



GROWING ONTARIO SOLUTIONS

FROM RESILIENCE TO RECOVERY

How the Alliance is growing the agri-food sector
for a healthier future and a sustainable economy



Supporting recovery and future growth with innovation



Dr. Beverley Hale
Associate Vice-President,
Research
(Agri-Food Partnership)
University of Guelph

This year's edition of Growing Ontario Solutions highlights stories of how long-term investment yields innovations, how collaboration can fluidly adapt to support recovery, how we continue to train future agri-food and veterinary leaders, and how we are preparing for the next challenges that face the sector.

The Ontario Agri-Food Innovation Alliance continues to deliver Ontario solutions with global impact as the province, country and world continue to recover.

The University of Guelph has sustained substantial research activities during the state of emergency, multiple lockdowns and stay-at-home orders. This was imperative, as the province identified research and agriculture and food activities as essential to Ontario's immediate future.

Since the beginning of the pandemic, hundreds of U of G research projects have been identified as critical or time-sensitive, enabling more than 400 faculty members to pursue research and engaging more than 1,700 highly qualified personnel, including undergraduate, graduate, and post-doctoral researchers and research staff.

Some 350 Office of Research staff have continued to work in place during the pandemic, running the research facilities, ensuring livestock and other animals are well-cared for, and sustaining provincial testing that contributes to Ontario's robust, safe, healthy and nutritious food supply.

This exceptional level of research-related activities sets U of G apart from other Ontario universities and underscores its unique, research-intensive, impactful, real-world-relevant nature.

I believe this resilience of the people, places and programs of the Alliance in the face of the pandemic pressures is a direct outcome of the long-standing partnership between the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and the University of Guelph. By working together, U of G and OMAFRA enable the research, innovation, laboratory science, training and infrastructure necessary to keep Ontario's agri-food sectors and rural communities competitive and sustainable.

As we collectively recover from COVID-19, we use our strength from this experience to continue pursuing solutions to emerging challenges such as climate change, sustainability and future diseases. The University of Guelph is a natural leader in addressing these challenges, and with OMAFRA's continued investment, the Alliance is fuelled by a shared commitment to support the growth and prosperity of Ontario's resilient agri-food sector and the vitality of our rural communities.

COVER PHOTOS: WHEAT HARVEST AT THE
ARKELL RESEARCH STATION; ISTOCK

The metrics presented in this report are from the 2020/21 fiscal year.

Research drives recovery in Ontario's agri-food and rural sector

Agri-food is one of Ontario's largest industries, worth \$46.3 billion to the province's economy and directly employing more than 723,000 people.¹ The COVID-19 pandemic caused supply-chain challenges that the agri-food sector not only needs to recover from but also needs to address to prevent future risk.

The Ontario Agri-Food Innovation Alliance invests in research, training and laboratory capacity to help the agri-food sector meet current and emerging challenges. We are committed to helping ensure food safety, supporting a competitive and sustainable agri-food sector, and working together to build healthier rural communities and a healthier environment. Our investments contribute to an adaptable agri-food sector while supporting long-term economic recovery and growth.

¹ omafra.gov.on.ca/english/stats/economy, 2020 data



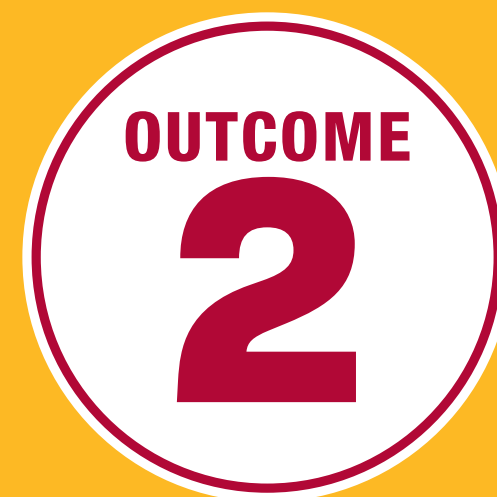
Ontario solutions. Global impact.

The Ontario Agri-Food Innovation Alliance brings together people, places and programs to create cutting-edge solutions that allow the agri-food sector to remain competitive and power the future of agriculture—a crucial cornerstone for economic recovery at this challenging time. The Alliance directs 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.



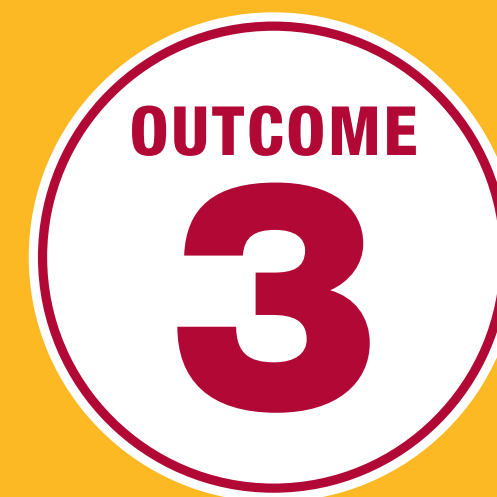
A world-class research and innovation system

[Page 6](#)



The next generation of agri-food innovators

[Page 11](#)



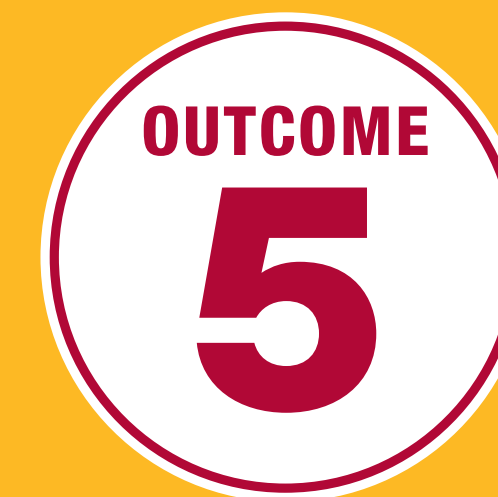
A unique platform for collaboration and innovation

[Page 13](#)



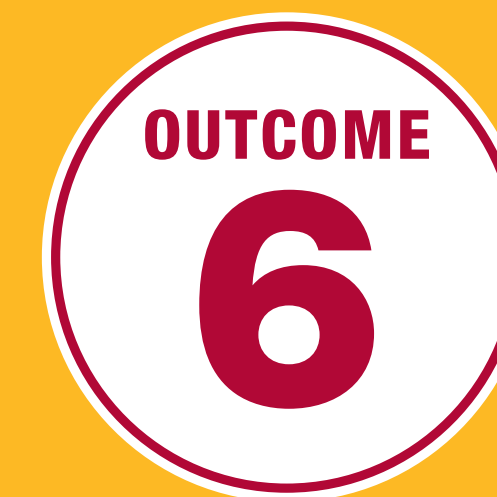
A transparent agri-food sector you can trust

[Page 15](#)



A safe and secure agri-food sector

[Page 17](#)



An enhanced system for research data access and storage

[Page 19](#)

2020/21 Financial Overview

[Page 21](#)

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 deliver new knowledge and technologies that support industry competitiveness and provide positive social benefits, maximizing the return on public investment.

 **#1**
 **#5**

**Leader in
veterinary
science**

#1 in Canada
#5 in the world¹

¹ 2021 ranking of veterinary science programs by Quacquarelli Symonds of veterinary science programs

 **#1**
 **#21**

**Leader in
agricultural
sciences**

#1 in Canada
#21 in the world²

² Ranking of best universities for agricultural sciences by *U.S. News & World Report*

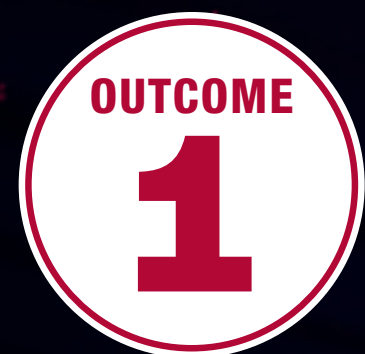
 **#1**
 **#18**

**Leader in
food science
and
technology**

#1 in Canada
#18 in the world³

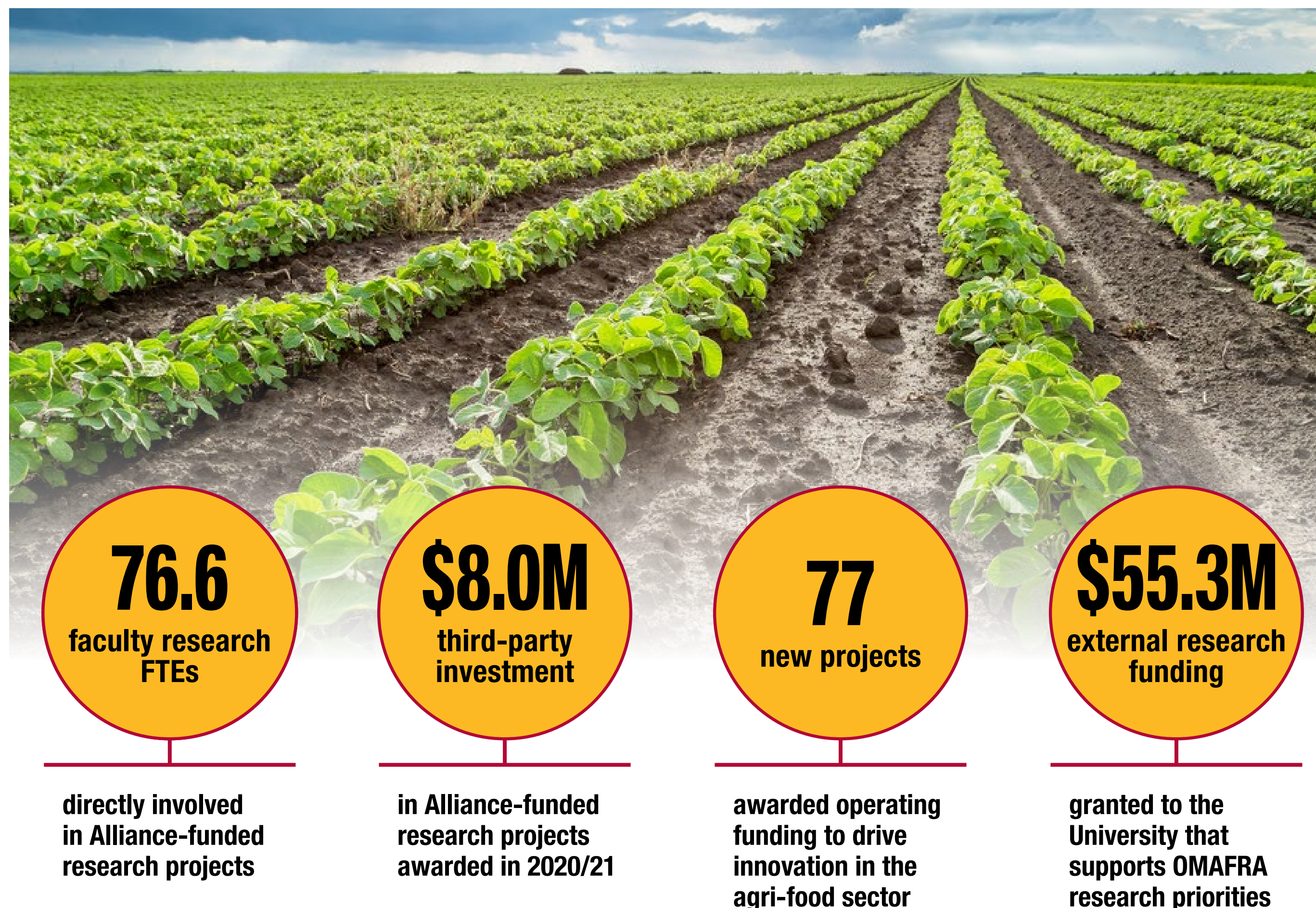
³ 2021 Shanghai Rankings of global food science and technology programs





A world-class research and innovation system

The Alliance research program funds projects along the innovation continuum, from discovery and market-driven research to mobilizing research results in both the public domain and the marketplace. Together with research partners, the program delivers Ontario solutions with global impact.



“In our research, we see waste as a valuable resource for creating new industrial products. Alliance projects have enabled us to partner with industry to support innovations that matter to consumers and society.”

—Dr. Amar Mohanty, professor and OAC Distinguished Research Chair in Sustainable Biomaterials, Department of Plant Agriculture; director, Bioproducts Discovery and Development Centre

New asparagus varieties help save Ontario sector

\$1.7M

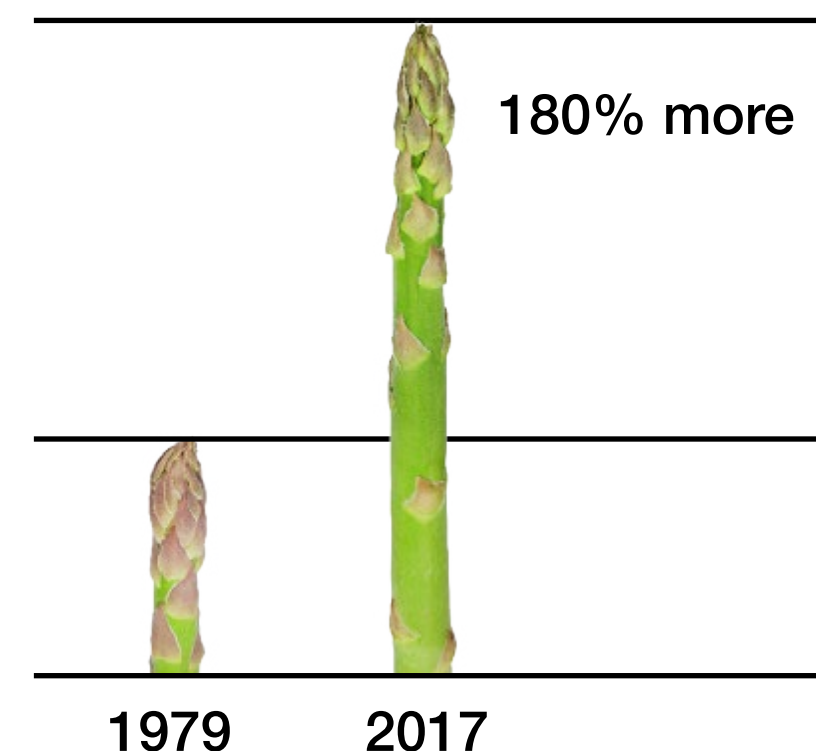
commercialization
revenue

generated from
licences associated
with Alliance-
funded research
supporting OMAFRA
priorities

In 2000, the release of the new asparagus variety Guelph Millennium helped bolster a struggling asparagus industry in Ontario and the United States. Hardier than other available varieties and able to survive Ontario winters, Guelph Millennium soon took hold in Ontario, Michigan and Washington state. Two additional Guelph asparagus varieties were released between 2000 and 2019. All three varieties have been credited with saving the region's asparagus industry.

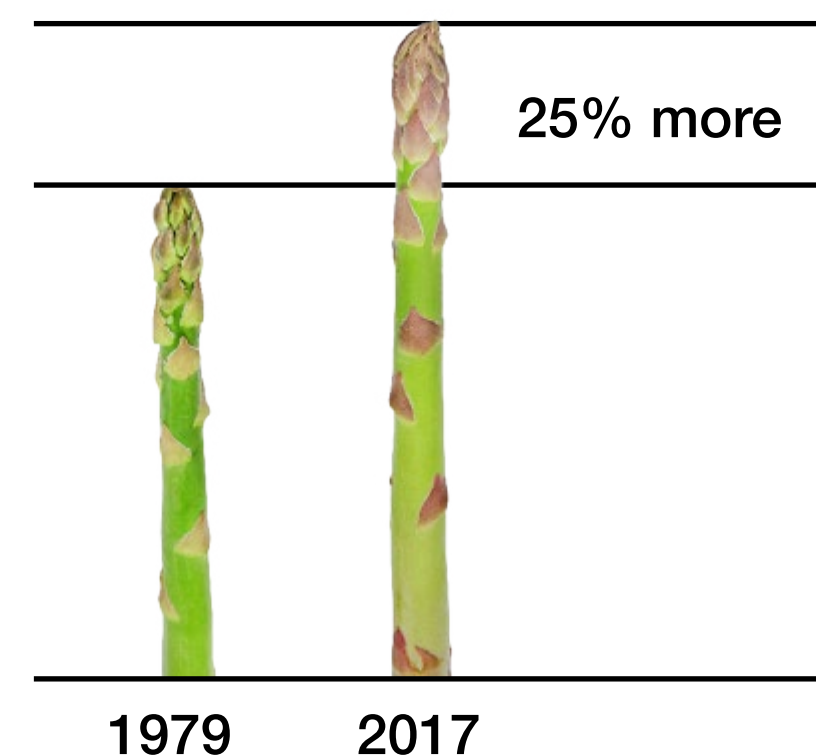
Long-term, stable investment from OMAFRA—combined with industry collaboration and University of Guelph research expertise—brought these three new asparagus varieties to market, allowing the \$25-million Ontario asparagus sector to bring homegrown goodness to consumers in Ontario and around the world.

Improved yield



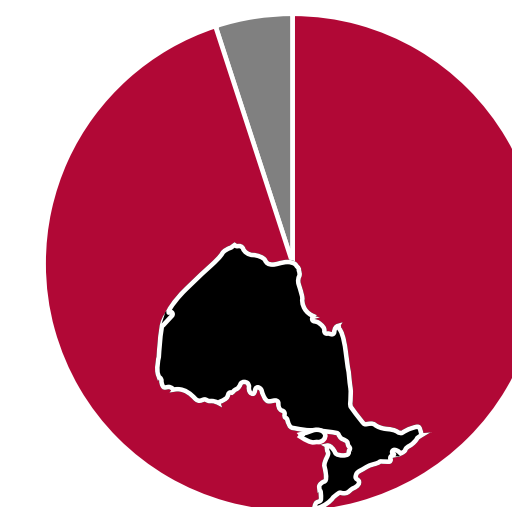
Asparagus yields increased by 514 kg/ha between 1979 and 2017.

Increased production

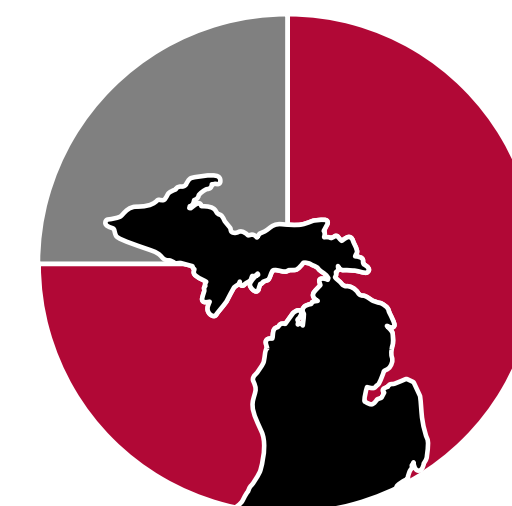


1,383 hectares of asparagus harvested in Ontario

Guelph varieties dominate the marketplace



95% of current acreage in Ontario



75% of existing asparagus acreage in Michigan

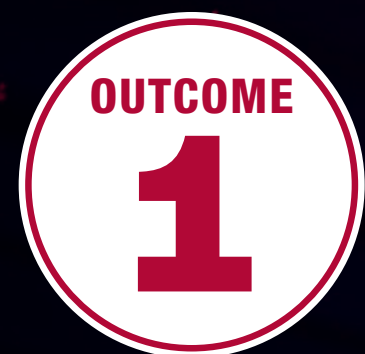
↑\$1.2M

Growth in asparagus exports between 2013 and 2017 thanks to improved yield and acreage



“Guelph Millennium has truly been the saviour of the North American asparagus industry, without question.”

—Ken Wall, co-owner, Sandy Shore Farms, and chair, Fox Seeds



Supporting farmer mental health during COVID-19



five of which included non-exclusive licences to the mental health literacy training program In the Know

Rural communities across Ontario share a dynamic balance of opportunities and challenges. Shifting demographics, complex infrastructure, land use and the impact of climate change are some of the challenges creating an ever-increasing need for innovative tools to build stronger, more resilient rural communities. Further, during the COVID-19 pandemic, people living in rural Ontario have experienced significant declines in mental health, employment satisfaction and personal safety, according to Dr. Leith Deacon's research.

Alliance funding enables Dr. Deacon, as well as other Alliance researchers including Dr. Andria Jones-Bitton, to continue their primary research on farmer mental health, build collaborations, mobilize knowledge and inform decision-making. Their work equips Ontario's rural agricultural communities with evidence to develop innovative, prosperous and healthy solutions that support the agri-food sector.



With Alliance funding, Dr. Deacon will expand his research to at least six additional rural counties in Ontario in order to provide data to policy makers on how rural populations are underrepresented in COVID-19 emergency management policies.

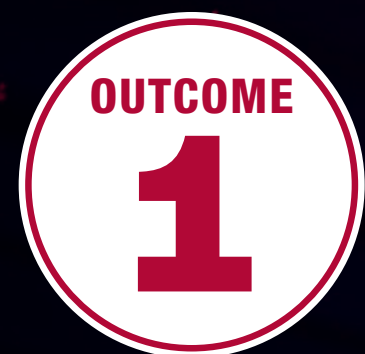


In the Know

This farmer mental health literacy training program was developed by Dr. Andria Jones-Bitton as part of an Alliance research project. Delivered in Ontario by the Canadian Mental Health Association and the Ontario Federation of Agriculture, and is licensed in five provinces.

Farmer mental health mandate

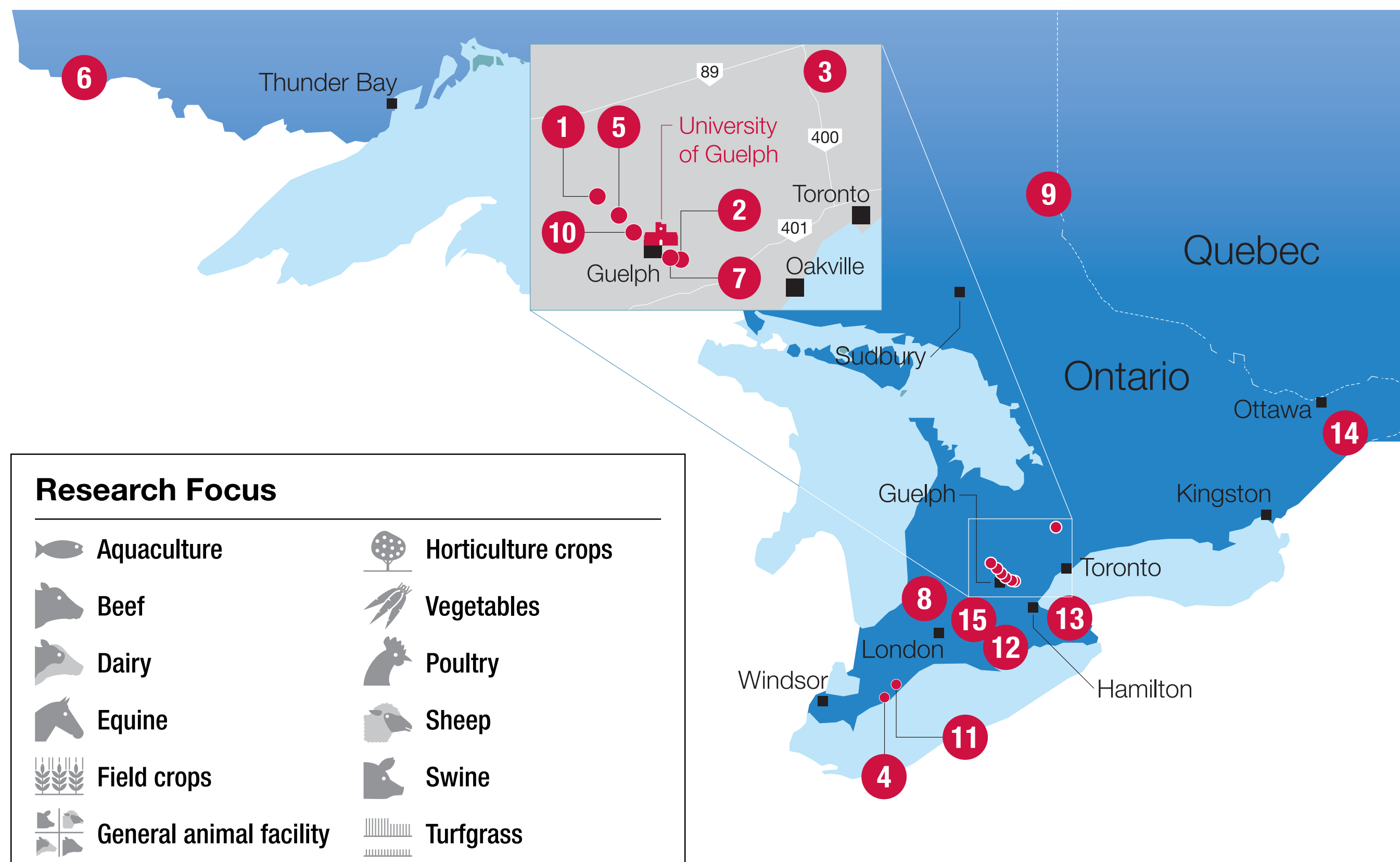
The success of In the Know led the Ontario Federation of Agriculture to integrate farmer mental health throughout its mandate.



Research that is farm-tested

The Ontario Agri-Food Innovation Alliance supports research that helps producers make evidence-informed on-farm decisions. Ontario's agri-food research centres are a key platform for honing farm-tested innovations and solutions that will keep the sector and rural communities competitive and sustainable.

Click the icons to the right to learn more about research happening across the province.



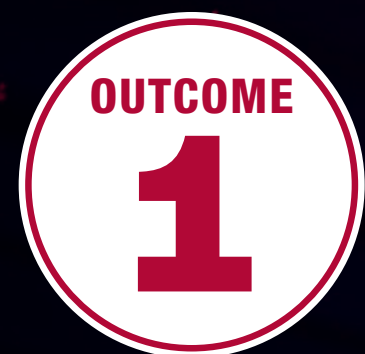
Research Focus

- | | |
|-------------------------|--------------------|
| Aquaculture | Horticulture crops |
| Beef | Vegetables |
| Dairy | Poultry |
| Equine | Sheep |
| Field crops | Swine |
| General animal facility | Turfgrass |

Location

- 1** Alma
- 2** Arkell
- 3** Bradford
- 4** Cedar Springs
- 5** Elora
- 6** Emo
- 7** Guelph
- 8** Huron
- 9** New Liskeard
- 10** Ponsonby
- 11** Ridgetown
- 12** Simcoe
- 13** Vineland*
- 14** Winchester
- 15** Woodstock

*Vineland Research and Innovation Centre is operated with support from the Ontario Agri-Food Innovation Alliance.



Ontario's agri-food research centres

Agri-food innovation paves the way to long-term economic recovery by creating jobs and supporting trade. A world-class network of research centres enables the farm-tested, multidisciplinary agri-food research that powers this innovation in Ontario.

Ontario's agri-food research centres 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.



\$4.7M
revenue

from the sale of animal products, including milk, eggs and crops

1.9M
animal research days

used to support research in animal welfare and enhance livestock production and sustainability

240.6
hectares of land

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

Look inside



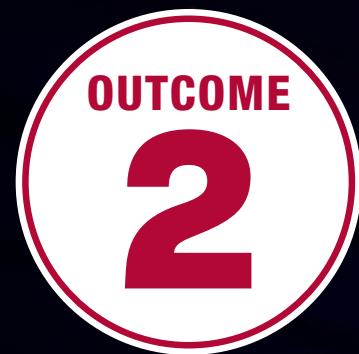
- [Ontario Beef Research Centre \(video\)](#)



- [Ontario Dairy Research Centre 360-degree virtual tour](#)

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

— Guy Séguin, systems engineer, Dairy Farmers of Ontario



The next generation of agri-food innovators

The Ontario Agri-Food Innovation Alliance supports the development of future researchers, policy makers and innovators in government, academia, the agri-food sector and rural communities, strengthening both society and the economy. The Highly Qualified Personnel (HQP) scholarship program, Veterinary Capacity Program (VCP) and Undergraduate Student Experiential Learning program are focused specifically on the development of skilled, forward-thinking agri-food leaders for Ontario.



340

HQP engaged
in research
projects

comprising 191 graduate and
post-doctoral researchers
and 149 undergraduate
students

50

HQP scholars

leading the next generation
of agri-food researchers,
policy makers and innovators

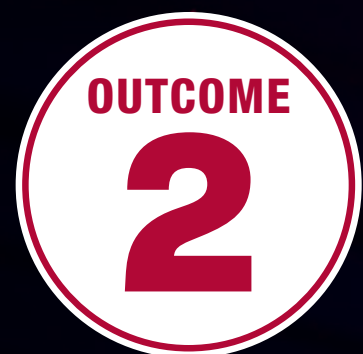
15

D.V.Sc. students
trained

in areas of research related
to OMAFRA priorities as
supported by VCP

“The HQP program has allowed me to expand the scope of my research into a PhD project, and the connections developed through the HQP program have been invaluable.”

—Nicholas Werry, Highly
Qualified Personnel
scholarship student



On-farm training for Ontario's future veterinarians



96%
pass rate

for the North American Veterinary Licensing Exam, which was six percentage points higher than the North American average, as OVC graduates consistently outperform graduates of other veterinary schools on questions related to OMAFRA priority species

Through the Veterinary Capacity Program (VCP), the Alliance has invested in developing a consistent pool of highly skilled veterinarians to serve Ontario's agri-food sector and rural communities.

The Ruminant Field Services (RFS) clinic enables students to combine academic research and on-farm skills through working with faculty, clinical veterinarians, and D.V.Sc. students on dairy and beef cattle, sheep and goats.

RFS places small groups of fourth-year DVM students with veterinarians who act as the primary veterinary service for local commercial farms and University-managed research centres and who respond to calls for herd health management and emergencies. The RFS clinic also encourages first-, second- and third-year students to participate in farm visits to enable them to learn about veterinary medicine in the agriculture and food sector at an early stage in their studies.



27 farms

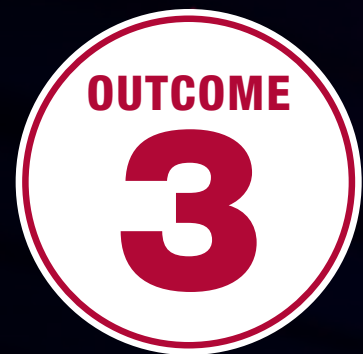
RFS veterinarians provide service to local farms and four U of G research centres.

30 4th year students

The RFS clinic enhances real-world skills for DVM students.

“We have been clients of the RFS for over 50 years. The students and staff of the RFS are outstanding. They all show genuine concern and compassion for our animals while still treating our farm as a business. In a way, they are like extended family.”

—Tim May, operator,
Mayhaven Farms



A unique platform for collaboration and innovation

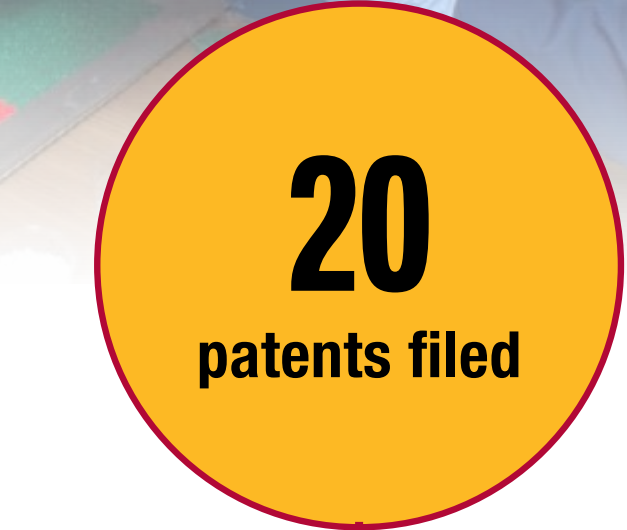
The Ontario Agri-Food Innovation Alliance brings together academia, government and industry to advance the health, sustainability and productivity of Ontario’s agri-food and rural sectors. Innovation is critical to the success of farmers and agri-businesses and to the economic and social well-being of Ontario’s rural and urban communities, especially while trying to recover from COVID-19 challenges.



working together to foster collaboration, investment and engagement for the benefit of Ontario



demonstrating that Alliance projects lead to innovations that are worth protecting



with support from the Research Innovation Office, which specializes in commercializing Alliance-funded research



in research projects supporting collaboration and knowledge transfer

“The most positive impact [of this Alliance research] has been to convince the world and industry at large that green technologies can be adopted at a reasonable cost and do not need to be a niche application.”

—Atul Bali, chief executive officer, Competitive Green Technologies

Getting research off the shelf and into the marketplace



163

research
co-funders

including funding from 100 business, industry or non-governmental organizations, demonstrating that Alliance research projects are addressing industry priorities and supporting the sector

Small and medium-sized enterprises (SMEs) make significant contributions to the Canadian economy. Between 2005 and 2015, SMEs accounted for 95 per cent of net new jobs across Canada. However, the first five years of start-up are difficult for new businesses due to challenges with market validation and product development.

The Research Innovation Office and Alliance-funded Gryphon's LAAIR (Leading to the Accelerated Adoption of Innovative Research) program support commercialization and business development, providing market validation and product development grants.

With technology developed at U of G, Clēan Works, an agri-food innovation company, commercialized a novel waterless process for decontaminating fresh and frozen produce, proteins, dried goods and shipping containers, increasing shelf life and reducing pesticide residue.



99% of pathogens killed

Clēan Works' technology is a portable, waterless decontamination unit with a chemical-free process that kills 99 per cent of pathogens, increases shelf life of produce by up to 25 per cent and reduces pesticide residue by 25–50 per cent.

\$7M operation

Located in St. Catharines, Ont., Clēan Works has 12 employees providing product to clients around the globe.

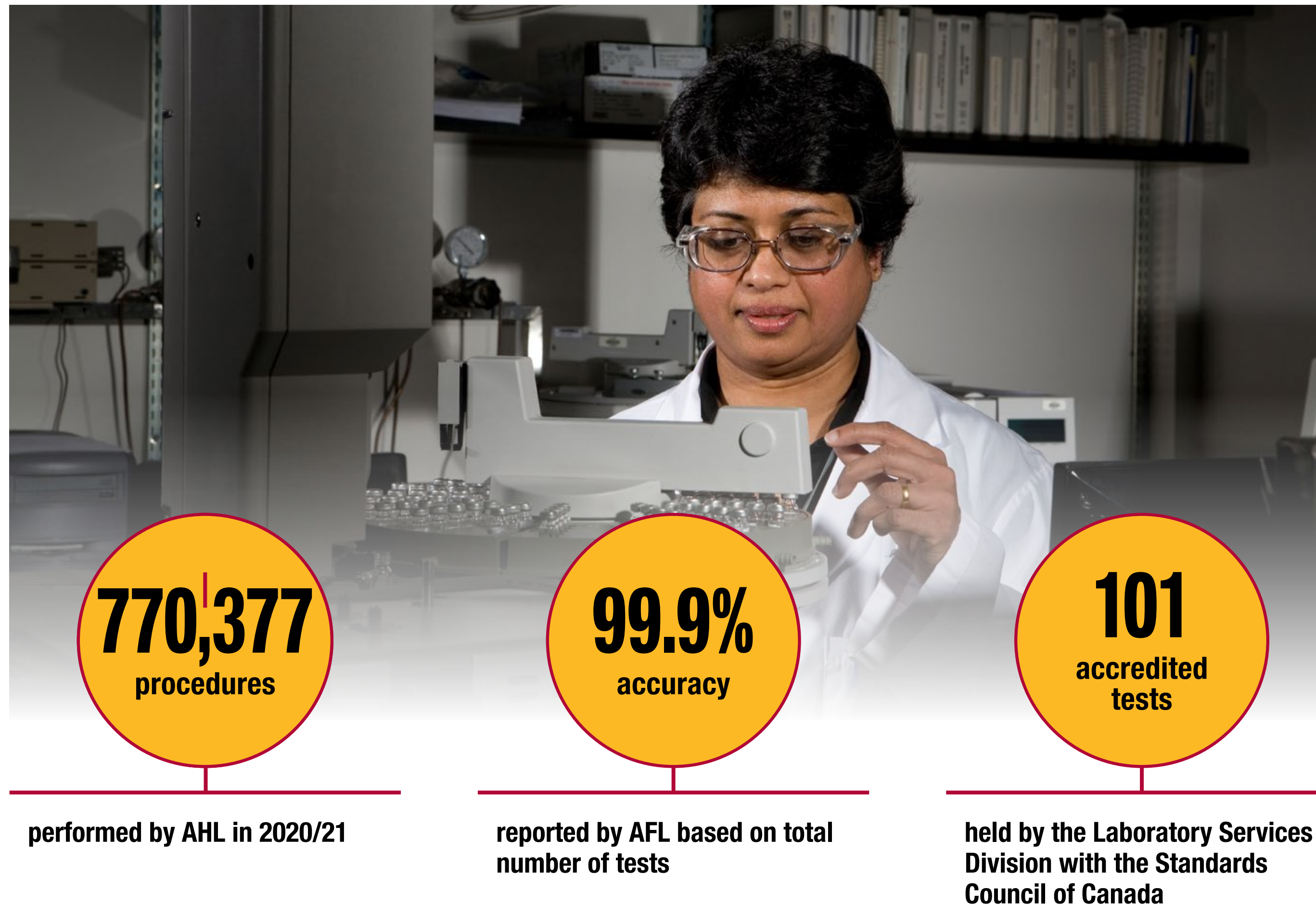


COVID-19 recovery

Clēan Works quickly adapted their technology to be able to decontaminate PPE during the COVID-19 pandemic, answering the province's call for innovative solutions to support the fight against the virus.

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 Animal Health Laboratory (AHL) and Agriculture and Food Laboratory (AFL), 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. AHL and AFL continued their work throughout the COVID-19 pandemic and met the prioritized testing needs of clients.

Monitoring pesticide and veterinary drug residue testing



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

AFL monitors the health of Ontario's animals, food and environment through its pesticide and veterinary drug residue testing in support of OMAFRA's various monitoring programs. AFL aligns its services, method development and testing with OMAFRA's needs to sustain regulatory and food safety initiatives.

With an important focus on pathogen detection and identification, AFL's microbiology lab tests finished food products, raw ingredients, water and environmental samples to detect microbial growth risks—including pathogen transmission risks—in the farm-to-fork supply chain. This enables OMAFRA to ensure compliance with regulatory standards and requirements of various food safety legislation, and thus ensure a safe food supply for Ontarians.



800+
active pesticide
compounds

AFL pesticide testing includes herbicides, fungicides and insecticides.

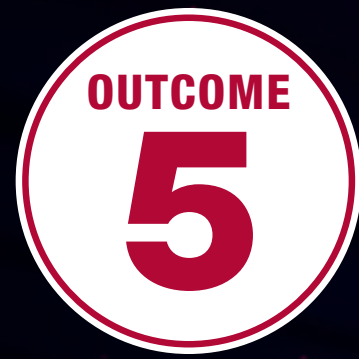


Multiple Target Analytes: customized testing method created by AFL

Concurrent testing of 85 drug residues in meat from duck, turkey, chicken, pig, cow, goat and sheep at one time enables efficient and rapid testing.

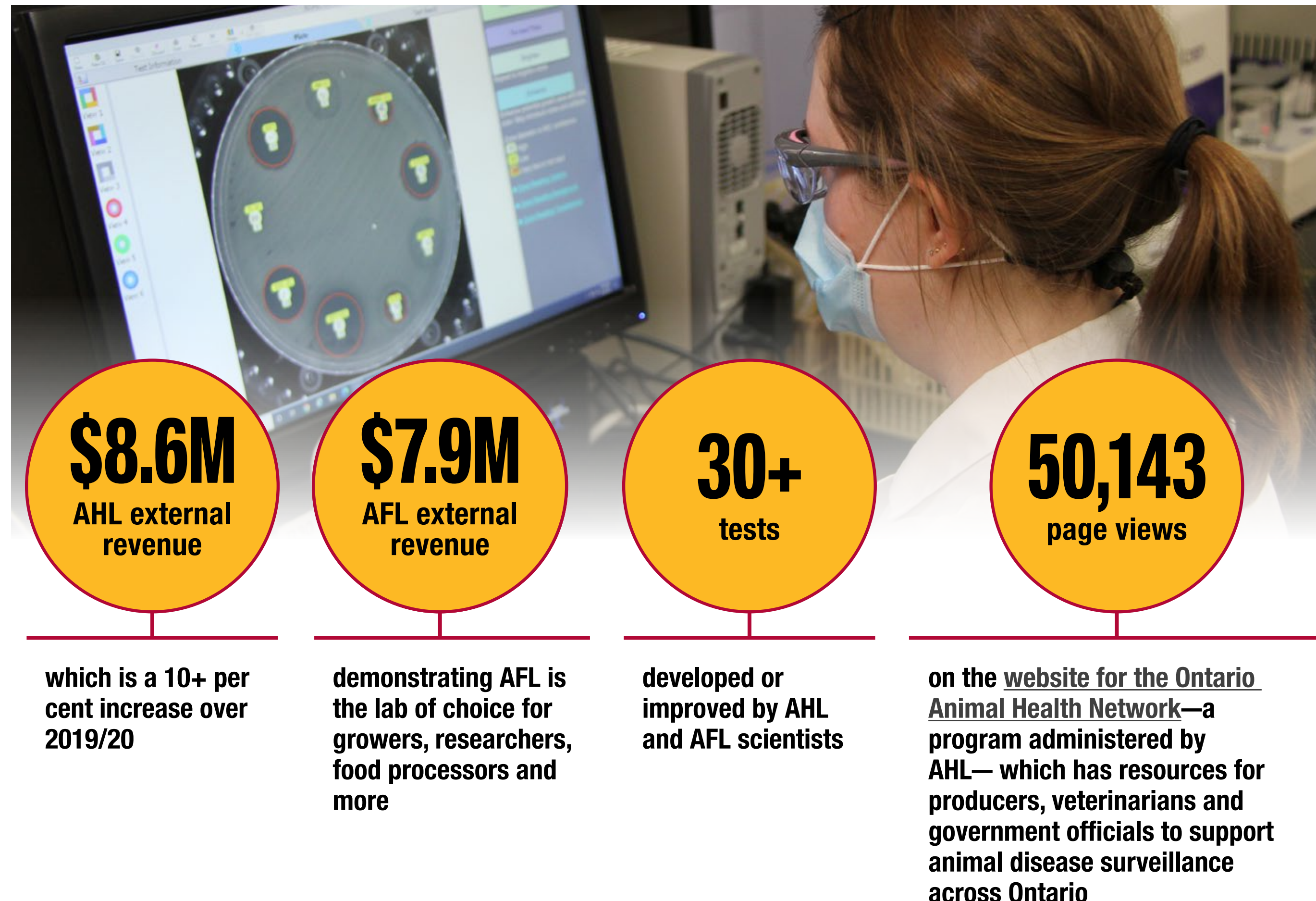
1,278 adverse results

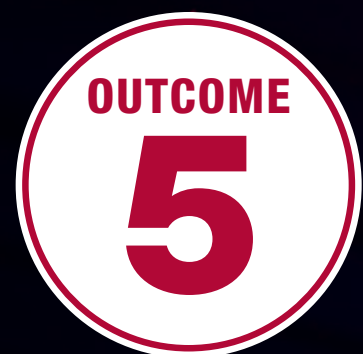
AFL reported 1,278 alertable test results to OMAFRA, representing 2.9% of analyzed samples, allowing for a rapid response to food safety concerns.



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 is ready to respond to emergencies and keep Ontario open for business.





Emergency preparedness for African swine fever

1,250+
cases

that identified
zoonotic pathogens
diagnosed by AHL

AHL plays a leadership role in disease monitoring and surveillance for Ontario livestock, ensuring a safe and secure agri-food system and providing support to producers and consumers.

For example, African swine fever (ASF) is a highly transmissible viral disease that poses a major threat to the commercial pork industry. If ASF were detected in Ontario, it would have devastating impacts, such as farmer bankruptcy, border closures limiting exports and major animal health and welfare implications, including morbidity and mortality. AHL is the only Ontario lab providing testing for ASF and the only lab able to identify that potential first positive case quickly and increase testing capacity rapidly to help monitor the spread of the disease.

AHL supports the current provincial and national ASF disease-free status with quick, confirmatory testing of samples from animals that may present with symptoms similar to those of ASF. It is critical for Ontario and Canada to maintain this disease-free status to ensure a safe, healthy and profitable commercial pork industry.



Ontario leader
Only Ontario lab
providing testing for
African swine fever

**Comprehensive
monitoring**

Monitors the industry through screening and diagnostic tests to support an ASF disease-free sector



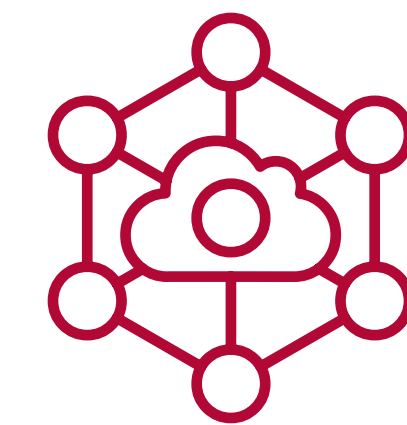
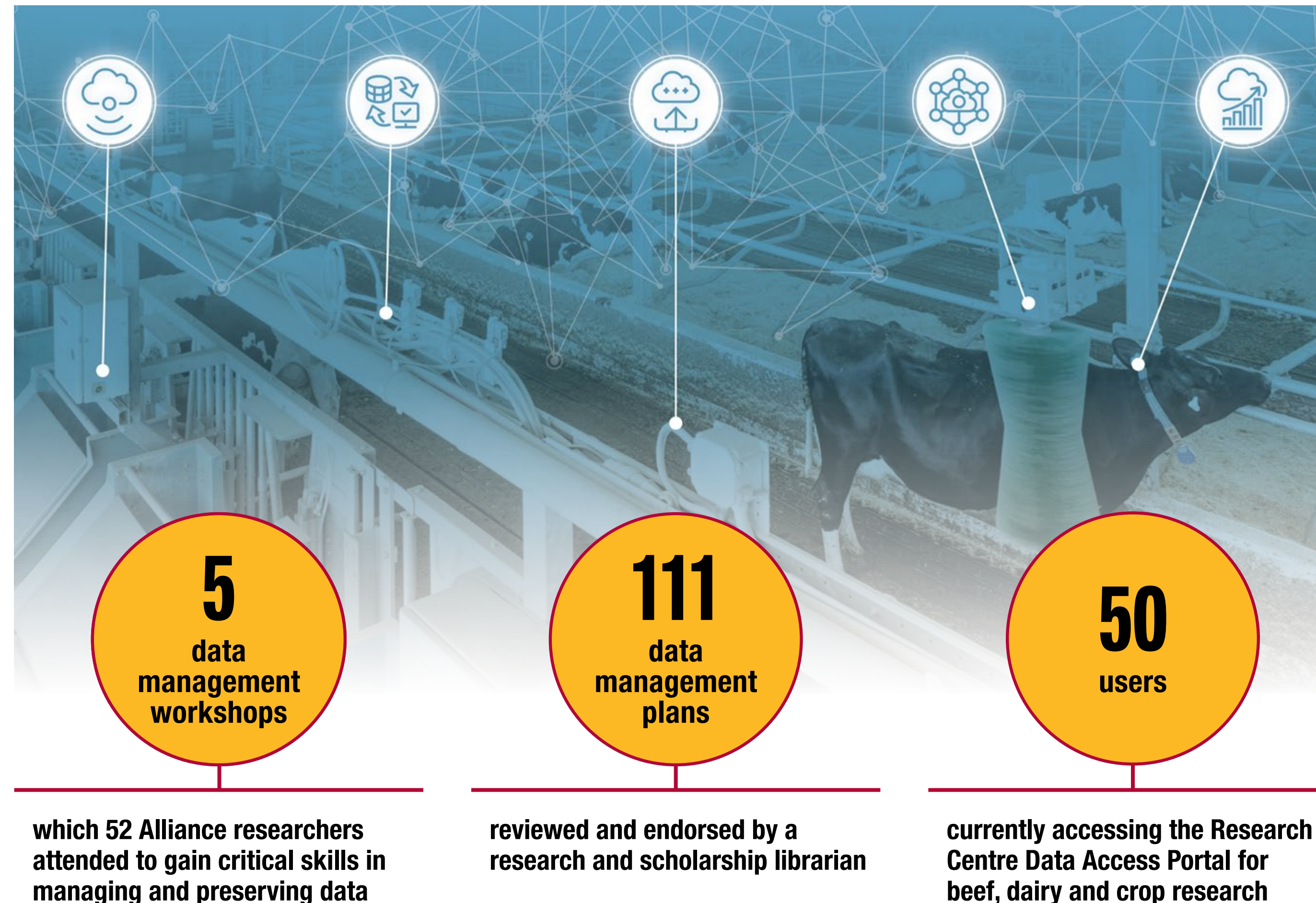
“The data and information that AHL provides into this network [Canadian Swine Health Intelligence Network] is extremely valuable to monitor endemic swine disease as well as to monitor for new and emerging swine pathogens.”

—Christa Arsenault, DVM,
Canadian Swine Health
Intelligence Network manager

OUTCOME
6

An enhanced system for data access and storage

The Ontario Agri-Food Innovation Alliance is committed to implementing data management practices to facilitate new agri-food and rural research. Our researchers and research centres produce an unprecedented amount of data. By ensuring the data are findable, accessible, interpretable, and reusable (FAIR), researchers gain new opportunities to support data-driven agriculture in Ontario.



Library-endorsed Data Management Plans are now a condition of award for all research projects. They are an important tool to help enhance data stewardship with the goal of improving the sharing and reuse of research data.

OUTCOME
6

Data platform supports more robust agri-food research

196
participants

attended
the webinar
“Harvesting Data at
the Ontario Agri-
Food Research
Centres” to learn
about the Research
Centre Data Access
Portal

Data generated at Ontario’s agri-food research centres are getting a big boost with the Research Centre Data Access Portal. It’s an innovative data management platform that’s bringing new stewardship standards to agri-food research, ensuring safe and secure data storage and giving researchers easier access to their research data. The made-at-Guelph portal is integrated at Ontario’s agri-food research centres to strengthen and support innovative research for the agri-food sector.

The Research Centre Data Access Portal is a node in Agri-Food Data Canada (ADC), a national data platform for secure collaboration among members of the University and the Canadian agri-food ecosystem. Developed under the University of Guelph’s Canada First Research Excellence Fund program, called Food from Thought, ADC connects nodes of existing agri-food research data across Canada. Together, these data projects will fuel U of G’s commitment to FAIR data principles and advance agri-food research nationally.

Read the [full article](#) on the Alliance website.



600 animals

At full capacity, the Ontario Beef Research Centre can house and capture data on up to 600 animals in cow-calf production, on pasture or in feedlot.

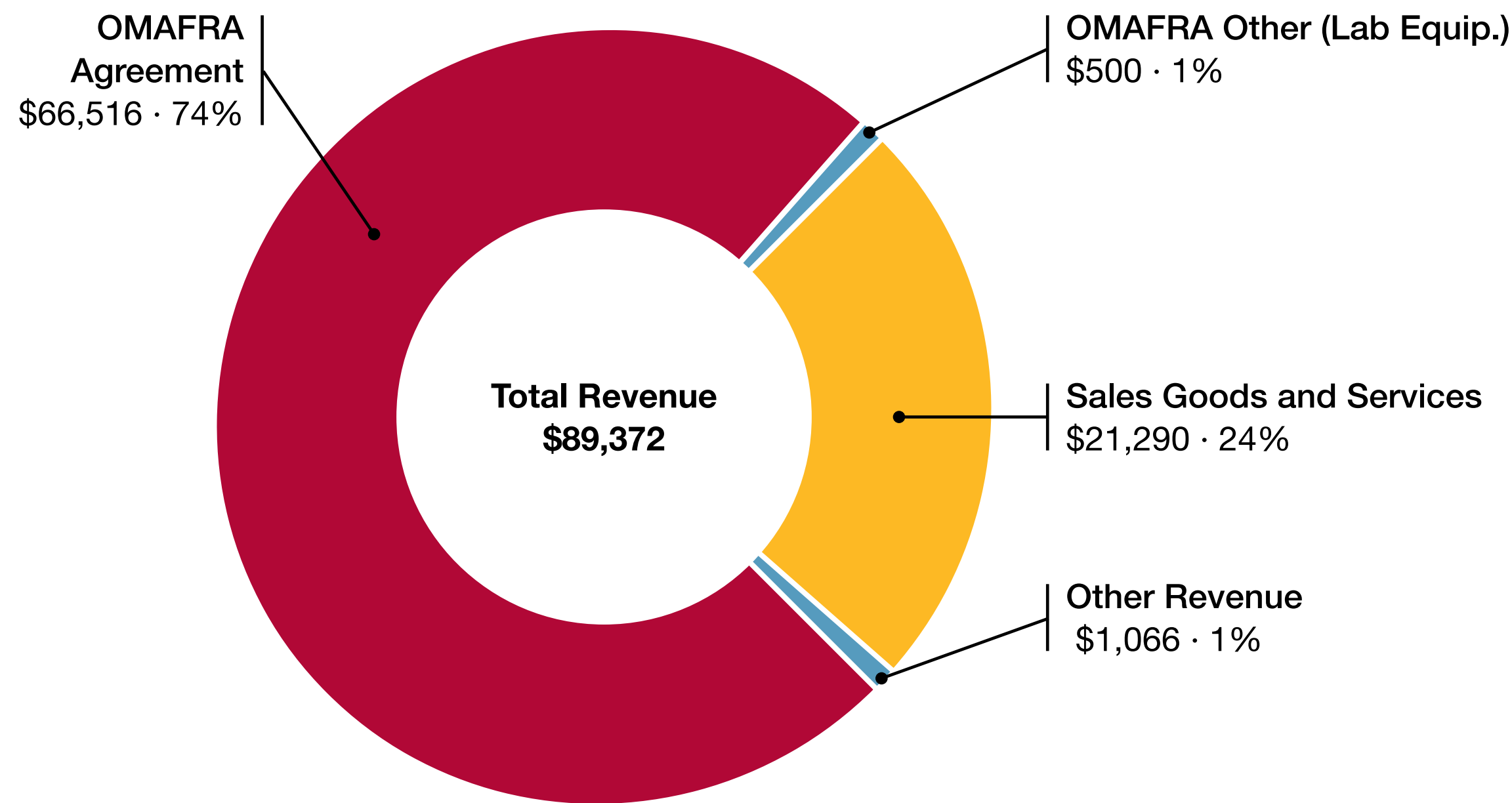
“Data produced by the Alliance through its robust research platform are foundational to Agri-Food Data Canada. These data include the full spectrum of inventor-owned, government and private sector-funded, public good surveillance, commercial-scale livestock husbandry, and long-term agronomy trials. Together with meta-data and governance structures to enable broad sector access, advanced data platforms will create new opportunities for both researchers and the agri-food sector.”

—Dr. Malcolm Campbell, vice-president (research), U of G

2020/21 Financial Overview

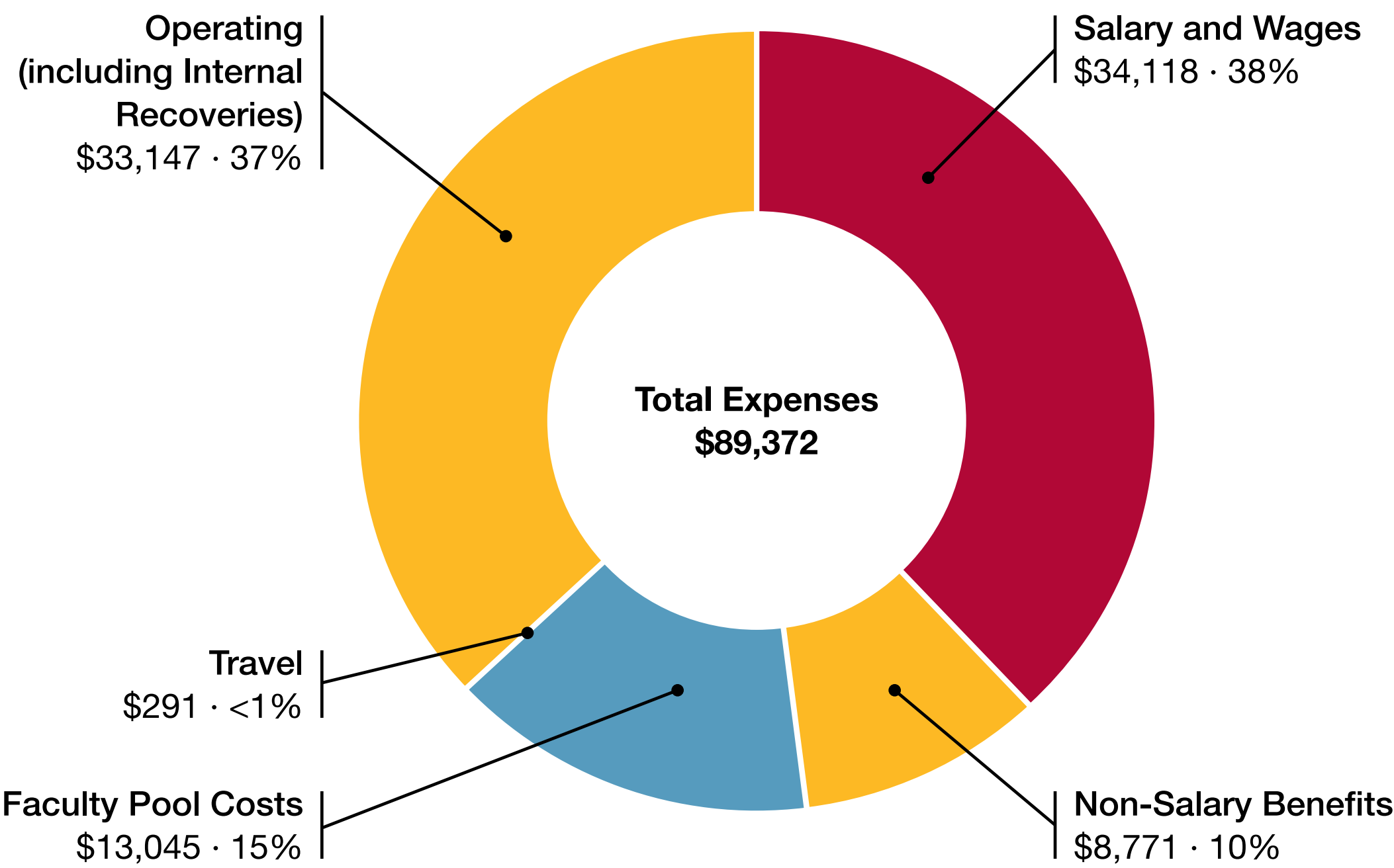
Agreement Revenues

(in thousands of dollars)



Agreement Expenses

(in thousands of dollars)



2020/21 Financial Overview

Agreement Financial Summary by Program

(in thousands of dollars)

Standard Accounts	Research Program	Veterinary Capacity Program	Animal Health Laboratory	Agriculture and Food Laboratory	Property Management	Total
Revenue						
OMAFRA Agreement	35,786	5,289	5,731	6,349	13,361	66,516
OMAFRA Other (Lab Equip.)				500		500
Sales Goods and Services	111		8,593	7,917	4,669	21,290
Other Revenue	32		1	4	1,029	1,066
Revenue Total	35,929	5,289	14,325	14,770	19,059	89,372
Expenses						
Salary and Wages	9,623	149	8,058	8,428	7,860	34,118
Non-Salary Benefits	1,888	24	2,212	2,504	2,142	8,771
Faculty Pool Costs	11,145	1,900				13,045
Travel	63	199	9	11	9	291
Operating	14,351	3,016	5,943	4,134	10,279	37,723
Internal Recoveries	(1,142)	0	(1,897)	(307)	(1,231)	(4,577)
Expenses Total	35,929	5,289	14,325	14,770	19,059	89,372
Net Revenue Over Expenses	0	0	0	0	0	0

PUBLISHER

Office of Research
University of Guelph
Guelph, ON N1G 2W1

Vice-President Research:
Dr. Malcolm Campbell

Associate Vice-President Research
(Agri-Food Partnership):
Dr. Beverley Hale

Address correspondence to:
OMAFRA Agreement Governance Officer
University of Guelph
omafrago@uoguelph.ca
uoguelph.ca/alliance

This publication is a summary of the Consolidated Annual Report of the Ontario Agri-Food Innovation Alliance, a collaboration between the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and the University of Guelph.

Growing Ontario Solutions and the Consolidated Annual Report are produced by the University of Guelph's Office of Research in accordance with the OMAFRA-University of Guelph Agreement. These annual reporting documents are reviewed and approved by the Ontario Agri-Food Innovation Alliance's joint governance structure.

More information on the Ontario Agri-Food Innovation Alliance, including the complete Consolidated Annual Report, is available on the [Alliance website](#).