians, highly qualified personnel

Ontario Dairy Research Centre

Ontario Crops Research Centre — Elora

Tier I, Tier II, KTT

Alliance investment (project funding): \$587K* Third-party leverage: \$5.6M* *From 2008 to 2019

Agriculture and Agri-Food Canada, Genome Canada, Dairy Farmers of Canada

Improved on-farm practices reduce greenhouse gas emissions

Building on a history of success

Ontario Agri-Food Innovation Alliance research was instrumental in developing the Environmental Farm Plan (EFP), launched in Ontario in 1992. Today, 70% of dairy farms in Canada have an EFP.



TO OPEN

Reducing GHG emissions

Canadian dairy farms are reducing their carbon footprint:

- ↓ 1% per year between 1990 and 2012
- ↓ 7% between 2012 and 2016 (per litre of milk)



U of G-developed best management practices reduce on-farm GHG emissions

- Livestock management
- Manure management
- <u>Crop management</u>

U of G research shows reducing on-farm GHG emissions can increase profit

Read the paper in the Journal of Cleaner Production

Environmental Farm Plan required on all Canadian dairy farms by 2021 through proAction[®]

\$10M Genome Canada project at Ontario Dairy Research Centre investigating relationship between genomics, feed efficiency and methane emissions





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Returning value to Ontario Economic models inform agri-food risk management



University of Guelph researchers have built economic models for most of the major agricultural sectors in Ontario. These models give the agri-food sector a mathematically sound understanding of "what-if" scenarios that inform trade negotiations and decision making, helping keep Ontario's agri-food sector sustainable, competitive and better able to manage risk.

U of G researcher: Dr. Alan Ker

Ontario Agri-Food Innovation Alliance

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OMAFRA

Dairy Farmers of Ontario, Dairy Farmers of Canada, Agriculture and Agri-Food Canada

Economic models also developed with: Ontario Pork, Swine Health Ontario, Beef Farmers of Ontario, Maple Leaf Foods, Chicken Farmers of Ontario

Economic models inform agri-food risk management

"The modelling program at U of G creates the collaborative environment for academia, industry and government to work together. This collaboration means that when something comes up that is important, we agree and are ready."

- Stephen Duff, chief economist, OMAFRA



U of G developed models to inform international trade negotiations:

- Comprehensive Economic and Trade Agreement (CETA)
- Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)
- Canada-United States-Mexico Agreement (CUSMA)

Government, industry and academia collaborate to support Ontario's agri-food sector

IMPACT

"U of G economic modelling research provides DFO with scientifically-based facts and valuable insights that help us better understand the challenges faced by the dairy industry in Ontario and in Canada."

 Patrice Dubé, chief economics & policy development officer, Dairy Farmers of Ontario

HQP trained at U of G become public sector experts

Chathurika Dayananda, dairy sector analyst for the Dairy Processors Association of Canada, is a graduate of FARE

"Modelling and economic research analyses from the University of Guelph have been useful for Agriculture and Agri-Food Canada in the development of evidence-based policies and programs."

Dr. Bernard Cantin, director,
Policy Analysis Division,
Agriculture and Agri-Food Canada



Research Impact Case Study

Returning value to Ontario Investing in people strengthens Ontario's dairy processing sector



The Ontario Agri-Food Innovation Alliance invests in the people who keep Ontario's dairy processing sector innovative and competitive. The dairy processing sector contributes 9,000 jobs to Ontario's economy, and processed dairy products — milk, cheese, butter, ice cream, yogurt — account for \$5.8 billion in sales in Ontario.

U of G researchers: Drs. Arthur Hill (cheese) and Doug Goff (ice cream)

Alliance-funded researchers and technicians make a lasting difference to this sector by training the next generation of agri-food innovators, maintaining critical spaces for work and innovation, and advancing the sector with expert advice.

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Pilot plant facilities and core dairy laboratory, Department of Food Science

Guelph Food Innovation Centre (GFIC)

Canadian Research Institute for Food Safety (CRIFS)

Investing in people strengthens Ontario's dairy processing sector

Training the next generation of agri-food innovators

40 students per year trained in dairy food processing



80+

Number of dairy processors who annually register for ice cream and cheesemaking technology short courses





3,000+

Number of trainees from around the world who have taken the ice cream and cheesemaking short courses over the past 100+ years

OMAFRA Pasteurizer Operator's course offered at Department of Food Science pilot plant with help of Alliance-funded technician

"Because of the competitive nature of commercial dairy processing operations, it is not feasible to hold training of this nature in a commercial operation."

- Rick Bond, food safety advisor dairy, OMAFRA

Ontario's dairy processors have access to expert advice and R&D support

Ontario Agri-Food Innovation Alliance Research Impact Case Study The Ontario Agri-Food Innovation Alliance is a collaboration between the Ontario Ministry of Agriculture, Food and Rural Affairs and the University of Guelph.

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