



Report and Recommendations

International Research Advisory Committee

September 25-26, 2024

This document summarizes discussions and recommendations that were made by the Livestock Research Innovation Corporation's International Research Advisory Committee. The meeting was held September 25 and 26, 2024, in Guelph, Ontario. The committee members of:

James White J White & Associates Consulting, LRIC Board Member, Committee Chair, Erin Ontario

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Stephen Miller, Director, Animal Genetics and Breeding Unit (AGBU), University of New England, Armidale, New South Wales Australia (not present at Guelph Meeting)

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Meeting participants represented:

Dairy Farmers of Ontario (DFO), Ontario Aquaculture Association (OAA), Ontario Pork (OP), Egg Farmers of Ontario (EFO), Chicken Farmers of Ontario (CFO), Grain Farmers of Ontario (GFO), University of Guelph (UofG), University of Waterloo, Ontario Ministry of Agriculture, Food and Agribusiness (OMAFRA), AgriFood Economics Systems

Table of Contents

<i>Purpose</i>	4
Research Facilities	4
Collaboration and Investment	5
People, Skills, and Capacity	6
Collaborative Research and Governance:	6
Human Resources and Succession Challenges:	7
Data-Driven Research and Commercialization:	7
<i>SWOT Analysis</i>	8
<i>Recommendations</i>	9

Purpose

Purpose: To build a strategy to advance Livestock Research and Innovation

Objectives

1. Understand changes in the Ontario Livestock Innovation Landscape.
2. Establish objectives with an international perspective that consider the Grow Ontario Strategy and ARIO modernization.
3. Identify strategic actions to ensure long term value from Ontario's animal research facilities

In advance of the meeting, attendees were provided a set of questions designed to identify strategic actions to ensure long term (30+ years) value from research facilities:

- What are 3 things that you think need to happen in order to increase the value that we will get from the fantastic new livestock research facilities we (will) have in Ontario?
- What are the needs now and into the future?
- What are the benchmarks for success?

The discussion was structured around these questions with opportunity for engagement between participants. Following the industry meeting, the IRAC members reviewed and discussed what they heard and provided international insights. Attendees provided candid and wide-ranging input which was captured and subsequently grouped into the following 6 themes: Facilities, Collaboration and Investment, People Skills and Capacities, Collaborative Research and Governance, Human Resources and Succession Challenges, Data-Driven Research and Commercialization. Recommendations were made in these areas to benefit Ontario, but a strategy was not developed.

Research Facilities

- Ontario is incredibly fortunate to have a suite of truly world-class livestock research facilities. It is a collective responsibility as an industry to ensure their value from the facilities is maximized.
- Globally, agriculture research facilities should serve as hubs for both innovation and knowledge exchange, where ideas are tested before being applied on commercial farms.
- Cross-sector collaboration for generating practical and useful outcomes, ensuring that research can be relevant across different commodity groups and animal species (for example manure management, animal care & welfare, antimicrobial usage, sustainability, etc.). Research must be practical and beneficial to on-farm operations, with a primary focus on economic viability at the production level. However, its value should extend beyond economics, taking into account holistic impacts such as environmental sustainability, food security, labor dynamics, and more.
- Collectively the ARIO research facilities should have a research program that includes academics across different institutions and disciplines (economists, social science, engineering, welfare) together with producers and funders to ensure research results are applicable and provide a positive return whether that be financially, environmentally and/or socially.

Collaboration and Investment

- The Canadian and Ontario governments have an established commitment of significant investment in the agri-food sector, a model that, while not entirely unique, remains distinct compared to the approaches seen in much of the world, where such coordinated and long-term public investment is less common.
- The Agricultural Ecosystem in Ontario is complex and requires a multi-faceted approach to make changes for strategic alignment. Funding on a five-year end and start cycle impedes long-term research trials.
- Diversity amongst livestock species, farm size and financial viability due to industry regulations and structures make it difficult to create simple and cohesive sector messaging. With a GDP exceeding the auto sector in Ontario the need for a cohesive messaging on behalf of the livestock sector was repeatedly highlighted. (Note: Auto industry in Ontario 13.9 B GDP in 2019, Agriculture and Food Sector in Ontario 51B GDP in 2023 StatsCan).
- Partnerships between producers, industry, academic institutions, and government are essential for driving innovation. The focus needs to be on two-way knowledge exchange, where both producer-driven and researcher-driven priorities result in a market pull for the research and higher rates of adoption because of academia having a better grasp of the grass roots need.
 - Look to the development of Environmental Farm Plan as an example of successful collaboration
- Ontario's livestock industry needs a longer-term target or vision with short to medium term actions that work toward increasing agri-food technology and adoption.
- Any new efforts must complement (and identify alignment between) several other current initiatives and plans including:
 - OMAFA's Grow Ontario strategy
 - Agricultural Research and Innovation Ontario's Act Modernization
 - University of Guelph's Feeding the Future
 - Agricultural Adaptation Council's 2050 Committee
- A coordinated, structured and accountable approach is required to provide a clear roadmap for actions needed regarding innovation.
- Research needs to address both short-term challenges and long-term transformational issues, with flexibility in design and research facilities that address emerging needs and technologies now and in the future.
- Planning currently underway for the new poultry build was highlighted as an example of continued investment in livestock research by Agricultural Research and Innovation Ontario, the poultry industry, and government. The new build reflects a recognition of the critical value research facilities bring to the livestock industry and the broader public good. A modernized feed mill is required to service the poultry and other livestock facilities which cannot otherwise be met by private industry,
- Continuous investment in facilities and research is required to:
 - attract new talent including students unfamiliar with agriculture
 - maintain a realistic budget for capital and technical support personal
 - foster entrepreneurial exposure for long-term sustainability and competitiveness for livestock agriculture in Ontario

People, Skills, and Capacity

- Internationally, success of research and innovation depends on people, including students, faculty, technicians, and staff from post-secondary institutions.
- There is a gap in technical skills in Ontario's agriculture sector, particularly for adopting new technologies such as autonomous systems, which highlights the need for both a transition period and capacity building.
- Getting people onto working farms is essential to understanding the complexity and interdependence of day-to-day activities provides invaluable learning in optimizing the research facilities and staff.
- Multidisciplinary collaboration, including the involvement of engineers and other experts, is needed to make the research facilities more versatile and responsive to changing research demands. These resources need to come both from the industry and within academia.
- The Swedish Livestock Research Centre (<https://www.slu.se/en/faculties/vh/about-vh/departments/the-swedish-livestock-research-center/research/>) was one institution noted as a model to look to for ideas. They have clear portal for research initiation.
- Having a priority session with only participants who are in early career across academia, industry (producers and agribusiness), and government, was recommended.

Collaborative Research and Governance:

- The importance of collaboration across sectors was noted, especially for setting cross-cutting research priorities. Research priorities need to be forward thinking and flexible, with quality data that can build an appropriate narrative. Components need to be challenge driven, are applied, focussing on research that can't or wouldn't take place on a commercial farm.
- Governance structures in place need to align with stakeholders across the supply chain, industry, colleges and universities (not just University of Guelph) to work toward a common goal. A united voice is critical for success. The challenge of this was noted with the total number of livestock and other commodities across the Ontario ecosystem.
- Intellectual Property (IP) policy and costs for accessing facilities to encourage use by a variety of institutions must be clear and not cost-prohibitive.
- Importance of a more innovative model of GRIP; moving beyond existing research design whereby KTT occurs only at the end of a project. Collaboration should be a core principle in knowledge exchange, ensuring that research meets industry and public interests.
- Priority of Agriculture to the University of Guelph.
 - Guelph is viewed internationally as a strong agriculture university, but there is less of a sense locally in Ontario and Canada
- Universities/Colleges need to be financially viable before research requirements can be met.
- Current underfunding of research, small capital and maintenance needed to operate, attract and retain staff at facilities.
- Establish and promote metrics of success for the research facilities in addition to capacity utilization rate e.g. How many producers are interacting with the facilities; University of Waterloo has benchmarks for number of startups as measure for success.
- Agricultural Research and Innovation Ontario plays the key role in the system which is not broadly recognized and understood.

Human Resources and Succession Challenges:

- The human side of research is paramount, with attention drawn to the challenges of losing international students due to immigration policies, impacting HQP, farm labour etc.
- The lack of awareness and/or interest of Canadian students in agriculture. Where are resident Canadians obtaining training in livestock research? Addressing the talent gap is essential for future research and industry needs.
- Early career orientation is a fundamental component to ensure a robust understanding of Ontario's livestock innovation sector for those new to livestock agriculture.
- High-quality personnel (HQP) are vital, and industry needs are diverse. Programs like internships and professional development are informed by industry feedback, but there's room for improvement in graduate student capacity and experience.
- Academics need to be recognized and rewarded for industry outreach and extension, not just academic publications. There is a lack of academic incentive to engage with industry.
- Research transparency in the livestock sector presents a complex challenge. Declaring funding and partnerships can undermine research credibility, yet public-private collaborations are essential. Approaches need to balance openness with scientific integrity.

Data-Driven Research and Commercialization:

- Data collection, particularly in dairy, has been a strength, supporting a platform for high-quality research and commercialization. There's an opportunity to leverage existing datasets to address complex, multifaceted problems without starting new projects.
- The commercialization process needs to be aligned with market and monetary demands, with a stronger focus on delivering return on investment (ROI) for extension efforts. It's not just about innovation but about understanding what the market wants and how to package and brand the outputs to meet consumer/industry needs and ultimately implementation and impact!

Following the discussion and input, the committee reviewed the strengths, weaknesses, opportunities and threats that were raised during the collective discussion. A tour to the University of Waterloo, School of Engineering was noted by the committee for the importance of strengthening and reiterating the value of maximizing facilities, industry/sector collaborations and having benchmarks and metrics for success.

SWOT Analysis

Strength	Weakness	Opportunity	Threat
<p>World-class livestock research facilities</p> <p>Investment in public funded research institutions</p> <p>Wide range of commodities produced in the province</p> <p>International reputation of ARIO facilities and University of Guelph faculty</p> <p>Foresight 30 yr lifespan in physical assets</p> <p>Financially strong livestock industry</p> <p>Platform for Data Collection in ARIO owned facilities</p>	<p>Lack of “North Star” towards which the sector, post-secondary institutions, ARIO and government can all work towards</p> <p>Coordination of central database across and between facilities</p> <p>Modernized feed mill designed for research needs</p> <p>Soft funding for technicians, HQP</p>	<p>Flexibility in use of Facilities</p> <ul style="list-style-type: none"> Challenge driven (increase usage by more clients) challenge driven for maximizing utilization applied research demonstrations basic science - cannot be done on farm <p>Compare IP policies across research institutions</p> <p>Knowledge Exchange: ROI for producers</p> <p>Collaboration:</p> <ul style="list-style-type: none"> cross sector cross discipline value chain with all sectors of agribusiness <p>Share and Utilize collected data</p>	<p>People, Skills, Capacity recruitment is required into agricultural careers</p> <p>Intellectually Property (IP) Policy that can stifle innovations and entrepreneurs</p> <p>Funding</p> <ul style="list-style-type: none"> Facilities maintenance (short and long term) Continued research investment without claw backs Adjusted for Inflation <p>Question is adequate succession planning built into agreements</p>

Recommendations

Note: Not all recommendations made by the group fall within LRIC's goals and mandate, and there is ongoing work being conducted that is and will be addressing aspects and opportunities.

Recommendations outside the mandate are included as they were raised and noted for the benefit of the Ontario livestock/agricultural research and innovation cycle. Every system is designed to get the result it gets, and if we want different results, we need to make changes.

1. LRIC to work with other multisector agricultural organizations, commodity groups, and agribusinesses to build collaboration with a united message for research and innovation across organizations

Action: GFO has offered to lead this initiative. LRIC would participate as livestock is a significant piece, but not the sole beneficiary of such an initiative.

2. LRIC to organize a priority setting session with members who are in **early career** (i.e. under 35 or < 10 years in current career) across academia, industry (producers and agribusiness), and government.

Action: This supports what LRIC does. The objective is to organize and conduct a session including only early career participants. Results from sessions in the UK provided unexpected insights by those planning their futures in the sector and individuals currently in leadership roles.

3. LRIC to investigate various international academic institutions/programs which are renowned in areas of cross-discipline research and GRIP. Suggestions include:

- **Swedish Livestock Research Centre** (<https://www.slu.se/en/faculties/vh/about-vh/departments/the-swedish-livestock-research-center/>). It was noted as having model facilities represent technology at the forefront of development. They have approximately 30 employees with long and documented experience of animal care, trials and production. The production, consumption, behaviour, reproduction and health of the animals are recorded continuously not unlike the capabilities of the ARIO owned livestock facilities.
- **Teagasc** – Agriculture and Food Develop Authority for the Republic of Ireland (<https://www.teagasc.ie/>). This national body provides integrated research, advisory and training services to the agriculture and food industry and rural communities.
- **Agri-food and Biosciences Institute** (<https://www.afbini.gov.uk/>) (AFBI) is a leading provider of scientific research and services to government, non-governmental organisations and commercial organisations. They are sponsored by key stakeholder, the UK Department of Agriculture Environment and Rural Affairs (DAERA).
- **Wageningen University and Research** (<https://www.wur.nl/en.htm>). is a collaboration between Wageningen University and the Wageningen Research foundation with the mission to 'To explore the potential of nature to improve the quality of life'
- **Nuffield Agricultural Scholarships** - Awards practitioners in agriculture with the opportunity to enhance the resilience, sustainability and profitability of Canadian agriculture.

Action: LRIC to seek funding to commission a report considering how other international institutions are conducting and exchanging knowledge and identify applicable applications for Ontario.

4. Ensure leadership to build cohesive partnerships and synergistic results between current initiatives already in play:
 - ARIO's Act Modernization
 - Exciting work is just beginning with the recent passage of the new Act
 - Important for ARIO to communicate to stakeholders who and what they do – define their purpose and objectives and strategy in agricultural innovation
 - University of Guelph Feeding the future initiative
 - Galvanizing support for a consolidated body of investment proposals that align with the action plan they are creating
 - Identifying avenues for implementation
 - Define additional activities as required
 - Agricultural Adaptation Council 2050 initiative
 - Grow Ontario

If there are other provincial or inter-provincial initiatives it is important that knowledge exchange be incorporated, and resources shared and maximized such as the Senate Soil Report.

Action: LRIC network with organizations and provide linkages where appropriate. Committee members will provide national and international inputs and knowledge that can be shared.

5. Encourage funding beyond livestock facilities for infrastructure to complement facilities and increase research output.
i.e.
 - Central storage of samples
 - Linkage of data within and across research sites
 - A modern feed mill to accommodate novel ingredients and small batch sizes

Action: LRIC network with organizations and continue to build and provide linkages for appropriate initiatives

6. A succession plan for both human resources and the facilities is needed to ensure continuity.

Action: Out of scope for LRIC. This recommendation to be shared with ARIO. As facilities are managed by University of Guelph, a change in the management structure was observed by committee members as a future risk.

7. A model for GRIP that ensures knowledge exchange be incorporated within research programs, projects, and facilities. Collaboration should be a core principle, utilizing already existing avenues and ensuring that research meets both industry and public interests.

Action: Utilizing research from recommendation #3, identify international best practices for GRIP/KE with potential application in Ontario's research ecosystem.

8. Showcase research facilities to demonstrate research, innovation and technology opportunities beyond traditional users.

Action: LRIC can provide opportunities to researchers outside the agricultural sector to recognize the innovation and technology within the sector. Meet with OMAFA and ARIO staff to identify collaborations and opportunities.

9. Explore models to alleviate administrative burden allowing researchers to focus on research.

Action: This was noted as an issue internationally, and a future meeting of LRIC's International Research Advisory Committee (virtual, 2hrs) could consider ideas that have been employed in other institutions to increase research focus.

10. Map out the various stakeholders within the innovation ecosystem of Ontario's Livestock sector and identify respective roles and responsibilities that can assist in advocating the benefits of research.

Action: Work in conjunction with LRIC Emerging Trends and Opportunities Committee to identify stakeholders (potentially new) to advance Livestock Research and Innovation in Ontario. To include identifying alternative and new funding sources and advocate benefits of investing in research.

These actions aim to enhance collaboration, prioritize research, learn from international best practices, and improve the overall research ecosystem in Ontario's livestock sector. Where the intent of the meeting was to build a strategy to advance Livestock Research and Innovation, this requires collaboration of the Ontario stakeholders. Meetings will be held over the next several weeks with sector stakeholders to discuss actions and activities that are underway, where leadership already exists, where there are voids and how and if the recommendation could, should or can be filled, by who, by when. The aspirational outcome from the stakeholder discussions is to draft a Strategy to ensure long term value from Ontario's animal research facilities with stakeholder buy-in.