

Ontario
Agri-Food
Innovation
Alliance

GROWING ONTARIO SOLUTIONS



BEHIND THE NUMBERS

How the Alliance drives impact in Ontario



IMPROVE LIFE.

OMAFRA—UNIVERSITY
OF GUELPH AGREEMENT
ANNUAL REPORT 2019/20



Long-standing partnership delivers solutions



Prof. Beverley Hale

Associate Vice-
President, Research
(Agri-Food Partnership)
University of Guelph

The Ontario Agri-Food Innovation Alliance is focused on delivering Ontario solutions with global impact.

When the Province of Ontario declared a state of emergency in March 2020 because of the COVID-19 pandemic, the “solutions” we needed in Ontario quickly changed. But I am proud to report that the people, places and programs of the Alliance rose to meet the occasion.

We needed solutions to ensure Ontarians had access to safe and healthy food, including milk, eggs and meat. The Agriculture and Food Laboratory implemented its emergency response plan and continued to deliver on its commitment to help support a safe and secure food supply. The Animal Health Laboratory continued testing to help monitor animal health and limit possible disease outbreaks, work that included developing a test for detecting SARS-CoV-2 in non-human animals.

We needed solutions to ensure a stable supply of personal protective equipment, including N95 masks. U of G researchers met the moment by adapting OMAFRA-funded technology — designed to disinfect fruit, vegetables and packaging — to sanitize N95 masks.

And we needed solutions to ensure the continuation of essential research that is at the core of a competitive and innovative agri-food sector. In the face of the pandemic, research at Ontario’s agri-food research stations has continued, thanks to their dedicated staff who have supported animal and crop trials.

Our ability to meet unforeseen challenges like COVID-19 reflects the long-standing partnership between the Ontario Ministry of Agriculture, Food and Rural Affairs and the University of Guelph. The pandemic has demonstrated how OMAFRA’s long-term, stable investment in research, training and laboratory capacity contributes to a strong and resilient agri-food sector. It has also demonstrated how the University of Guelph’s commitment to Improve Life can mean meeting immediate and unexpected challenges with research and expertise.

COVID-19 has changed the world we live in. This report is a reminder of the important work that occurred before the pandemic and the important work that will continue to support the sector.

In this year’s edition of *Growing Ontario Solutions*, we tell some of the stories that illustrate how the Alliance helps ensure a safe and secure agri-food sector. Behind the numbers we track to make sure we deliver value to Ontarians are stories of people working for our benefit — people who conduct essential work, who bring creativity and intellect to the benefit of the province, and who persevere in the face of adversity. We would like to thank everyone who adapted and continued their essential work during this time.

I hope you enjoy this edition of *Growing Ontario Solutions* and take pride in the exceptional work we deliver by working together.



Continuing in the face of COVID-19

Many organizations were forced to pause, re-evaluate and plan for how they would safely continue operations after the Province of Ontario declared a state of emergency in March 2020.

The programs of the Ontario Agri-Food Innovation Alliance provide essential services to Ontario's agri-food sector. With additional

biosecurity precautions in place, researchers, research station staff and Laboratory Services Division staff continued their essential work.

Here is a glimpse of how we continued to deliver Ontario agri-food solutions in the first 100 days after the state of emergency was declared.



Dig Deeper

Read more about [how essential work continued](#) during the first 100 days of the COVID-19 emergency in Ontario.



276,467

tests completed by the Agriculture and Food Laboratory



15,636

cases submitted to the Animal Health Laboratory, resulting in 217,310 tests



130+

research projects continued to advance agri-food innovation and support post-pandemic recovery



23,500+

plots and 800+ hectares of crops planted across five sites of the Ontario Crops Research Centre

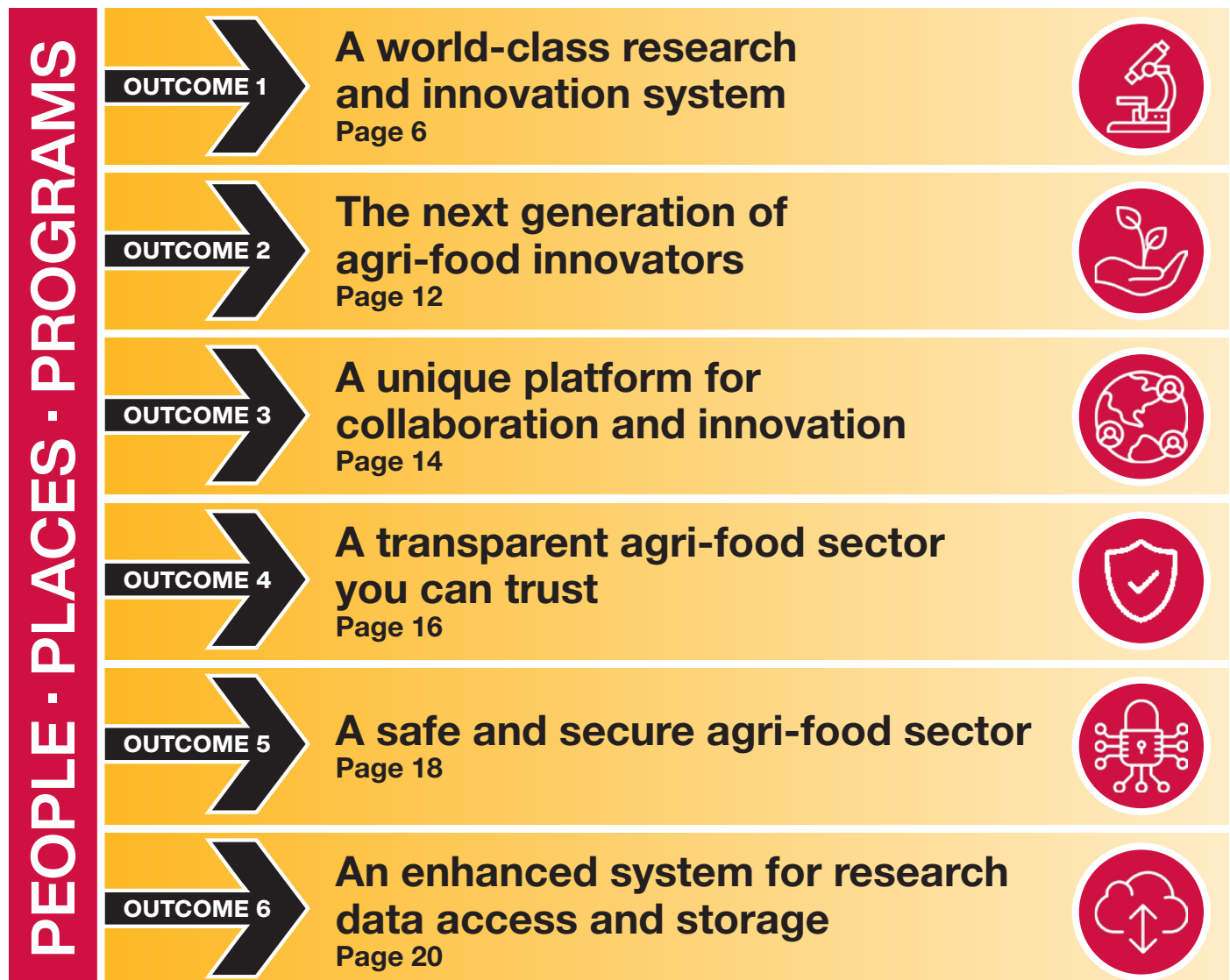


322

calves born at the beef and dairy research centres at the Elora Research Station

Ontario solutions. Global impact.

The Ontario Agri-Food Innovation Alliance is a collaboration between the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and the University of Guelph. We create impact by directing the efforts of our people, places and programs toward six key outcomes that support the agri-food and rural sectors—at home and around the world.



Leveraging U of G's research excellence for the benefit of Ontario

The University of Guelph is a global leader in agri-food and rural research. The Government of Ontario's investment through the Alliance leverages the University of Guelph's world-class expertise in agriculture, food and veterinary sciences to produce Ontario solutions with global impact.



Leader in veterinary science

#1 in Canada, #5 in the world¹



Leader in agricultural sciences

#1 in Canada, #17 in the world²



Leader in food science and technology

#1 in Canada, #13 in the world³



The agri-food sector contributes \$47.3 billion to the Ontario economy and directly employs more than 860,000 people.⁴

¹ 2020 ranking by [Quacquarelli Symonds](#) of veterinary science programs

² Ranking of [best universities for agricultural sciences](#) by *U.S. News & World Report*

³ 2020 Shanghai Rankings of [global food science & technology programs](#)

⁴ omafra.gov.on.ca/english/stats/economy, 2019 data

OUTCOME

1

A world-class research and innovation system

The Ontario Agri-Food Innovation Alliance brings people, places and programs together to create a world-class research and innovation system—the cornerstone of a successful and sustainable agri-food sector. The Alliance leverages expertise at the University of Guelph and in the wider agri-food sector to drive innovation and return value to Ontario.

THE NUMBERS

75.5
FTEs

Faculty full-time equivalents (FTEs) directly involved in Alliance-funded research projects

\$6.2M
invested

Third-party investment in Alliance-funded research projects awarded in 2019/20

78
new projects

Research projects awarded operating funding to drive innovation in the agri-food sector
SEE NEXT PAGE →



“The reason that we partner with the University [of Guelph] is because we recognize the importance of this research. Everything that we are doing on the farm, every protocol we have, every ration that we mix, every new barn that we build is all based on the best research that we have available.”

—Ben Loewith, Dairy Producer, Summitholm Holsteins

\$53.1M
external research funding

External research funding held by the University that supports OMAFRA research priorities

385
researchers

U of G researchers engaged in research supporting OMAFRA priorities



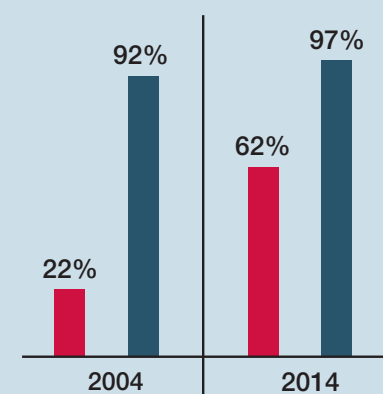
BEHIND THE NUMBERS

Alliance-funded research contributes to new on-farm pain management protocol to improve calf welfare

Dairy calves are an integral part of Ontario's \$2.2-billion dairy industry. Access to a world-class research and innovation system — including the Ontario Dairy Research Centre and six Alliance-funded projects over 18 years — resulted in better on-farm pain management practices during disbudding (the process of removing the horn bud in young calves for the safety of other cows and farm staff) and the licensing of a new pain management drug in Europe and Canada.

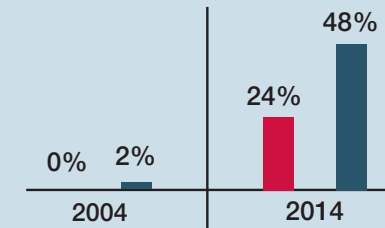
Long-term Alliance investment helped identify and promote the new pain management protocol. Here's how this research has made an impact on Ontario farms.

More producers and vets use a nerve block during disbudding



Percentage of **producers** and **vets** using a nerve block (e.g., Lidocaine)

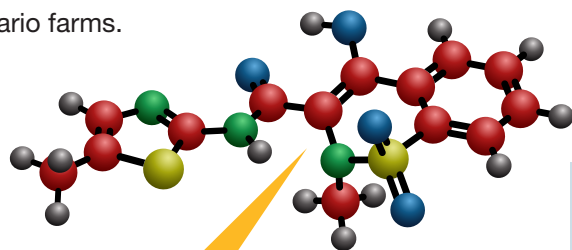
More producers and vets use an NSAID after disbudding



Percentage of **producers** and **vets** using NSAID pain control post-disbudding

New two-part pain management best practice

Required on all Canadian dairy farms via a national dairy standard called **proAction®**



NSAID meloxicam licensed in Canada and Europe for use in calves thanks to Alliance-funded research



New U of G online training module teaches students and producers how to use new pain management protocol

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

OUTCOME

1

A world-class research and innovation system

Ontario's agri-food research stations

Innovation fuels economic development, job creation and trade across the agri-food sector. A world-class network of research stations enables multidisciplinary agri-food research that powers innovation in Ontario.

Ontario's agri-food research stations are owned by the Agricultural Research Institute of Ontario, an agency of the Government of Ontario, and managed by the University of Guelph through the Alliance.



“We are proud to work with partners to modernize livestock research infrastructure in Elora to enhance the competitiveness, prosperity and sustainability of Ontario's agricultural and food sectors and rural communities.”

—**Lorne Hepworth**, chair of the Agricultural Research Institute of Ontario

THE NUMBERS

\$4.27M

revenue

Revenue from sale of animal products —including milk and eggs— and crops

253 ha

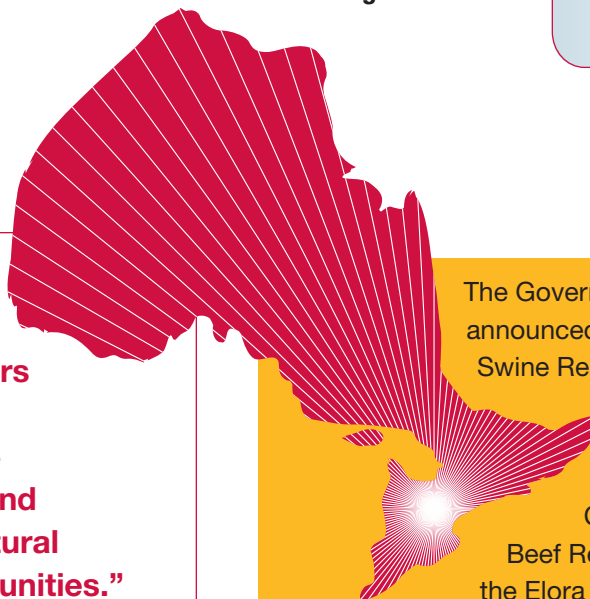
land

Hectares of land used in research to reduce disease, manage pests, support soil health and enhance plant breeding

2.14M

research days

Animal research days used to support research in animal welfare and enhance livestock production and sustainability
SEE NEXT PAGE →



The Government of Ontario announced that the Ontario Swine Research Centre will join the world-class Ontario Dairy Research Centre and Ontario Beef Research Centre at the Elora Research Station, making this cluster of facilities the epicentre of livestock research in Canada.



BEHIND THE NUMBERS

Canada's most sophisticated beef research centre opens in Elora, Ontario



The Ontario Beef Research Centre celebrated its official opening in August 2019. At the \$15.5-million facility, researchers will work to enhance livestock health, welfare and production to benefit the province's 6,800 beef farmers and others across Canada.

The opening marked the completion of the cow-calf portion of the research centre, which has space for more than 280 animals. The next phases of the project include pastures and a feedlot.

"The University of Guelph is committed to working with

government and industry partners to advance the competitiveness, resilience and sustainability of Ontario's beef sector through world-class research and innovation," said Malcolm Campbell, U of G's vice-president (research).

A version of this story appeared on U of G news. Read the [full article](#) on the U of G website.

"The Ontario Beef Research Centre will play a vital role in contributing to the long-term strength and success of Ontario's beef industry and the broader economy it supports. We are extremely appreciative of the collaboration and investments made by Ontario beef farmers, the provincial and federal governments, and the University of Guelph to support beef research in the province."

—**Rob Lipsett**, president,
Beef Farmers of Ontario



Dig Deeper

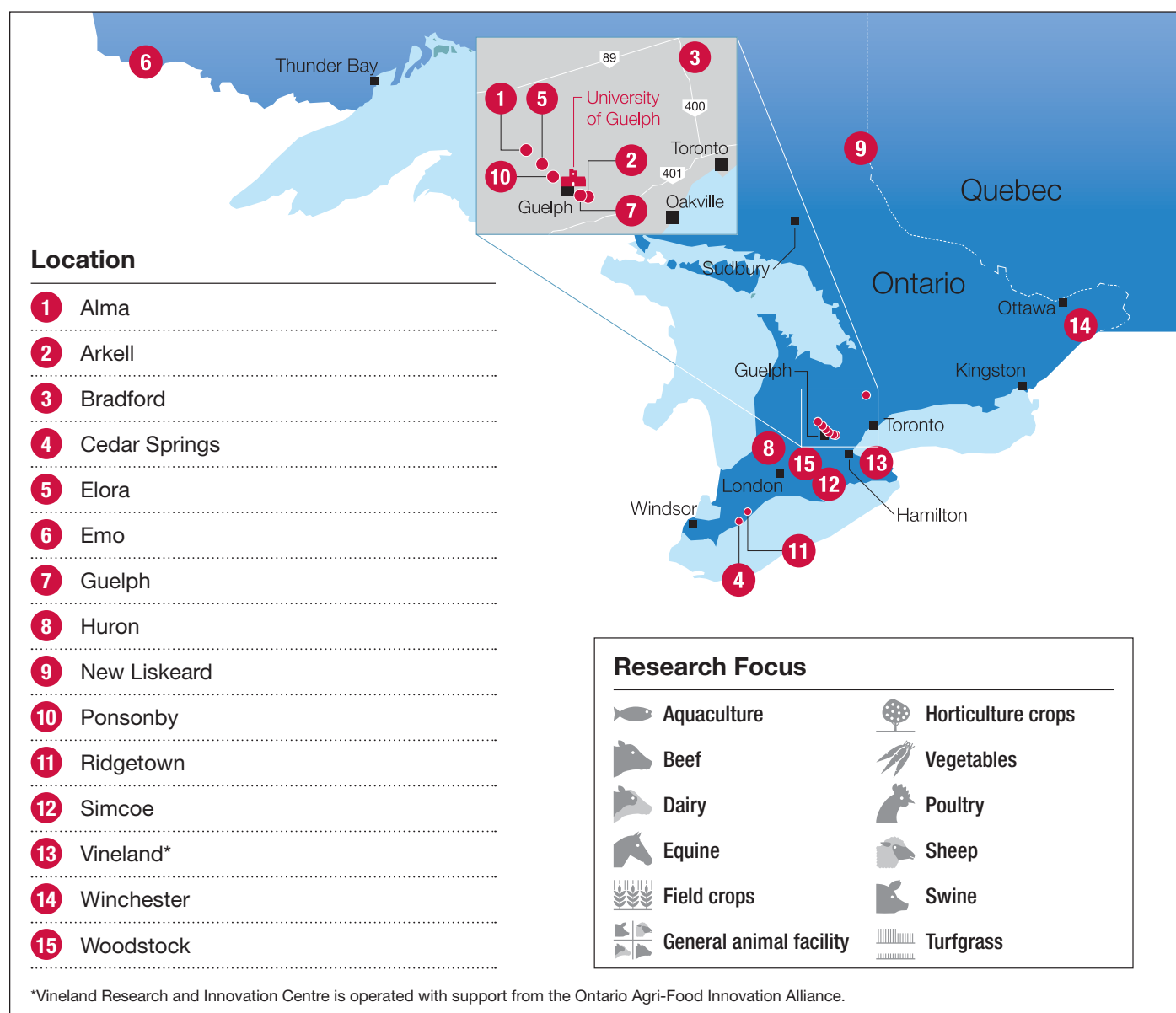
Take a look inside:

- [Introducing the Ontario Beef Research Centre \(video\)](#)
- [360-degree virtual tour](#)

A world-class research and innovation system

Research that is farm-tested

The Ontario Agri-Food Innovation Alliance supports research that helps farmers make evidence-informed on-farm decisions. Ontario's agri-food research centres are a key platform for honing the next generation of farm-tested innovations. Click the icons below to learn more about research happening across the province.



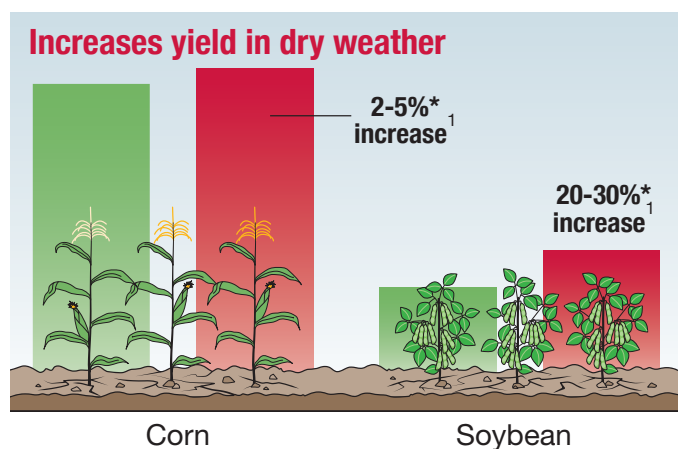
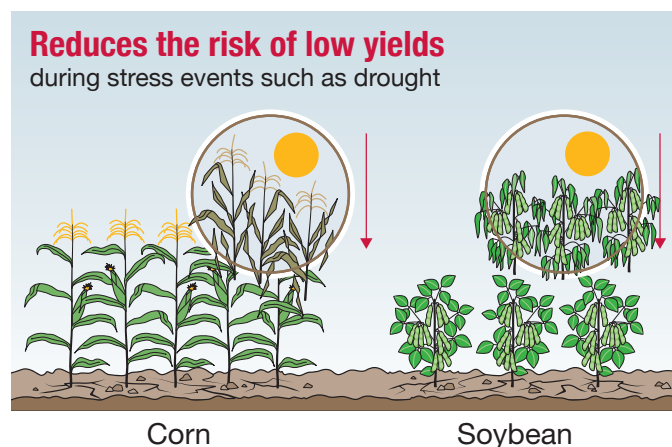
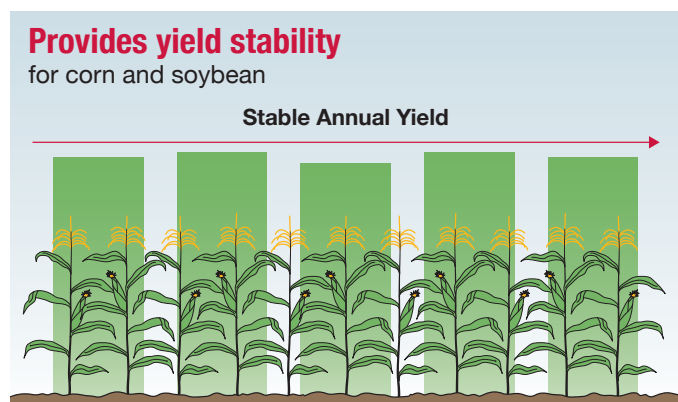


Celebrating 65 years of crop rotation research

It can take time to understand trends and see results. That is where long-term research at Ontario's agri-food research stations comes in. For decades, long-term trials at the Elora Research Station and Ridgetown Campus have generated evidence that farmers can use to make decisions about crop rotation, tillage systems and nitrogen management.

2020 marks the 40th and 25th anniversaries of the long-term rotation plots at the Elora Research Station and Ridgetown Campus, respectively. This research has generated results demonstrating that crop rotation counts.

Benefits of adding a small grain cereal or forage crop to your corn-soybean rotation



¹ Source: Gaudin A.C.M., Tolhurst T.N., Ker A.P., Janovicek K., Tortora C., Martin R.C., Deen W. (2015). Increasing crop diversity mitigates weather variations and improves yield stability. *PLoS ONE* 10(2):e0113261.

Crop rotation counts

Research shows that adding a small grain cereal (e.g., winter wheat) or a forage crop to your farm's corn-soybean rotation can make a big difference. Here is how:

- [Higher yield](#)
- [More resilient crops during dry years](#)
- [Improves soil nitrogen use efficiency](#)
- [Improves soil health](#)

The next generation of agri-food innovators

The Ontario Agri-Food Innovation Alliance helps build the future skilled workforce that will advance Ontario's agri-food and rural sectors. The Highly Qualified Personnel (HQP) scholarship program, Veterinary Capacity Program and Undergraduate Student Experiential Learning program are focused specifically on the development of skilled, forward-thinking agri-food leaders for Ontario.



The Veterinary Capacity Program supports several important programs that train veterinary students in animal agriculture, emergency preparedness, food security and animal-related public health.

THE NUMBERS

255

HQP engaged in research projects

155 graduate and post-doctoral researchers, 100 undergraduate students involved in research projects funded in 2019/20

15

D.V.Sc. students trained

VCP supports doctor of veterinary science students engaged in OMAFRA priorities

50

HQP scholars

The HQP scholarship program engages the next generation of agri-food researchers, policy-makers and innovators

SEE NEXT PAGE →

93%

pass rate

The OVC pass rate for the North American Veterinary Licensing Exam was four percentage points higher than the North American average. OVC graduates consistently outperform graduates of other veterinary schools on questions related to OMAFRA priority species.



BEHIND THE NUMBERS

HQP scholar uncovering big potential in tiny vegetables

Department of Food Science PhD candidate and HQP scholarship recipient Oday Alrifai is studying how microgreens—just-sprouted plants such as radish, mustard and mizuna—have the potential to be grown in limited space using inexpensive LED lights.

Early results indicate that with more amber light from the LED lights, the antioxidant phytochemical content in the microgreens also grows.

Alrifai hopes to inspire the next generation to grow their own vegetables, even if space and resources are limited, ultimately contributing to the global effort of improving nutrition and reducing resource use.

VCP program builds rural and agricultural veterinary capacity in Ontario

The Alliance provides funding to the University of Guelph's Ontario Veterinary College through the Veterinary Capacity Program (VCP). The VCP ensures an ongoing supply of rural and agricultural veterinarians who can support farming communities and monitor the health of animals in the food chain, as well as veterinarians with the skills and expertise to serve on the front line of disease surveillance.



Dig Deeper

Read about Salomon Schroeter's experience with mixed animal veterinary practice, experience enabled by the VCP program, in his August 2019 [blog post](#).

OUTCOME

3

A unique platform for collaboration and innovation

The Ontario Agri-Food Innovation Alliance brings together academia, government and industry to advance the health, sustainability and productivity of Ontario's agri-food and rural sectors. We work together to deliver Ontario solutions with global impact.

THE NUMBERS

150

research
co-funders

Alliance research projects attract funding from academic, government and industry partners

\$1.56M

commercialization
revenue

Revenue generated from licences associated with Alliance-funded research*

322

research
collaborators

The Alliance fosters collaboration, investment and engagement for the benefit of Ontario
SEE NEXT PAGE →



More than 100 research co-funders were from business, industry or non-governmental organizations —demonstrating that Alliance research projects are addressing industry-relevant priorities and supporting the sector.

*Research includes OAC Strive (a soybean variety sold by Secan) and High Immune Response Technology (commercialized by Semex).

20

patents filed

The Research Innovation Office supports commercialization of Alliance-funded research

1,083

KTT activities

Activities in research projects supporting collaboration, technology transfer and implementation



BEHIND THE NUMBERS

Long-term U of G–industry collaboration powers Ontario craft brewing innovations

A collaboration between U of G Prof. George van der Merwe, Department of Molecular and Cellular Biology, and Escarpment Laboratories, supplier of liquid yeast cultures for Ontario's \$1.4-billion craft beer industry, has led to new products, processes and technologies that will benefit the Ontario agri-food sector.

Several Escarpment Laboratories innovations have been made possible through Gryphon's LAAIR (Leading to the Accelerated Adoption of Innovative Research) program funding and a strong partnership with van der Merwe.

This partnership results in local economic growth, new jobs and opportunities for U of G graduates, and a better understanding of yeast, "helping the brewers that we work with to make better beer, reduce their losses and create a lot of value for the industry in Ontario and the rest of Canada," says Richard Preiss, co-founder of Escarpment Laboratories.

Creating unique products

To stay competitive internationally, the craft beer sector must develop and offer unique, hard-to-duplicate products. This partnership will increase the profitability of several components in the craft brewing value chain.

Creating a competitive advantage for Ontario craft beer through the use of novel regional yeast strains

Expanding sour beer production in Ontario

Breeding stress-tolerant beer yeast strains for enhanced fermentation capacity and product consistency



OUTCOME

4

A transparent agri-food sector you can trust

The Ontario Agri-Food Innovation Alliance invests in laboratory testing and emergency planning to make Ontario's food system one of the safest in the world. U of G's Laboratory Services Division, made up of the Agriculture and Food Laboratory (AFL) and Animal Health Laboratory (AHL), provides comprehensive, reliable, accredited testing services to help build transparency and public confidence in the agri-food sector.



Laboratory Services Division works with partners across the food, veterinary and agriculture sectors to help ensure that our food is safe and that our plants, animals, people and environment are healthy.

THE NUMBERS

72,111

cases
completed

AHL performed 798,358 procedures to complete 72,111 submitted cases

99.9%

accuracy

AFL accurately reported 54,309 of 54,366 tests in 2019/20, a 99.9% accuracy rate

93

accredited
tests

Laboratory Services Division received accreditation for 93 tests by the Standards Council of Canada (SCC)
SEE NEXT PAGE →

100%

compliance

AFL alerts OMAFRA to any test results that require immediate notification, including presence of *E. coli* 0157:H7.

In 2019/20, 366 alerts were generated, reporting 1,013 alertable, adverse or presumptive positive tests for 682 samples. This allows OMAFRA to rapidly respond to food safety concerns.



BEHIND THE NUMBERS

Accredited tests for food quality and safety

The Laboratory Services Division is accredited by the Standards Council of Canada (SCC) and the Canadian Association of Laboratory Accreditation to the International Organization of Standardization standard 17025 (ISO/IEC 17025:2017).

Accreditation means that a third party audits laboratory tests and methods for consistent, quality-controlled application. The audited lab must also accurately test samples that contain contaminants unknown to the lab. These samples are provided by the accreditor, and successful identification of the contaminant is another indicator that the lab is producing high-quality, accurate results — the foundation of a safe and transparent food supply.

Among the 93 tests that received accreditation by the SCC are milk composition testing and antibiotic and bacteria testing for fluid milk. The Agriculture and Food Laboratory uses these accredited tests to process about 800,000 samples of fluid milk every year, from every bulk tank on every dairy farm in Ontario. The sampling and testing of fluid milk continued even



after Ontario declared a state of emergency in March 2020.

The AFL also tests tens of thousands of other food and environment samples. Front-line workers in the Laboratory Services Division helped keep food staples — including milk, eggs and

meat — on grocery store shelves. With the AFL open for business, meat inspectors were able to send samples for analysis, egg producers were able to monitor *Salmonella* levels in their barns, and processors could wash vegetables confident in the quality of their water.



Dig Deeper

- What is the ISO/IEC 17025 standard? Learn more about this standard for testing and calibration laboratories on the [ISO website](#).
- The Standards Council of Canada is a Crown corporation that reports to Parliament through Innovation, Science and Economic Development Canada. Learn more on the [SCC website](#).

A safe and secure agri-food system

The Ontario Agri-Food Innovation Alliance supports the Animal Health Laboratory (AHL) and the Agriculture and Food Laboratory (AFL) to keep Ontario's animals, people and environment healthy. With new lab tests continually developed and refined, the Laboratory Services Division stands on guard, ready to respond to emergencies and keep Ontario open for business.



Continuing in the face of COVID-19

Scientists and lab technicians at the AHL and the AFL have remained at the lab bench since the Province of Ontario declared a state of emergency in March 2020 because of the COVID-19 pandemic.

“As an essential service, from the beginning, we never stopped testing, not even for a day, and we continue to support agriculture in the province.”

—Maria Spinato, director of the AHL

THE NUMBERS

\$8.7M

AFL revenue

AFL revenue, demonstrating AFL is the lab of choice for growers, researchers, food processors and more

\$7.76M

AHL revenue

AHL revenue, a more than 10% increase over 2018/19

34

new tests

Laboratory tests developed or improved by AHL scientists
SEE NEXT PAGE →

53,025

web page views

The [website](#) for the Ontario Animal Health Network—a program administered by AHL—has resources for producers, veterinarians and government officials to support animal disease surveillance across Ontario



BEHIND THE NUMBERS

AHL develops SARS-CoV-2 test for animals

When it became apparent that SARS-CoV-2, the virus that causes COVID-19, was coming to Canada, the Laboratory Services Division at the University of Guelph followed its emergency preparedness plan to ensure services could continue during any staff illness or supply chain disruption.

But unlike other service providers, the fully accredited Animal Health Lab (AHL) specializes in infectious disease diagnostics and surveillance for livestock, poultry, horses and pets — so its staff were also preparing for the possibility they would be testing animals for the virus.

“We were unsure at the beginning, because the first SARS coronavirus [in 2003] could also infect pigs, as does influenza,” says Maria Spinato, director of the AHL. “AHL developed a test for SARS-CoV-2 in animals in case it affected pigs and placed the swine industry at risk.”



To develop a test for SARS-CoV-2 that could be used for animals, the AHL turned to its resident virologist, Dr. Davor Ojkic, who assessed several existing options for the most appropriate method.

So far, the laboratory has not been called on to run many tests for the SARS-CoV-2 virus in animals, but it certainly is not letting its guard down. Spinato says she is currently monitoring the emergence of a new

strain of influenza (G4 EA H1N1) in China that infects both swine and people, and has been watching as African swine fever (ASF) spreads throughout China, Russia and Eastern Europe. Preparation for a possible incursion of ASF virus, for which there is a high mortality rate and no vaccine, has been under way for more than two years.

“Animal diseases move in unpredictable manners — through feed, by human and animal movements,” says Spinato. If the disease were confirmed in Canada, the AHL could be asked to support the Canadian Food Inspection Agency and OMAFRA as they set up quarantine areas and attempt to eradicate ASF. This would entail providing hundreds or perhaps thousands of tests per day.

Overall, the AHL has remained busy during the pandemic. Over the first 100 days, the AHL ran more than 15,600 cases comprising 217,636 individual tests/procedures, including virology, bacteriology, toxicology, molecular, parasitology and clinical pathology tests that support its role in disease surveillance, analytics and diagnostics.



Dig Deeper

Read the [complete Alliance news story](#) for more information on how the AHL is working to safeguard animal health and the agri-food sector during the COVID-19 pandemic.

OUTCOME

6

An enhanced system for research data access and storage

The Ontario Agri-Food Innovation Alliance is committed to leading data management practices to facilitate new agri-food and rural research. Our researchers and research centres produce an unprecedented amount of data to realize the promise of data-driven agriculture.

THE NUMBERS

24

data workshops

315 researchers and graduate students received training on data management and planning

645

data attributes

Data attributes, including milk production, feed consumption and body condition score, are available for each animal, for a total of 369M data points

39

sensors and data sources

Sensors send unique, animal-specific data points from the beef and dairy research centres to U of G servers
SEE NEXT PAGE →



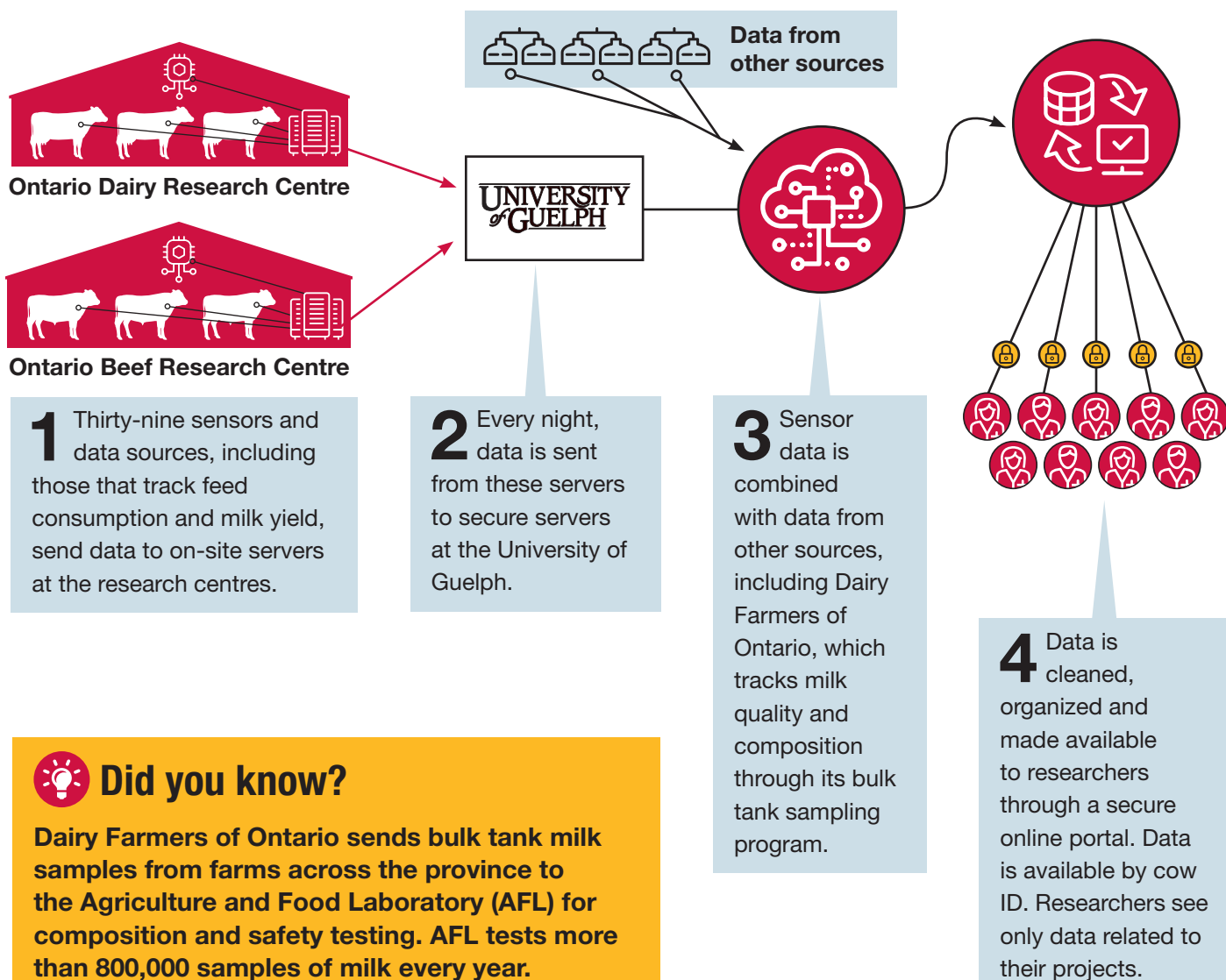
The Ontario Agri-Food Innovation Alliance was one of the first funders to require that a data management plan (DMP) be included with all funded projects. DMPs articulate how data generated during a research project will be stored, shared and maintained.





BEHIND THE NUMBERS

The Research Station Data Access Portal makes it easier for researchers to access data generated at the Ontario Dairy Research Centre and Ontario Beef Research Centre. This project not only facilitates researcher access to relevant data but also ensures data is consolidated, archived and made available for future research. Here is how it works:



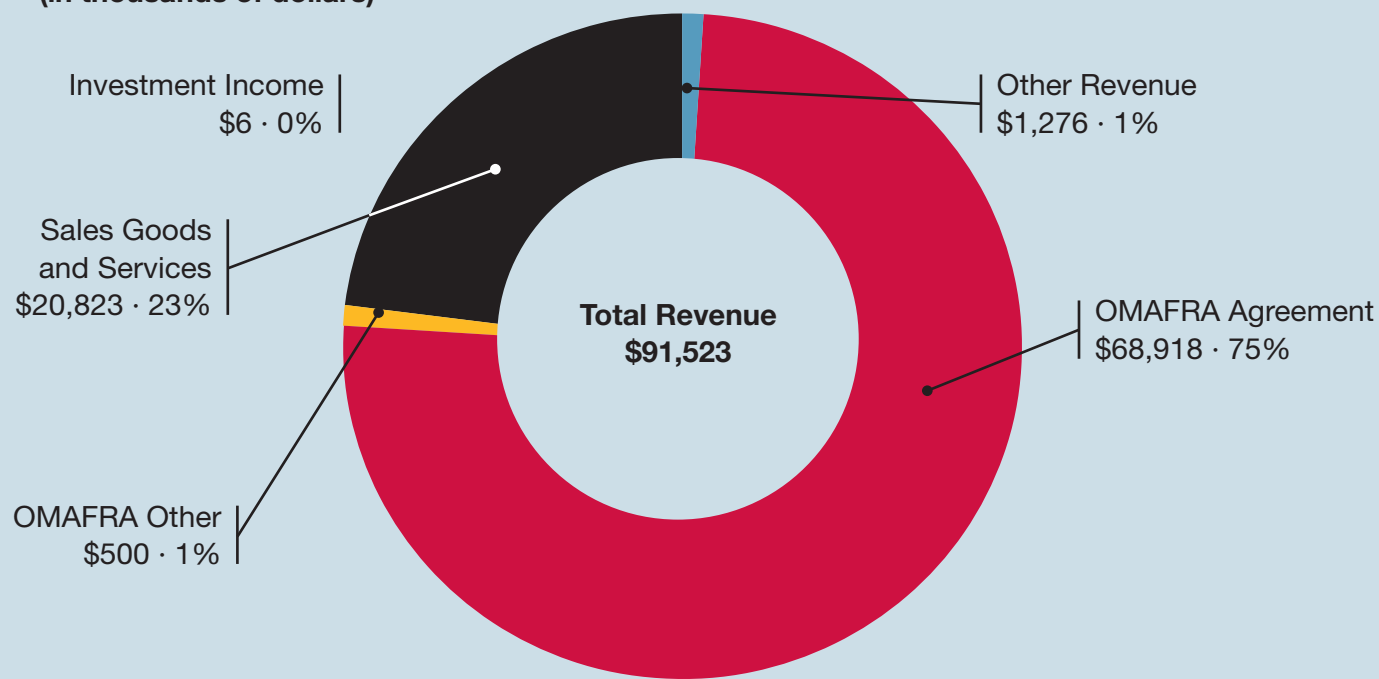
Did you know?

Dairy Farmers of Ontario sends bulk tank milk samples from farms across the province to the Agriculture and Food Laboratory (AFL) for composition and safety testing. AFL tests more than 800,000 samples of milk every year.

2019/20 Financial Overview

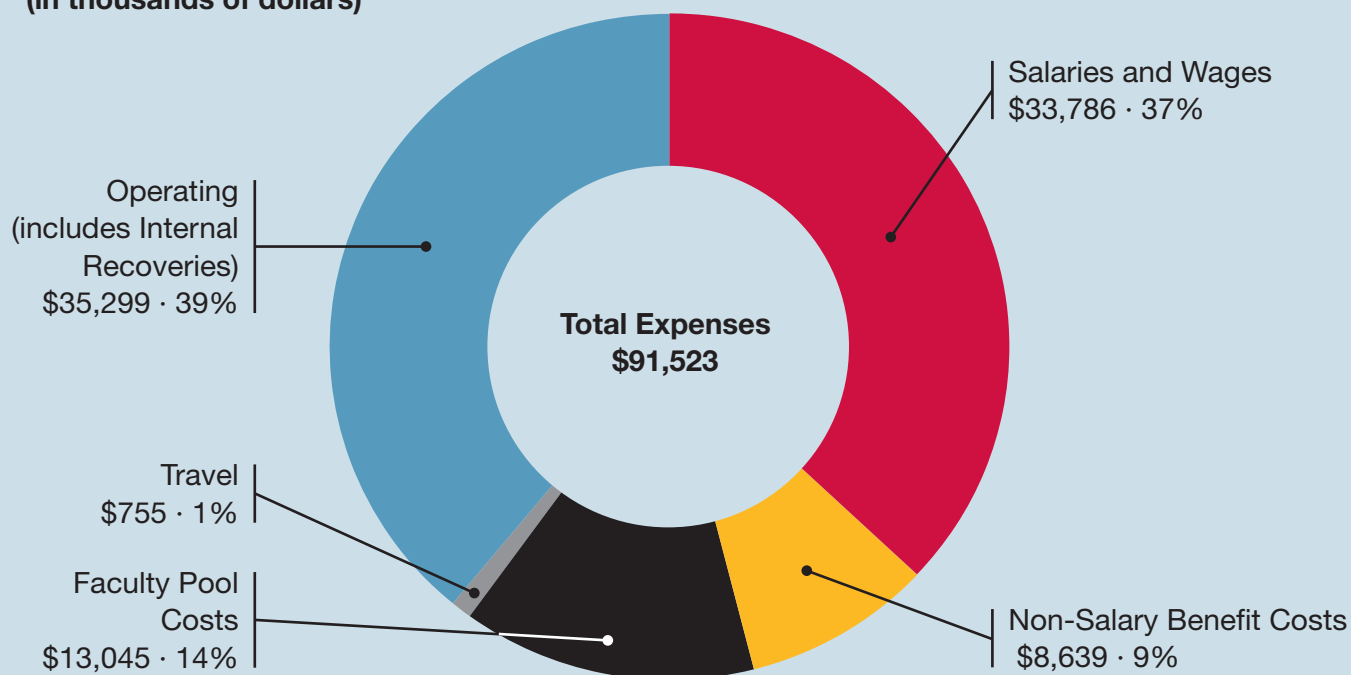
Agreement Revenue for 2019/20 by Standard Accounts

(in thousands of dollars)



Agreement Expenses for 2019/20 by Standard Accounts

(in thousands of dollars)



Agreement Financial Summary for 2019/20 by Program

(in thousands of dollars)

	Research Program	VCP	AHL	AFL	Property Management	Exigency Fund (Recognized)	Total
Revenue							
OMAFRA Agreement	37,043	5,292	6,771	6,413	13,399	0	68,918
OMAFRA Other	0	0	0	500	0	0	500
Sales Goods and Services	99	0	7,762	8,715	4,248	0	20,823
Investment Income	0	0	0	0	0	6	6
Other Revenue	49	0	3	7	1,218	0	1,276
Total Revenue	37,191	5,292	14,536	15,635	18,864	6	91,523
Expenses							
Salaries and Wages	9,516	162	8,098	8,418	7,586	6	33,786
Non-Salary Benefit Costs	1,824	27	2,209	2,471	2,108	0	8,639
Faculty Pool Costs	11,145	1,900	0	0	0	0	13,045
Travel	396	203	75	48	33	0	755
Operating	15,379	3,000	6,354	5,289	10,594	0	40,616
Internal Recoveries	(1,069)	0	(2,200)	(592)	(1,456)	0	(5,317)
Total Expenses	37,191	5,292	14,536	15,635	18,864	6	91,523
Net Revenue Over Expenses	0	0	0	0	0	0	0



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IMPROVE LIFE.

