GROWING ONTARIO SOLUTIONS

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

OMAFRA–UNIVERSITY OF GUELPH AGREEMENT
ANNUAL REPORT 2020/21
Supporting recovery and future growth with innovation

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.

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
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.

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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 | #1 | #1 |
| #5 | #21 | #18 |
| Leader in veterinary science | Leader in agricultural sciences | Leader in food science and technology |
| #1 in Canada | #1 in Canada | #1 in Canada |
| #5 in the world¹ | #21 in the world² | #18 in the world³ |

¹ 2021 ranking of veterinary science programs by Quacquarelli Symonds of veterinary science programs
² Ranking of best universities for agricultural sciences by U.S. News & World Report
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

76.6 faculty research FTEs
directly involved in Alliance-funded research projects

$8.0M third-party investment
in Alliance-funded research projects awarded in 2020/21

77 new projects
awarded operating funding to drive innovation in the agri-food sector

$55.3M external research funding
granted to the University that supports OMAFRA research priorities

Growing Ontario Solutions | Ontario Agri-Food Innovation Alliance Annual Report 2020/21

Growing Ontario Solutions | Ontario Agri-Food Innovation Alliance Annual Report 2020/21
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**


Guelph varieties dominate the marketplace:

- 95% of current acreage in Ontario
- 75% of existing asparagus acreage in Michigan

**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

**$1.7M commercialization revenue** generated from licences associated with Alliance-funded research supporting OMAFRA priorities.
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.
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.

*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

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.

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.

“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

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.
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.

“...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
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.
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.

- **770,377** procedures performed by AHL in 2020/21
- **99.9%** accuracy reported by AFL based on total number of tests
- **101** accredited tests held by the Laboratory Services Division with the Standards Council of Canada

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.
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.

**100% compliance** in AFL alerting OMAFRA to any test results that require immediate notification, including presence of *E. coli* 0157:H7

**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.
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.

$8.6M
AHL external revenue

which is a 10+ per cent increase over 2019/20

$7.9M
AFL external revenue

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

30+
tests

developed or improved by AHL and AFL scientists

50,143
page views

on the website for the Ontario Animal Health Network—a program administered by AHL—which has resources for producers, veterinarians and government officials to support animal disease surveillance across Ontario
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

Growing Ontario Solutions | Ontario Agri-Food Innovation Alliance Annual Report 2020/21
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.
Data platform supports more robust agri-food research

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.

“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 metadata 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

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.
### Agreement Revenues

*(in thousands of dollars)*

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<thead>
<tr>
<th>Description</th>
<th>Revenue (in thousands)</th>
<th>Percentage</th>
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<tr>
<td>OMAFRA Agreement</td>
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<td>OMAFRA Other (Lab Equip.)</td>
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<td>Sales Goods and Services</td>
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<td>Other Revenue</td>
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<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>$89,372</strong></td>
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### Agreement Expenses

*(in thousands of dollars)*

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<th>Description</th>
<th>Expenses (in thousands)</th>
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<td>Salary and Wages</td>
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<tr>
<td>Travel</td>
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## Agreement Financial Summary by Program

*(in thousands of dollars)*

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<th>Standard Accounts</th>
<th>Research Program</th>
<th>Veterinary Capacity Program</th>
<th>Animal Health Laboratory</th>
<th>Agriculture and Food Laboratory</th>
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<td><strong>5,289</strong></td>
<td><strong>14,325</strong></td>
<td><strong>14,770</strong></td>
<td><strong>19,059</strong></td>
<td><strong>89,372</strong></td>
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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.