Ontario Forage Research Priorities 2025

FULL REPORT

Contents

1. Introduction

In 2019, the Ontario Forage Council (OFC) established research priorities for the first time specifically for Ontario's forage and grazing sector. On November 13, 2025, the OFC brought together a wide range of stakeholders and subject-matter experts to revisit and update these priorities. The session, facilitated by the Livestock Research Innovation Corporation (LRIC), included presentations highlighting provincial and national forage research developments since the previous priority-setting exercise, collaborative brainstorming of challenges and opportunities, and discussion aimed at building consensus around research priorities and identifying gaps in research and in Knowledge Translation and Transfer (KTT).

Discussions underscored the importance of increasing forage use on Ontario farmland as a central objective. Although several research needs were identified, participants noted that many topics have been previously addressed, indicating that continued extension and KTT efforts remain essential – a role well suited to the OFC.

This document provides an overview of the day's structure and discussion, the key themes and research priorities that emerged, and where existing forage-related research priorities fit. It is intended as a tool to guide the development of meaningful research and future KTT initiatives that strengthen Ontario's forage and grazing sector. In addition, it serves as a practical map to help organizations identify shared interests and foster greater collaboration across sectors.

2. Background and Context

The OFC plays a central role in supporting and advancing the province's forage and grazing sector. As a producer-led organization, the OFC works to identify emerging challenges and opportunities, facilitate research and innovation, and promote the adoption of best management practices across Ontario's diverse agricultural landscapes. The Council acts as a key connector between farmers, researchers, industry partners, and government, helping to coordinate efforts, reduce duplication, and strengthen knowledge exchange. Through extension activities, events, and collaborative initiatives, the OFC ensures that forage-related research is relevant, accessible, and effectively translated into on-farm improvements that enhance productivity, environmental stewardship, and long-term sector resilience.

In 2019, research priorities were developed for the Ontario forage and grazing sector for the first time. Attendees of this session can be found in *Appendix A* The overarching priority areas in 2019 were Management, Environment, Economic, Technology and Genetics. The 2025 priority-setting session built upon this earlier work, using the 2019 document as a benchmark to assess progress, identify ongoing needs, and recognize areas where additional research of KTT is required. The 2019 Ontario Forage Research Priorities document is included as *Appendix A.*

Across Ontario's agricultural sector, multiple organizations have established research priorities that link directly or indirectly to forage and grazing systems. These priorities reflect shared interest in improving soil health, crop nutrient use efficiency, feed quality, livestock performance, and environmental sustainability. A summary of these organizations and their detailed priorities is provided in *Appendix B*.

3. Overview of the Event

3.1 Purpose and Participants Involved:

The purpose of this event was to collaboratively identify and document forage and grazing research priorities that reflect the shared needs of all participating organizations. The resulting unified document will serve as both a roadmap for coordinated research efforts and a catalyst for attracting joint and collective funding opportunities. It will also provide a resource that members can share within their organizations and across industry sectors to align initiatives and strengthen funding proposals.

A broad range of stakeholder and subject-matter experts participated in the event. These included representatives from producer organizations, forage producers, government, academia, industry associations. A list of attendees can be found in *Appendix C*.

3.3 Summary of Presentations and Updates:

Christine O'Reilly, Forage and Grazing Specialist, Ontario Ministry of Agriculture, Food and Agribusiness (OMAFA), provided a provincial update on forage and grazing research undertaken since the previous priority-setting event. Her presentation highlighted current research institutions and programs engaged in forage research, completed projects, and outstanding needs that remain aligned with the 2019 priorities. She emphasized the importance of leveraging environmental funding to support production-focused outcomes and noted that if producers cannot achieve the yield, quality and potential they require, they will pivot to other crops.

Supplemental document and presentation available in Appendix D.

Stacey Domolewski, Science and Knowledge Mobilization Specialist, Beef Cattle Research Council (BCRC), provided a national overview of forage-related research and outlined BCRC's approach as they renew their Five-Year Canadian Beef Research & Knowledge Mobilization Strategy. She highlighted the importance of aligning research funding with strategic priorities and shared findings from the Canadian Cow-Calf Adoption Rates Report related to forage and grazing management. Her presentation underscored the importance of addressing limited research capacity and determining which research is best conducted nationally, outsourced to another jurisdiction or undertaken within Ontario.

Presentation available in Appendix E.

Birgit Martin, Chair, Ontario Forage Council (OFC), shared the progression of corn vs hay yields from 1919 to 2018. Corn yields have risen dramatically thanks to advances in both genetics and technology. Hybridization beginning in the 1930s and genetic engineering since the 1990s have boosted inherent yield potential, stress tolerance, and pest and disease resistance—accounting for an estimated 45–75% of total yield gains. Layered on top of that, modern input management, precision agriculture, and irrigation technologies further enhance productivity through a systems-based approach. She shared that a push must be made to bolster forage, particularly hay, research and development if perennial forages are to expand in the Ontario cropping landscape.

Presentation available in Appendix F.

3.4 Discussion Methodology

Through facilitated discussions, six overarching themes emerged as a framework to guide conversation and identify research and KTT gaps:

- Building Healthier Soils and Cropping Systems
- Advancing Forage Productivity, Quality, and Longevity
- Strengthening Grazing Systems
- Enhancing Environmental Sustainability and Climate Resilience
- Understanding Markets and Consumer Alignment
- Supporting Adoption and KTT

These themes were used as the pillars to ensure a holistic approach to discussion and priority identification. Many priorities intersected multiple themes, reinforcing the need for integrated, systems-based, One-Health approaches. For this reason, final research priorities are not categorized strictly by theme. Instead, they were placed under three main research priority categories; **breeding research, management research** and **research that highlights the economic and societal benefits** to increase forage acres in the province.

There was a consensus that Supporting Adoption and KTT should be treated as a standalone section to capture important needs that do not require new research but require targeted and strategic KTT efforts.

4. 2025 Research Priorities

Breeding Research

Priority: Forage breeding. Test varieties for Ontario, tracking traits such as drought tolerance, climate resilience, digestibility, disease resistance, and winter hardiness

❖ Relevant & Applicable Research:
- 98% of forge breeding occurs in the public sector.
- AAFC breeders recognize these priorities, though trait selection is complex and progress is slow.

❖ Regional or National Gap:
- National: Breeding capacity and testing programs are limited, no breeding programs based in ON
- Regional: Need to test varieties from other regions

❖ Partnership & Collaboration Opportunities:
- Strong alignment with BCRC, Beef Farmers of Ontario (BFO), and Dairy Farmers of Ontario (DFO) priorities around yield, persistence, climate resilience, and forage quality.
- Sector demand for regionally adapted forages supports muti-commodity collaboration.

Management Research

Priority: Compile data package on crop fertility to support forage crop nutrient recommendations

❖ Relevant & Applicable Research
- Caroline Reisiger looking into completing a literature review for nitrogen (N) crop fertility.
- Sulfur application trial Dr. Kim Schneider and Dr. John Lauzon of the University of Guelph.
- Literature review on fertilizer research in the Great Lakes Basin since the 1970s.
- Past projects have been done, but a clear understanding of what exists and where gaps remain is needed to submit to Ontario Soil Management Committee (OSMC) for review. OSMC updates OMAFA's crop fertility recommendations.

❖ Regional or National Research Gaps
- Regional: Literature review on crop fertility with other nutrients (i.e. N, P, K, and S).

❖ KTT
- Outline for researchers the OSMC requirements for updating soil management and fertility recommendations.

❖ Partnership & Collaboration Opportunities
- Ontario Soil and Crop Improvement Association (OSCIA), Grain Farmers of Ontario (GFO), and Fertilizer Canada emphasize the need to understand how management practices impact soil structure, nutrient cycling and long-term productivity.
- OSICA focuses on long-term impacts of best management practices (BMPs) such as cover crops and optimized tillage.
- GFO is driving work on 4R nutrient stewardship and soil degradation remediation.
- Fertilizer Canada identifies a gap in forage-specific BMPs and supports site-specific nutrient management for perennial forage systems.
- OMAFA priorities around soil health indicators, fertility BMP validation, and cropping system impacts align directly with this work.

Priority: Determine the nitrogen credit available when an alfalfa or other perennial legumes are terminated.

❖ Relevant & Applicable Research
- Red clover crop research (Dan and Connor – Dr. Kim Schneider's lab)
- N credit to corn research – Joe Lauer's Lab, University of Wisconsin-Madison (may or may not be relevant)

❖ Partnership & Collaboration Opportunities
- Opportunities to leverage environmental funding to deliver production-focused research.
- Alignment with Fertilizer Canada, GFO, and OSCIA on nitrogen optimization, nutrient cycling, and soil health.

Priority: Evaluate and communicate best practices for drone seeding to extend the

grazing period, including species selection and management recommendations

- ❖ Relevant and Applicable Research:
- Aerial seeding is not a new concept – existing research.
- Dormant drone seeding trials at community pasture Thunder Bay and Lakehead.

- ❖ KTT
- Midwest Cover Crop Council (MCCC) has a cover crop decision tool which has Ontario data included
- Extension needed to share existing resources.

- ❖ Partnership & Collaboration Opportunities
- Cross-sector alignment on grazing extension, especially from beef, sheep and dairy sectors.
- Opportunity to integrate with OMAFA adaptive grazing and water-use efficiency BMP research.

Priority: Evaluate alternative methods for making or storing forages, including options that reduce or eliminate single use plastic (bale wrap and silo covers)

- ❖ Relevant and Applicable Research
- Engineering research on alternatives to single-use plastic bale wrap/silo covers

- ❖ National or Regional Research Gaps – Regional

- ❖ KTT
- Always work that could be done here

- ❖ Partnership & Collaboration Opportunities
- Cross-sector alignment on feed quality, storage efficiency and cost

Priority: Livestock compaction research – impacts on cover crop grazing and soil health

- ❖ Relevant and Applicable Research
- Initial steps underway by Dr. Kim Schneider, follow up project has potential to look at this.
- Agriculture and Agrifood Canada's Living lab – Ontario administered by OSCIA.

- ❖ National or Regional Research Gaps – National

- ❖ KTT
- System dependent; share information on minimizing impacts for different grazing systems.

- ❖ Partnership & Collaboration Opportunities
- Strong relevance to cash crop-livestock integration priorities across OSCIA, BFO, Canadian Roundtable for Sustainable Beef (CRSB), and OMAFA.

Priority: Investigate intensive management BMPs for "racehorse" and perennial forage

varieties of hay crops

- ❖ Regional or National Research Gaps - Regional

- ❖ KTT
- BMPs can be shared for certain crops.

- ❖ Partnership & Collaboration Opportunities
- Opportunities within all livestock sectors, specifically within equine sector and hay marketing groups
- Opportunity for private sector collaboration

Priority: Assess perennial warm season grasses as a forage crop option to support climate change adaptation.

- ❖ Relevant and Applicable Research:
- Management knowledge for native prairie from the U.S. and Western Canada.
- Work in Elora and Simcoe (Caroline Reisiger and Christine O'Reilly)

- ❖ National or Regional Research Gaps
- Regional – need to understand how these species perform in Ontario's climate.

- ❖ KTT
- Use applicable US/Western Canada BMPs

- ❖ Partnerships & Collaboration Opportunities
- Strong ties to climate resilience priorities across beef, dairy, sheep and OMAFA sustainability frameworks.

Priority: Evaluate contributions of white clover, forage sorghum, and other forage species to a corn silage system

- ❖ Relevant and Applicable Research
- Ream, A., Wang, G., & Earnest, E. (2025) Is White Clover Living Mulch a Viable Option for Corn Silage Production Systems? [Abstract]. CANVAS 2025, Salt Lake City, UT. https://scisoc.confex.com/scisoc/2025am/meetingapp.cgi/Paper/167916
- Earnest, E., Wang, G., & Ream, A. (2025) Does Intercropping Corn and Sorghum Improve Yield Stability and Forage Quality? [Abstract]. CANVAS 2025, Salt Lake City, UT. https://scisoc.confex.com/scisoc/2025am/meetingapp.cgi/Paper/168113

- ❖ Regional or National Research Gaps - Regional

- ❖ KTT
- OFC to monitor progress and report findings.

- ❖ Partnership & Collaboration Opportunities
- Strong alignment with dairy, beef, and sheep priorities for improved forage quality and resilience.
- OMAFA plant health and competitive production systems priorities support this research area.

Research to Highlight Economic and Societal Benefits

Priority: Determine the economic impact a perennial forage crop provides on the yield of other crops, soil health, and the societal benefits associated with increased hay acres.

- ❖ Relevant & Applicable Research
- Ontario Agri-Food Innovation - Crop Rotation Counts: Key Findings from Long-Term Rotation Plot Research

- ❖ Regional or National Research Gap
- Regional: Apply cost scenarios to existing research results
- Regional: Department of Food, Agricultural & Resource Economics (FARE), University of Guelph, analysis needed to apply long-term rotation plot data.

- ❖ KTT
  - Relevant research exists and could be share more widely.

- ❖ Partnership & Collaboration Opportunities
  - Strong alignment with OSCIA's interest in long-term BMP impacts and soil structure improvement,
  - Opportunities to partner with OMAFA, GFO, and BFO on the economic and environmental value of perennial forages.

Priority: Provide evidence showing that cash crop producers benefit economically from grazing cover crops and crop residues

- ❖ Relevant & Applicable Research
- ❖ Agriculture and Agrifood Canada's Living lab – Ontario, administered by OSCIA.

- ❖ Regional or National Research Gap - National and Regional

- ❖ KTT
- Amplify OSCIA and Living Lab results and events.

- ❖ Partnership & Collaboration Opportunities
- Alignment with OSCIA, OMAFA soil health research priorities, and BFO environmental sustainability themes around BMP validation and soil structure benefits of grazing.

Priority: Determine how much carbon is sequestered when converting annual cropland to perennial forage

- ❖ Regional or National Research Gap – Regional

- ❖ KTT
- Messaging around conversation of boreal forest to cropland and maintain carbon levels when breaking new land.
- Possible positive communications piece to support silvopasture systems in Ontario.

❖ Partnership & Collaboration Opportunities
- Alignment with BFO environmental sustainability, CRSB carbon footprint benchmarking, and OMAFA soil health and biodiversity research priorities.

Priority: Conversion of boreal forest to cropland – approaches to maintain carbon levels when breaking new land

❖ Relevant and Applicable Research
- Agroforestry and silvopasture
- Université du Québec en Abitibi-Témiscamingue (UQAT) is doing some good research on silvopasture that could be expanded for Northern Ontario

❖ Regional or National Research Gaps - National

❖ KTT
- Communicate difference in carbon storage across systems and how clearing practice influence carbon loss.

❖ Partnership & Collaboration Opportunities
- Strong overlap with CRSB, BCRC, DFC, and OMAFA climate and sustainable production priorities.
- Opportunities to position silvopasture as a climate solution.

5. Adoption and Knowledge Translation & Transfer (KTT)

The goal of KTT within Ontario's forage sector is to ensure that research findings lead to meaningful, practical, and economically viable changes on farms. This requires coordinated communication, producer-driven research design, and deliberate use of existing networks to ensure information reaches the right audiences in the right ways.

5.1 Barriers to Adoption:

There were challenges discussed that limit how effectively producers adopt new practices. They include:

- Information Gaps
    - Harvest timing varies significantly and producers lack clear, simple decision tools.
    - Mixed messages across sectors can confuse producers (e.g. what defines "quality hay" across the various livestock sectors).
    - Absence of regional variety testing data. Stronger collaboration with the private sector could help generate and share this needed information.

- Limited Researcher-Producer Connection
    - Few structures exist for regular interaction between researchers and producer.
    - Producers may not feel involved during early stages of research design. This is important to ensure meaningful/applicable research is conducted.

- Behavioural and Economic Barriers

    - Some profitable BMPs still have low adoption rates.
    - Barriers differ between livestock, equine, and crop producers.

- Communication and Capacity Constraints
    - Many organizations produce excellent content but operate in silos.
    - Not all sectors use the same communication channels.
    - There is limited capacity for KTT initiatives.

5.2 KTT Priorities:

- Improve Decision-Support Tools and Management Guidance
    - Provide clear guidance on cutting, harvesting, and management timing.
    - Support double-cropping strategies such as grazing corn stalks with overseeded cover crops.
    - Promote and build on the forage U-Pick tool

- Increase Collaboration
    - Leverage existing organizational networks to amplify content rather than duplicating efforts.
    - Strengthen Research-Producer partnerships by using a bottom-up approach, where possible so results are relevant to producers

- Enhance Peer-to-Peer Learning Opportunities
    - Facilitate producer-to-producer extension (e.g. Ontario Sol Network)
    - Support producer-led pasture walks, field days, and cross-sector tours.

- Integrate Environmental Messaging
    - Highlight silvopasture and northern forage opportunities.
    - Develop communication pieces on carbon implications of land-use change.

5.3 KTT Strengths by Organization:

- BFO: Strong webinar capacity and reach.

- DFO: Weekly email newsletter with exceptional engagement.

- Ontario Sheep Farmers (OSF): High demand for in-person district meetings; “Flock Talk” podcast is a strong platform.

- Crop Sector: Continuing Educations Units (CEUs) provide incentive for Certified Crop Advisors (CCAs) to attend events.

- OSCIA: Strong webinar delivery - especially with Knowledge Sharing Events (KSEs) and on-the-ground support through field staff.

- OFC: Experienced in event planning, pasture walks, and coordinating cross-sector collaboration.

6. Considerations and Summary

Several overarching considerations emerged during the 2025 priority-setting discussions that should guide future forage and grazing research across Ontario. A consistent message across participants was the importance of emphasizing the broader societal benefits of forage research. Integrating a One Health approach that recognizes the links between animal health, healthy forages, and a sustainable environment, provides a foundation for both research planning and funding justification. Because perennial forages contribute significantly to soil health, water retention, carbon storage, and long-term farm resilience, there is a strong argument for increased public and private investment in this research area. Economic integration is also essential; without clear cost–benefit information or continued development of improved forage varieties, adoption and sector growth will remain limited.

Three keys to successful forage research were identified:

1. Increase collaboration within and across organizations.
2. Effective KTT through the whole processes.
3. Consider environmental and economic implications of on-farm implementation.

Overall, the 2025 research priorities point to a clear and connected direction across Ontario's agricultural landscape. Forage and grazing systems are seen as key levers for soil health, climate resilience, and long-term farm sustainability. Research is shifting from a single productivity focus toward including economic, environmental, and performance outcomes. National-level breeding programs remain essential, with trials preformed across regions to reflect differences in climate and production systems. A strong interest in cross-sector collaboration emerged, emphasizing that forage systems bridge crop, livestock, environmental, and economic interests. The Ontario Forage Council can use this document to guide future research development, strengthen collaborative efforts, and track progress over time.

7. Appendices

Appendix A: Forage and Grazing Research Priorities (2019)

Report:

Ontario Forage Council

LRIC LIVESTOCK RESEARCH INNOVATION CORPORATION

Forage and Grazing

Research Priorities

October 29, 2019

Forage Strategy Outcomes

This report summarizes the meeting held on October 29th, hosted by Livestock Research Innovation Corporation (LRIC) and The Ontario Forage Council (OFC) to establish forage and grazing research priorities for Ontario. This is the first time such a comprehensive session has been held for the Ontario Forage Council. The meeting was attended by 27 participants from 16 different organizations (See list in Appendix A).

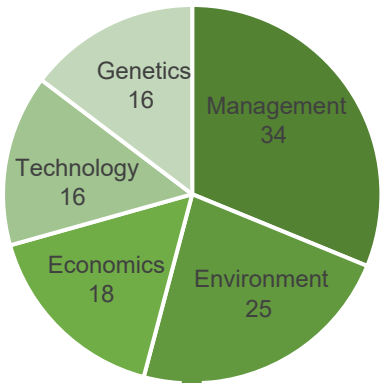
Presentations were made by Dr. Reynold Bergen, Science Director with Beef Cattle Research Council (BCRC), and Christine O'Reilly, OMAFRA Forage and Grazing Specialist with the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). Both highlighted the loss of research capacity in the field over the last 40 years. There has continued to be national research however the lack of researchers and capacity in Ontario has limited trials that consider our regional conditions, including climate conditions, soil and production practices. The University of Guelph is in final hiring negotiations with a researcher who will have a forage mandate. Current funding opportunities can provide this new hire the opportunity to initiate and collaborate to address areas highlighted by this report. Providing an **industry mentor** to the position was identified as a valuable collaboration to assist the researcher in advancing the research more rapidly.

It was noted that a review of existing relevant research would be valuable, in part to determine which would be applicable to Ontario soils and climatic conditions and how this shapes the gaps in research.

Three important keys to for successful research were identified by the participants:

1. There needs to be a higher level of **collaboration** between and within organizations to maximize results for all stakeholders.
2. **Effective technology transfer** must be a focus of all initiatives.
3. Each project needs to consider the **economic** impacts of the research outcomes relative to on-farm implementation of results, when applicable.

Five overarching priority areas were identified by the participants and ranked during discussion. Further prioritization was done with each participant using 5 stickers to identify their top individual priorities. The stickers within each category were totaled (see Appendix C), and results displayed in the chart below. The ranking of the topic areas matching with the discussion.



The top ranking priorities across all areas identified by participants are listed below.

1. Technology to measure **on farm yield** such as sensors on hay equipment. A compilation of existing resources would be a benefit prior to any investment in research and development being made in this area.

2. Outcomes that results in **extending the grazing season** for livestock, as long as possible. This could involve but is not limited to: targeting of winter grazing crops such as: corn and turnips, use of stockpiles and/or annual crops.

3. Conduct **fertility** study(s) using biologic and other measures to assess how fertility affects quality. Considerations to include but not limited to phosphorus and potassium rates, nitrogen and assessment of soil organic matter.

4. An economic assessment of the **cost competitiveness of forage in rotation with annual crops in high production land** areas.

5. **Systems assessment** that quantifies agronomic and environmental (including biodiversity/pollinators) impacts of including forages in annual rotations.

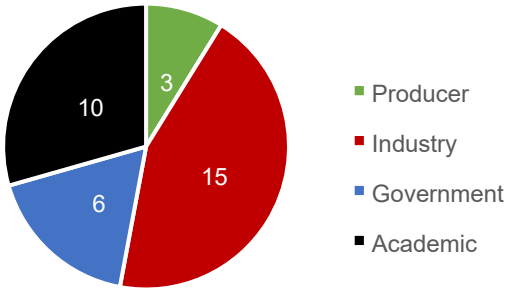
6. Develop **options that are comparable to alfalfa**. Considerations can include but are not limited to:
    - that will thrive in northern climates,
    - on untiled, poor nutrient,
    - rocky and/or marginal lands.

Background

Following table and group discussions, the participants using stickers scored individual topics, identifying the top priorities within each area. The priorities listed in each area are compiled. It should be noted that several attendees were identified as industry as they were representing

organizations, however they are also producers. The number of sticker votes show within each area of the charts.

Management



1. Extended grazing to have as long a grazing season as possible.
    - Stockpiles
    - Annual crops
    - Targeted winter grazing crops like corn and turnips

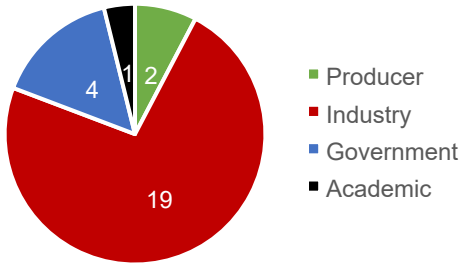
2. Fertility study
    - P & K rates, N OM?
    - How does fertility affect quality?
    - Biologic measures

3. Management strategies and Agronomics for best practices for Forage and Grazing Considerations identified:
    - Species and Cultivars
    - Quality
    - Duration of grazing period
    - Marginal Pastures
    - Utilizing Native and Tame Production Systems
    - Bird and pollinator species habitats
    - Fertilization of pasture

4. Selecting the livestock genetics to match the grazing strategies
    - breed traits best for pasture utilization
    - breeds best for certain pasture/grazing densities

5. Impact/evaluation of increased management intensity in the interface between forestry and grazing croplands (Silvaculture) to enhance both forage and tree productivity and animal welfare (shade for cattle in annual pastures)

Environment



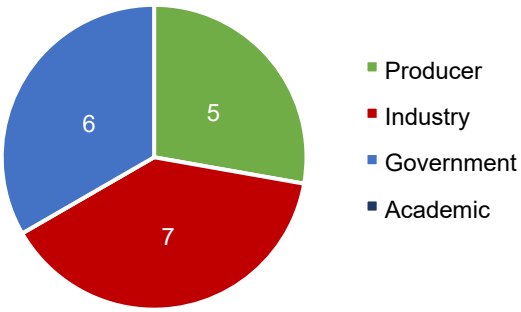
1. Systems-based research that quantifies agronomic and environmental impacts of including forages in annual rotations.
    - including soil health

2. Pollinator health #'s
    - On pastures and hayfields
    - Also overall biodiversity on pastures and hayfields

3. Data/quantification of soil health of grasses and forages compared to other (ag and nonag) land uses – e.g.city parks
    - Identify the measurement/claim of soil health in easy to understand and simple way

4. Carbon storage and sequestration
    - Need Ontario info on carbon dynamics on our grasslands with our soils, climate, practices, etc.
    - Compare with other land uses

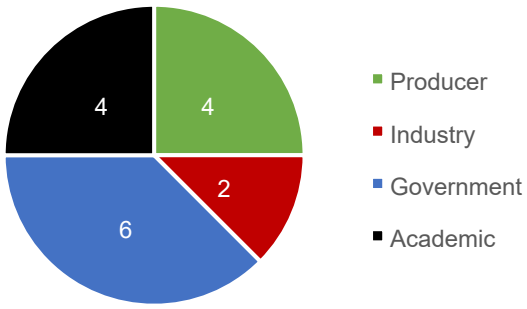
Economics



1. Cost competitiveness of forage in rotation with annual crops in high production land areas
   • Economic analysis of forages vs other crops and as cover crops

2. Integrate Economics, Environmental Goods and Services contribution acres to prime production acres

Technology

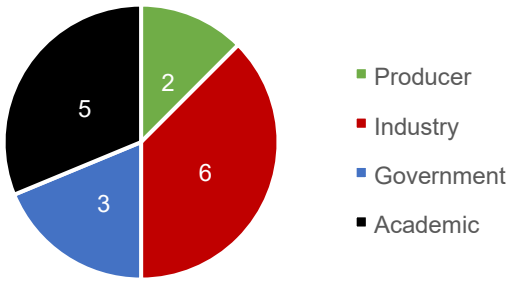


1. Methods to measure on farm yield
   - Sensors on hay equipment
   - Plate meters etc. for pastures

2. Within Intensive grazing systems increase plants per acre Examples could be:
   - Fencing Technology
   - Crop resilience
   - Labour saving devices

3. Different Methods for Making and Storing Forages
   - Wrap, bunker silos, hay shed
   - Recycling sileage wrap, edible or biodegradable wrap

Genetics



1. Develop options that are comparable to alfalfa. Considerations can include but are not limited to:
    - hardiness in northern climates, • on untiled, poor nutrient land,
    - rocky and/or marginal lands.

2. Adapt and Identify Forage/Pastures for
    - Conditions of weather variability and Climate Change
    - Reduction of winter kill in alfalfa
    - Palatability of species
    - Cultivars able to extend grazing and meet nutritional requirements
    - Improved digestibility e.g. tannins in trefoil

3. Programs (breeding or other) that will:
    - Increase yields on less acres
    - Varieties with greater genetic potential
    - Disease resistance

Getting research and knowledge adopted also received discussion and needs to be considered in all research. Impacting the mindset of the primary producer on technology and agronomy adoption was identified with the need to use the non-profit sector to deliver applied extension projects. Involving seed companies with industry-led forage research was also noted as an important collaboration.

Conclusion

There are now several clear priorities for forage research in Ontario. The overriding priorities of collaboration, effective technology transfer and analysis of economic impact are central to all research initiatives. There is currently a window of opportunity to source funding through OMAFRA, led by researchers at the University of Guelph, as well as through Beef Farmers of Ontario. Further opportunities though BCRC and collaborations in Northern Ontario also exist.

Appendix A

Name	Email	Organization
Andrew Campomizzi	andy@beco-birds.org	Bird Ecology and Conservation Ontario
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Appendix B: A Review of Existing Forage Research Priorities

A Review of Existing Forage Research Priorities

Livestock Research Innovation Corporation

Contents

Existing Forage and/or Grazing Related Research Priorities

Across Ontario's agricultural sector, multiple organizations have established research priorities that link directly or indirectly on forage and grazing systems. These priorities reflect a shared interest in improving soil health, nutrient efficiency, feed quality, livestock performance, and environmental sustainability.

The following summary outlines the existing research priorities of key provincial and national organizations involved in Ontario agriculture, including: Ontario Soil and Crop Improvement

Association (OSCIA), Grain Farmers of Ontario (GFO), Beef Cattle Research Council (BCRC), Canadian Roundtable for Sustainable Beef (CRSB), Beef Farms of Ontario (BFO), Dairy Farmers of Canada (DFC), Ontario Sheep Farmers (OSF), Fertilizer Canada, and Ontario Ministry of Agriculture, Food and Agribusiness (OMAFA).

Ontario Soil and Crop Improvement Association (OSCIA)

- Measuring the long-term impacts of both conventional practices and BMPs on soil health, e.g. cover crops;
- Explore optimized tillage system in crop production to maximize profit and minimize environmental impacts;
- Enhance residue management systems in crop production to enhance benefits to productivity and soil health.

Grain Farmers of Ontario (GFO)

- Optimize plant use efficiency and profitability of nutrients, particularly nitrogen, phosphorus, potassium, sulfur, and calcium (e.g., 4R nutrient stewardship), and validate the effectiveness of 4R practices on farm, including their impact on nutrient losses, opportunities for reduced nutrient application requirements, reduced GHG emissions, and improved water quality.
- Develop strategies to optimize soil structure and minimize and remediate impacts of soil degradation (e.g., shallow and deep soil compaction, loss of soil organic matter, water/tillage erosion) with a focus on demonstrated cost-benefit analysis (factoring soil type into economics).
- Advance production systems to maximize profit, maintain or build soil health, improve crop resilience and reduce GHG emissions & nutrient losses (e.g., factoring in crop rotation, fertility, tillage system, and seeding). Consider the interactions among inputs, specific cropping practices, and environment for increased production, soil health and sustainability.
- Develop effective crop residue management practices to minimize residue challenges, and maximize crop production, profitability and environmental sustainability under minimal tillage/no-till.

Beef Cattle Research Council (BCRC)

For all priority areas, proposed research needs to give strong consideration to the following overarching aims:

1. Improved communication, collaboration and understanding between researchers and industry, with research/industry collaborations increasing to account for 25% of research activities.
2. Cost-benefit analysis completed to support recommendations and knowledge transfer from research projects that impact production profitability.

3. Encouragement of interdisciplinary teams undertaking systems-based approaches integrating appropriate parts of the value chain.
4. Investigate technologies with the potential to reduce labor and improve production efficiencies throughout the forage, cattle and beef production chain.
5. Enhanced awareness and consideration of relevant international research and development activities to avoid duplication and identify opportunities for collaboration.

Five-Year Canadian Beef Research & Technology Transfer Strategy - 2021
Feed Efficiency & Utilization Outcomes and Priorities

- Improve feed grain and silage yields through plant breeding, agronomic practices and harvest strategies
    - Develop new, high yielding feed grain and silage varieties with superior agronomic performance and nutritional quality
    - Investigate agronomic, harvest, and ensiling practices to optimize feed and silage yield, nutritional quality, and animal health and performance
    - Improve producer awareness and adoption of regionally appropriate varieties for feed grain and silage
    - Improve producer awareness and adoption of optimal agronomic, harvest and storage practices for feed grains and silage production
- Investigate feed processing, by-products, additives, supplements or other feeding strategies that optimize productivity and profitability
    - Develop rapid and cost-effective ways to assess nutritional value, digestibility, and optimal processing of feedstuffs and by-products
    - Develop cost-effective methods to measure, and feeding strategies to ensure, uniform supplement intake on pasture
    - Re-investigate and update nutritional recommendations to maintain optimal animal health and performance
    - Investigate feed processing methods and practices, additives and management systems to improve digestibility, animal maintenance costs and cost of gain
    - Quantify the role and identify opportunities to further use cattle to upcycle and reduce food loss and waste
    - Promote the adoption of BMPs for utilizing by-products, additives, supplements, and other feed processing and feeding strategies
    - Evaluate the economic feasibility of feed processing, by-products, additives, supplements or other feeding strategies

Forage & Grassland Productivity

- Improve the management and productivity of native/naturalized pastures to enhance profitability and discourage land conversion
    - Identify practices that optimize utilization and resilience of pastures which may include indicators of appropriate recovery times
    - Identify or develop cost-effective management strategies to control the spread of invasive plant species on rangeland
    - Promote grazing management practices that optimize the productivity of native plant species
    - Promote best management practices to help producers control invasive plants

- Better understand the impact of grazing management on plant, animal and soil interactions and how the overall system contributes to plant and animal health and productivity
    - Quantify the impact of agronomic and grazing management practices on economic and environmental outcomes such as plant health, forage yields and quality, animal health and performance, soil carbon sequestration and organic matter, soil health and quality, water infiltration and nutrient cycling in different ecoregions of Canada
    - Identify and validate technology to simply and cost-effectively manage grazing systems and quantify improvements in forage productivity
    - Identify simple, practical, cost-effective indicators of soil quality that have impacts on forage quality and productivity
    - Evaluate long term effects of incorporating grazing on crop production land Extension Priorities:
    - Encourage the development and adoption of forage and grazing management plans and practices that encourage long term plant, soil and animal health and productivity
    - Encourage the adoption of cost of production analysis to assist in decision making
    - Promote the use of resources and tools to evaluate grazing management practices
    - Encourage the adoption of management practices that extend the grazing season
    - Identify and promote best management practices for incorporating grazing on cropland
- Cost-effectively improve the agronomic performance, yields, nutritional quality and palatability of annual and perennial tame species for grazing or stored forages
    - Develop strategies and best management practices to promote stand productivity and longevity, preserve forage quality and prevent waste in stored forages
    - Develop and evaluate new varieties with improved germination, emergence, yield, digestibility, salinity, drought and flood tolerance, reduced fall dormancy and improved winter hardiness and plant persistence
    - Independent comparisons of promising international and domestic forage varieties and mixtures on a meaningful scale to determine varietal and mixture adaptation under a range of environmental conditions and soil types
    - Promote regionally appropriate management practices that encourage long-term stand maintenance and profitability
    - Identify simple, cost-effective strategies to rejuvenate tame pastures when required
    - Communicate the potential forage yield and animal carrying capacity improvements that can be cost-effectively achieved under different management systems
    - Promote management practices that maintain legumes in mixed grass stands and provide producers with information on safe and effective ways to graze legumes in pastures

- Communicate variety testing trial results to help producers make informed variety and seed selection decisions
- Develop and communicate cost-benefit analysis of different harvest strategies
- Promote best practices for irrigation for forage and feed production

Environmental Sustainability

- Develop cost-effective ways to reduce greenhouse gas emissions, maintain or improve biodiversity, increase soil carbon or improve water infiltration on pastures and rangeland
  - Validate grazing practices that improve water infiltration, forage yield and soil organic matter in Canadian conditions across a variety of ecoregions
  - Evaluate the roles of the soil microbiome and plant-soil interactions in short-, medium- and longterm soil carbon storage and sequestration, plant yield and water holding capacity
  - Develop simple outcomes- and systems-based approaches for producers to understand and quantify the costs and benefits of environmental best management practices
  - Investigate cost-effective ways to reduce greenhouse gas emissions on pasture- or forage-based systems
  - Quantify N and P excretion rates in grazing animals, N impacts on GHG emissions and P runoff and leaching impacts on water quality/eutrophication in central and eastern Canada.
  - Develop or repurpose materials with the potential to reduce the amount of single-use plastics along the forage, cattle and beef production and supply chains
  - Develop and promote best management practices for improved environmental sustainability
  - Encourage the adoption of best management practices that support biodiversity and species at risk habitat preservation
- Develop cost-effective ways to reduce feedlot greenhouse gas emissions and evaluate the impacts of manure nutrients on pasture and cropping systems
  - Evaluate supplements, strategies and practices used to reduce greenhouse gas emissions in the feedlot using a systems approach
  - Quantify the effectiveness of forages to mitigate the nutrient mobility associated with extended winter grazing practices
  - Develop manure handling and processing technologies and strategies that enable manure to be transported and spread more cost-effectively Extension Priorities:
  - Determine the cost benefit of utilizing manure on crop land
  - Promote best manure and odour management practices

Source:
https://www.beefresearch.ca/content/uploads/2022/04/Five_Year_Canadian_Beef_Research_and_Technology_Transfer_Strategy_July_2021_web-1.pdf

Canadian Roundtable for Sustainable Beef (CRSB)

CRSB Research Priorities & Recommendations – Updated July 2023
Environment

- Develop cost-effective methods of reducing GHG emissions or emissions intensity in primary production.
    - Feed - Improve feed and forage yields, quality, digestibility, efficiency and optimize both feed quantities and nutrients within rations to match animal requirements.
    - Innovations in products and/or management that could increase productivity, efficiency and/or reduce, reuse, or recycle waste along the supply chain.
- Quantify the impact of land management on carbon storage potential; developing and/or incorporating regionalized values for soil cover, type and climate parameters.
    - Develop ways to validate annual carbon sequestration using satellite data.
    - Develop carbon protocols that are effective for producers with minimal measuring and reporting burden.
    - Develop methods to assess carbon stock deeper than 30 cm into the soil.
    - Develop region-specific data and specific carbon stock change per cover type.
- Land Use and Biodiversity
    - Quantify the economic, agronomic and biodiversity benefits of integrated annual crop, forage and beef production systems.
    - Improve land use data quality - clarifying national land use conversion numbers and identifying land that is at high risk of conversion.
    - Further identify and quantify beneficial management practices including rotational grazing, understanding of stocking capacity and grazing days per acre, and soil health through technical assessments.
    - Update and refine the Wildlife Habitat Capacity Index (WHCI) developed by Agriculture and Agri-Food Canada (AAFC) with current data. Such refinements could include:
        - Improve granularity of the analysis, by assessing wildlife breeding and foraging/feeding habitat requirements and impacts of species when increasing/decreasing in population separately, on different cover types and by considering taxonomic groups or endangered species separately.
        - Better understand how grazing systems and management practices can affect biodiversity using multi-taxon criteria.
- Water Quality
    - Quantify the impact of native and tame pasture management on water use, cycles and watersheds in eastern Canada.

Economic

- Producer Viability
    - Assess the economic feasibility and acceptance of various recommended management practices (RMPs) for different production systems across Canada.
        - Evaluate various winter-feeding strategies as feed is a major cost.
        - Identify practices for different production systems that result in win-win situations that are both lower cost of production and have lower economic impact

Source:
https://www.beefresearch.ca/content/uploads/2022/04/Five_Year_Canadian_Beef_Research_and_Technology_Transfer_Strategy_July_2021_web-1.pdf

Dairy Farmers of Canada (DFC)

Sustainability:

- Sustainable feed cropping systems are defined for long term productivity
    - Design crop rotation systems and study complex forage mixtures adapted to the region and soil type, intercropping, interseeding, double cropping and cover crop practices to improve soil health, control weeds, optimize yields and maintain nutrient value throughout entire season.
    - Improve forage quality, yield and resistance (drought, flooding, winter survival) through breeding and management practices (for cropping and conservation), such as increasing the nutritive value, extending productive longevity and reducing fall dormancy of alfalfa and increasing the yields of grasses (regrowth) during the summer.
    - Optimize best management practices for manure, nutrients, and pesticides in various cropping systems.
    - Explore alternatives to plastic silage materials (e.g., bio-degradable materials, use of milk components in the development or creation of bioplastics, etc.) while ensuring that alternatives are not damaging to the environment (e.g., non-degradable residues or microparticles)
- Cost-effective and concrete measures to increase biodiversity are clearly defined
    - Assess and demonstrate the short- and long-term benefits and impacts of increased biodiversity on dairy farms.
    - Investigate the potential of strategies such as pasture lands, complex crop mixture, use of plants in intercropping or on uncropped land (riparian zone, wetland restoration, woodlots, etc.), and other initiatives (e.g., bat boxes) to promote plant and animal biodiversity and pollinating insects.
- Social and economic factors impacting adoption and implementation of any new practices on dairy farms are well understood, through integration of social and economic science into all research projects
    - Assess the short- and long-term economic impacts of the adoption of new strategies, practices and technologies on Canadian dairy farms.
    - Better understand barriers to the adoption of some recommended practices.
    - Evaluate and identify means to gauge and monitor evolving societal acceptance of dairy farm practices among Canadians.

Animal Health, Care and Welfare

- Practical and sustainable (environmentally, economically and socially) housing and management options are identified and adapted to evolving Canadian climate change for the best care and welfare of dairy cattle of all life stages
    - Investigate the impacts of new construction and renovations of housing systems (e.g., recycled manure bedding, compost pack barn, outdoor/pasture access, etc.) on animal health, welfare and handling, onset and development of mobility issues and other injuries, and potential trade-offs between animal welfare, production, labour, cost and environmental sustainability.

Source: https://dairyfarmersofcanada.ca/en/dairy-research/national-dairy-research-strategy

Fertilizer Canada

Strategic Plan 2020-2025

- Preliminary research highlights the need and potential for an established science-based program to provide site-specific BMPs to forage crop producers.

Beef Farmers of Ontario (BFO)

Research Investment Strategy 2021-2024 (reviewing this year)

Theme 1: Environmental Sustainability

- Ontario beef farmers are measurably reducing the industry's environmental footprint by developing solutions and systems beneficial to both beef production and the Environment.
    - The carbon impact of standard practices is identified and benchmarked
    - Life Cycle Analysis (LCA) of beef production in Ontario is measured
    - Improved feed efficiency and nutrient utilization that demonstrably reduces environmental impact
    - Cost-effective technologies that prevent phosphates from contaminating water are being implemented on Ontario beef farms
    - The environmental impact of developing a beef industry in Northern/eastern Ontario has been undertaken and published

Theme 2: Animal Health

- Nutrition
    - New nutritional management strategies have reduced the incidence of metabolic diseases by 20%, with no associated decrease in productivity

Theme 3: Economic Sustainability

- Financial modeling tools have been developed that allow producers to undertake a COP based evaluation of new market opportunities
- The economics of developing a beef industry in Northern/Eastern Ontario is understood
- Feed efficiency
    - Cost-effective novel nutritional strategies increase feed efficiencies by 5-10% by 2024
    - Improved nutrition has enabled cost-effective access to markets where a guarantee of hormonefree products is required

Theme 4: Forages/Feeds

- Development forages and feed systems that satisfy nutritional demands for animals at the same time increasing performance, optimizing animal health as well as decreasing production cost for producers
    - Continue to improve cow efficiency through new and current feeds and feeding systems

    - An efficient and cost-effective method of evaluating the feasibility of using nutritional manipulation and novel feeding strategies for utilizing by-product and alternative feeds is developed
    - Producers are confidently developing nutritional strategies to meet carcass targets that satisfy processor/market demand
    - By 2024, a forage research program for the beef industry is established in Ontario. The target of this program will be to increase yields by 10% over 10 years
    - By 2024, alternative feed energy sources (to corn) are being trialed

Subcategories:

- Pasture Systems
    - Develop pasture management systems that increase animal health and performance while making a positive impact on the Environment
- Cover Crops
    - Development of strategies that utilize cover crops in production systems
- Field Crops
    - Research field crops that optimize performance without impacting the overall health of the animal
- Feed Systems
    - Increase overall feed efficiency by 5%-10% by 2024
    - Develop strategies around maintaining feed quality both in storage and in the bunk

Theme 6: Market Research (Consumers)

- Producers have developed and are operating a market intelligence system designed to forecast future consumer needs
- What consumers are buying and why,
    - The product characteristics for which consumers are willing to pay a premium. Objectives for Market Research recommended for consideration at the national level 9
    - Effective methods for consumers to identify desirable traits or characteristics
    - An effective methodology to flow value throughout the whole value chain
    - Survey results for consumer desires instead of “vote with their wallet” currently being utilized, i.e., organic, carcass side, product range, etc.
    - Improved knowledge of consumer demands and how to communicate with them

Source: BFO Research Investment Strategy 2021–2024 (PDF)

Ontario Sheep Farmers (OSF)

Ontario Sheep Industry Desired Outcomes & Potential Areas for Investigation – Spring 2019
Environment:

- A literature review of existing data to determine its applicability to sheep production, the landscapes and climatic conditions in Ontario

Nutrition: The economics of various feeding strategies for sheep and lambs in Ontario are available to and useful for producers

- Could winter wheat or rye be grazed with a minimal impact and/or improvement to the crop yield?

- The impact of dietary ingredients on meat quality
- Options and methods for forage and grass grazing during drought conditions
- Assessment of feed sources and their impact on the gut microbiome

Nutrition & Health:

- Maternal Nutrition: Identify nutritional strategies that will reduce variations and optimize ewe body condition score in accelerated rearing systems
- Methods including grazing systems to improve control of parasites
- Management and nutritional methods to manage gastrointestinal parasitism

Source: https://www.ontariosheep.org/media/coxfqb4l/full-final_2019_april-3.pdf

Ontario Ministry of Agriculture, Food and Agribusiness (OMAFA)

OMAFA's Research Priorities, guided by the Grow Ontario Strategy and the Sustainable Canadian Agricultureal Partnership (Sustainable CAP), aim to enhavne the competitiveness, productivity and sustainability of Ontario agri-food sector. These are research priorities for the 2025-2026 Alliance Project Operating Funding, including 11 high-level Research Priorities Areas aligned with the Ministry's core business areas: Protection and Risk Resilience, Environmental Stewardship, and Productivity and Growth.

Research Priority Area: Competitive Production Systems

Goal:

- Improve the efficiency, productivity, and competitiveness of production systems through technology adoption and innovation such as:
    - Labour-saving technology or practices
    - Waste reduction and recycling
    - Increased water/energy efficiency
    - Establishing basic agronomic practices for new cultivars and new production systems (e.g., cultivar evaluation, survival in challenging environments, fertility guidelines, irrigation requirements, planting dates and methods)
    - Assessing the economic viability of growing a new crop in Ontario by analyzing market demand, production costs and profitability, and climate suitability.

Relevant Research Focus Areas:

- Improved Management and Processes: Crop and livestock production systems that improve yields and quality through agronomy, production practices, decision-making, and efficient fertilizer use.
- Input Use Efficiency: Research on input efficiency (e.g., feed efficiency, fertilizer optimization, automation, irrigation efficiency).
- Labour Access/Efficiencies: Strategies to improve access to labour and enhance efficiency in forage or livestock production systems.

Research Priority Area: Animal Health and Welfare

Goals:

- Enhance public confidence in the sector to deliver on animal health and animal welfare expectations and demands.
- Anticipate, detect, mitigate, and/or reduce animal health hazards and antimicrobial use along the supply chain.

Relevant Research Focus Areas:

- Prevention & Control of Pathogens: Development and integration of effective prevention, mitigation, and control methods for production-limiting and emerging diseases (e.g., biosecurity BMPs, vaccines, carcass management) relevant to grazing livestock.
- Development of Best Management Practices: Creation of BMPs to improve animal welfare (e.g., housing, pain management, pasture-based systems).
- Health, Welfare, and Productivity of Early Life Stages: Research to reduce morbidity and mortality, particularly in pasture-based or mixed systems.

Research Priority Area: Plant Health and Protection

Goals:

- Anticipate, detect, mitigate, and/or reduce plant hazards along the supply chain and improve plant resilience and resistance.
- Help strengthen the agri-food sector's sustainability through increased use of Integrated Pest Management (IPM) and other pest mitigation strategies.

Relevant Research Focus Areas:

- Biology of Current and Emerging Pests: Study of pest biology, ecology, and management of species affecting forage and pasture crops.
- Integrated Pest Management: Development of management strategies and alternative control options (e.g., biological controls, predictive pest forecasting) for forage and pasture crops.
- Pathway Analysis: Identification of pest and pathogen movement pathways within forage and mixed cropping systems.

Research Priority Area: Soil Health

Goal:

- Protect and enhance soil health and conservation to support agricultural productivity and improved public trust in the sector's sustainability.

Relevant Research Focus Areas:

- Baseline Soil Health Information: Development of measurable soil health indicators (physical, chemical, and biological) relevant to pasture and forage systems.
- BMP Development: Validation of management practices and technologies that enhance soil structure, fertility, and biodiversity, including cover cropping and pasture renovation.
- Environmental Impact of Management Practices: Research on how cropping and grazing practices affect soil health, fertility, and erosion control.

Research Priority Area: Water Quality and Quantity

Goal:

- Protect and enhance water quality to strengthen public trust in the sector's sustainability.

Relevant Research Focus Areas:

- BMP Development: Research and validation of practices and technologies that support water quality and water-use efficiency in forage and livestock systems.
- Environmental Impact of Management Practices: Study of nutrient management, fertilizer use, and green infrastructure in pasture and forage operations.
- Analysis of BMP Adoption: Understanding the social and economic barriers to adopting water- and nutrient-related BMPs in grazing or mixed-use systems.

Research Priority Area: Sustainable Production
Goals:

- Strengthen the sustainability of the agri-food sector through:
    - Sustainable land use to improve and maintain resilient, connected agri-ecosystems.
    - Sustainable use of inputs and resources, including improved water, waste, and energy efficiency, recovery, and reuse.
    - Reduced greenhouse gas (GHG) emissions.
    - Increased utilization of 4R Nutrient Stewardship (Right Source, Rate, Time, Place).
    - Improved understanding of sustainability requirements (regulatory, certification, and market).

Relevant Research Focus Areas:

- BMP Development: Develop and validate sustainable practices for soil, water, nutrient, and energy management in forage and grazing systems.
- Environmental Impacts of Management Practices: Evaluate the effects of nutrient management, fertilizer use, and IPM on ecosystem health, biodiversity, and climate resilience in forage-based systems.
- Analysis of BMP Adoption: Assess economic and behavioral factors influencing the adoption of sustainable forage and grazing management practices.

Research Priority Area: Productive Land Capacity
Goal:

- Implement land use policies that support a healthy and resilient agriculture and food industry, ensuring access to land for pasture, forage production, and mixed farming systems.

Relevant Research Focus Areas:

- Evidence to Support Land Use Policies: Research to inform land use decisions that protect farmland availability for forage and grazing production.
- Effectiveness of Land Use Policies: Assessment of how current policies influence land access and economic success for producers dependent on pasture and forage systems.

Cross-Cutting Research Focus Areas (Directly Relevant to Forage and Grazing)

- Climate Change Resiliency: Identify risks, adaptation strategies, and mitigation measures to strengthen resilience of forage, grazing, and mixed systems.
- Innovative and Disruptive Technologies and Practices: Develop and validate new tools, such as remote sensing, automation, and decision-support technologies for forage and livestock systems.
- One Health Opportunities: Integrate animal, plant, and environmental health research to enhance grazing system sustainability.
- Measuring Performance: Quantify BMP adoption, soil and water health improvements, and productivity outcomes in forage systems.
- Emergency Management: Develop strategies for risk management in forage supply, disease outbreaks, and environmental events affecting livestock feed availability.

Source: https://api.liveugconthub.uoguelph.dev/sites/default/files/2025-07/2025-26_omafa-research-priorities_tier-1-alliance_aoda_updated.pdf

Shared Research Priorities Related to Forage & Grazing in Ontario

Introduction

Across Ontario's agricultural sector, multiple organizations have established research priorities that link directly or indirectly on forage and grazing systems. These priorities reflect a shared interest in improving soil health, nutrient efficiency, feed quality, livestock performance, and environmental sustainability, etc. The following section highlights shared priorities across organizations and suggests connected direction that have been established.

Shared Priorities Across Sectors

1. Building Healthier Soils and Cropping Systems

Many organizations — including the OSCIA, GFO, and Fertilizer Canada — emphasize the need to understand how management practices impact soil structure, nutrient cycling, and long-term productivity.

- OSCIA focuses on long-term impacts of best management practices (BMPs), particularly cover crops and optimized tillage.
- GFO is driving work on 4R nutrient stewardship and soil degradation remediation, linking soil health to economic outcomes.
- Fertilizer Canada identifies a gap in forage-specific BMPs, calling for site-specific nutrient management programs for perennial systems.
- BFO's environmental sustainability theme aligns directly here, highlighting life cycle analysis of Ontario beef production and identifying the carbon impact of standard practices to benchmark industry progress. Their research also prioritizes exploring the environmental implications of developing a beef industry in Northern and Eastern Ontario.
- OMAFA's Soil Health and Sustainable Production priorities reinforce these sector-led efforts by emphasizing measurable soil health indicators, BMP validation for fertility and biodiversity, and the environmental impacts of cropping and grazing practices on soil structure and productivity.

Together, these priorities point toward the need for integrated, systems-based soil research that includes forages and grazing within Ontario's broader soil health strategy.

2. Advancing Forage Productivity, Quality, and Longevity

Organizations across beef, dairy, and sheep sectors share a focus on improving forage yields, nutritional value, persistence, and resilience under Ontario's variable conditions.

- The BCRC and BFO both call for forage breeding and management strategies that increase yield and efficiency while reducing costs.

- DFC emphasize breeding and management practices that improve forage quality, resistance to drought and winterkill, and year-round productivity.
- OSF is exploring forage options under drought and economic feeding strategies suited to Ontario's landscapes.
- Under BFO's Forages/Feeds theme, measurable targets have been set — such as establishing a forage research program aimed at increasing yields by 10% over 10 years, trialing alternative energy sources to corn, and developing systems that optimize animal health while decreasing production costs.
- OMAFA's Plant Health and Protection priority also contributes through research on pest biology, integrated pest management (IPM), and resilience of forage species.
- OMAFA's Competitive Production Systems priority complements these aims by supporting research on improved management practices, input use efficiency, and the economic viability of new crop systems – all directly relevant to forage and pasture performance.

Across these groups, there's a consistent push to make forage research more regionally adapted and economically grounded, recognizing that better forages mean stronger livestock performance and improved environmental outcomes.

3. Strengthening Grazing Systems and Integration

Grazing management is a cross-cutting priority across beef, dairy, and sheep sectors, reflecting its importance for both productivity and environmental outcomes.

- BCRC outlines comprehensive research on grazing management's effects on plant–animal–soil interactions, carbon sequestration, and water infiltration.
- CRSB highlights rotational grazing and integrated crop–forage–beef systems as key practices for carbon storage and biodiversity.
- BFO emphasizes pasture systems that increase animal health and performance while improving environmental outcomes, complementing the broader national focus on adaptive, regenerative grazing practices.
- OSF is exploring grazing in mixed systems (e.g., winter wheat/rye) and parasite control through pasture management.
- OMAFA's Sustainable Production and Water Quality priorities support these goals by encouraging BMP development for water-use efficiency, nutrient management, and GHG reduction in grazing and mixed-use systems.
- The OMAFA Animal Health and Welfare priority contributes additional depth by funding research on prevention and control of livestock diseases, development of pasture-based welfare BMPs, and management practices that enhance animal resilience in outdoor systems.

Collectively, these priorities show strong alignment toward adaptive, regionally tailored grazing systems that link productivity, animal welfare, and climate resilience.

4. Enhancing Environmental Sustainability and Climate Resilience

Several organizations are linking forage and grazing research directly to climate goals and ecosystem services.

- CRSB and BCRC prioritize GHG reduction, carbon sequestration, and biodiversity enhancement, supported by measurable on-farm outcomes.
- DFC integrates environmental and social sustainability, emphasizing manure and nutrient management, biodegradable materials, and biodiversity on dairy farms.
- BFO's environmental sustainability objectives extend these efforts through carbon benchmarking, feed efficiency improvements, and cost-effective nutrient technologies that demonstrably reduce environmental impact.
- OMAFA's Sustainable Production and Climate Change Resiliency priorities reinforce this by focusing on sustainable resource use (land, water, energy), 4R Nutrient Stewardship, and the adoption of management practices that improve carbon outcomes and ecosystem health.

These efforts underscore the role of forages and grazing in natural climate solutions and circular agri-food systems.

5. Supporting Adoption and Knowledge Translation and Transfer (KTT)

Across all organizations, there's recognition that research must be practical and economically viable.

- BCRC looks for cost-benefit analysis and extension planning for all projects.
- GFO and BFO integrate economic analysis into their soil, nutrient, and forage priorities.
- DFC emphasizes understanding barriers to adoption and producer decision-making.
- Within BFO's Economic Sustainability theme, tools for cost of production-based financial modeling have been developed, helping producers evaluate new market opportunities and quantify the economics of emerging beef regions.
- OMAFA's Sustainable Production, Water Quality, and Soil Health priorities emphasize BMP validation, adoption analysis, and measurement of performance — providing data and behavioral insights that directly support knowledge transfer and on-farm implementation.

This signals a shift from research for producers to research with producers, ensuring KTT planning, research relevance, and measurable return on investment.

6. Understanding Markets and Consumer Alignment

While most organizations focus on production and sustainability, BFO adds an important market component to the forage and grazing research landscape.

- Their Market Research theme focus is to forecast consumer preferences, identify value-added product traits, and improve communication of sustainability attributes across the supply chain.

- OMAFA's Competitive Production Systems and Productive Land Capacity priorities complement this by supporting research on economic viability, land use, and policies that preserve productive capacity for forage and livestock operations.

Together, these initiatives strengthen the connection between production performance and market expectations, positioning Ontario's forage and grazing sector within a value chain that rewards verified sustainability and resilience.

Summary:

Ontario's existing research priorities reveal a connected direction across sectors:

- Forage and grazing systems are recognized as an important part of environmental and economic strategy, serving as key levers for soil health, climate resilience, and potential long-term farm sustainability.
- Research is shifting from productivity focus alone: emphasizing measurable outcomes that demonstrate the benefits of improved management practices for profitability, performance and environmental benefit and sustainability.
- Interest in deepening collaboration across sectors: linking soil, crop, livestock, economics, conservation – with forages and grazing included as a common thread.
- Knowledge transfer and translation (KTT) is increasingly critical, ensuring research is applicable, co-developed with producers and industry, and leads to on-farm adoption and measurable impact.
- Research and practices are being aligned with market expectations, emphasizing transparency and sustainability performance to maintain and build consumer trust in Ontario's agri-food system.

Appendix C: List of 2025 Session Attendees

A total of 38 people attended in person or virtually.

Name	Organization	Attendee Email
Scott Fisher	DLF, OFC Board of Directors	scott.fisher@dlf.com
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Robert Matson	DFO	robert.matson@milk.org
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Appendix D: Christine O'Reilly Presentation and Supplemental Document

Presentation:

2025-12-10

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Genetics

- Alternatives to alfalfa
- Identify options for:
  - Climate change resilience
  - Reduced alfalfa winterkill
  - Palatability
  - Extending the grazing season
  - Improved digestibility
- Increase yield, yield potential, and disease resistance

7

What's Changed?

- Dr. Kim Schneider started at University of Guelph
- FERCA closed
- Environmental funding has made grazing cool again

8

Christine's Hot Take

We need to be better at leveraging environmental funding to also deliver production research results.

If growers cannot achieve the yield, quality, and persistence they need, they will grow other crops.

Research on environmental benefits will be a moot point.

9

3 keys to successful research:

- More **collaboration** between and within organizations.
- **Effective technology transfer** must be a focus of all initiatives.
- Consider the **economic** impacts of on-farm implementation.

10

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11

Supplemental Document:

Forage and Grassland Research in Ontario

Updated October 17, 2025 by Christine O'Reilly, OMAFA Forage and Grazing Specialist

Research Institutions and Programs

Lakehead University

- Agronomy/Plant Nutrition – *Tarlok Singh Sahota, Ph.D., CCA-ON*
- Plant Ecology/Herbivore Behaviour – *Brian McLaren, Ph.D.*

Northern Ontario Farm Innovation Alliance (NOFIA)

- Agriculture in Northern Ontario – *Emily Seed, BSc.Agr*

Rural Agri-Innovation Network (RAIN) – Sault Ste Marie Innovation Centre

- Agri-Food Economic Development – *David Thompson, MBA*
- Agronomy/Agriculture in Northern Ontario – *Mikala Tosh*

Trent University

- Soil Microbiology and Agricultural Soil Health – *Karen Thompson, Ph.D.*
- Agroecology and Biogeochemical Cycling – *Kira Borden, Ph.D.*
- Sustainable Agriculture/Farm Operations Coordinator – *Matt Porter*

Université du Québec en Abitibi-Témiscamingue (UQAT)

- Sustainable Beef Production – *Simon Lafontaine, Ph.D.*
- Organic Field Crops – *Stéphanie Lavergne, Ph.D.*

University of Guelph

Department of Animal Biosciences

- Ruminant Nutrition – *Katie Wood, Ph.D.*
- Dairy Cattle Nutrition, Behaviour, Management, and Welfare – *Trevor Devries, Ph.D.*
- Animal Systems Biology/Livestock Genetics and Genomics – *Angela Cánovas, Ph.D.*

Department of Plant Agriculture

- Grass Physiology/Root Biology/Precision Agriculture – *Eric Lyons, Ph.D.*
- Forage Agroecology, Nutrient Use Efficiency/Agronomy, Soil Quality – *Kim Schneider, Ph.D.*
- Sustainable Turfgrass Management/Plant Pathology – *Katerina Jordan, Ph.D.*

School of Environmental Sciences

- Soil Fertility and Soil Management – *John Lauzon, Ph.D.*

Winchester

- Ontario Crops Research Station – *Holly Byker, Ph.D.*

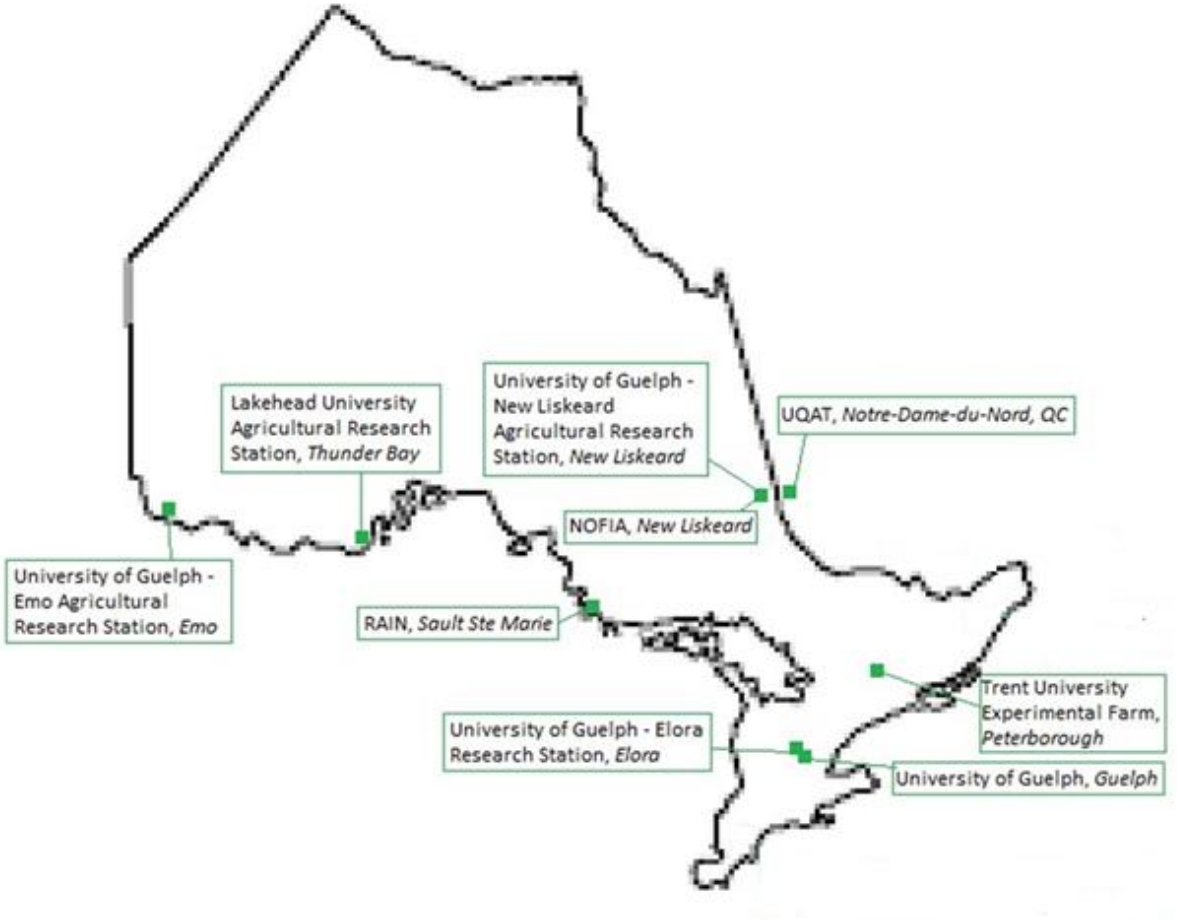
New Liskeard

- Ontario Crops Research Station – *Melinda Drummond*
- Ontario Beef Research Station – *Leo Giesen*

Emo

- Ontario Crops Research Station – *Kim Jo Bliss*

Map of Research Centres, Farms, and Sites



Projects Funded (start date 2020-2025)

Management

Topics of interest:

- Grazing season extension
- Soil fertility
- Best Management Practices (BMPs): strategies and agronomics
- Livestock genetics that are fit-for-pupose
- Agroforestry and silvopasture

Project Title	Project Lead	Status
Sustaining the legume component of grazed pasture mixtures for stockpiling complex mixtures in Ontario	Ira Mandell / Eric Lyons *(University of Guelph)*	In progress
Living Lab – Grazing Cover Crops	Kim Schneider *(University of Guelph)*	In progress
Optimizing environmental and economic outcomes for Ontario forage cropping systems	Kim Schneider *(University of Guelph)*	In progress
Evaluating economic and environmental outcomes of N fertility management and incorporating supplementary annual forages in a cool-season perennial pasture operation.	Kim Schneider *(University of Guelph)*	In progress
Cutting management and fertilizer requirement of alfalfa	Tarlok Singh Sahota *(Lakehead University)*	In progress
Best management practices for alfalfa production	David Thompson *(Rural Agri-Innovation Network)* & Tarlok Singh Sahota *(Lakehead University)*	Completed
Integration of Livestock on Annual Cropland	Kim Schneider *(University of Guelph)*	In progress
Maximizing Crop Potential through Nutrient Management for alfalfa and Sustainability Practices for Sorghum-Sudan Grass in relation to seeding rate and allelopathy effects.	David Thompson *(Rural Agri-Innovation Network)* & Tarlok Singh Sahota *(Lakehead University)*	In progress
Determining preference for resilient forage species and varieties by dairy cattle	Renée Bergeron *(University of Guelph)*	In progress
Combined cultivation of sorghum-sudangrass and alfalfa	Tarlok Singh Sahota *(Lakehead*	In progress

	University)	
Defining strategies that increase forage yield by monitoring pasture soil, crop and animal behaviours with investments in multi paddock grazing	Brian McLaren *(Lakehead University)*	In progress
Understanding the genes and metabolic pathways associated with the resistance of sheep to gastrointestinal nematodes and its climate change effects	Olivia Willoughby *(University of Guelph)*	Completed
Improving feed efficiency in the cow herd: Individual cow variability in fibre digestibility, feed efficiency, and methane emissions.	Katie Wood *(University of Guelph)*	In progress

Environment

Topics of interest:

- Impact of forage crops in annual crop rotations
- Pollinator health and populations; other biodiversity
- Soil health under grasses vs other land use
- Carbon storage and sequestration

Project Title	**Project Lead**	**Status**
Holistic Modeling approach to Quantify Soil Health and Water Quality Benefits of Agricultural BMPs under changing climate	Prasad Daggupati *(University of Guelph)*	In progress
Effects of Pasture Management Strategies on Carbon Sequestration, Soil Health, and Forage Productivity for Optimizing Cow-Calf Performance using Sustainable Production Practices	Ira Mandell / Eric Lyons *(University of Guelph)*	In progress
Developing recommendations for pasture management (degree of defoliation and nitrogen fertilizer application) to increase soil carbon storage	Kim Schneider *(University of Guelph)*	In progess
Living Lab – Carbon sequestration in field boundaries and pasture lands	Bert VandenBygaart *(AAFC)*	In progress

Economics

Topics of interest:

- Financial feasibility of forage crops on high value land. Opportunity cost and profitability compared to other crops.
- Integration of economics and environmental goods and services (EG&S) on prime land

Project Title	**Project Lead**	**Status**
Economic analysis of corn rootworm management strategies	Jocelyn Smith *(University of Guelph - Ridgetown)*	In progress

Technology

Topics of interest:

- Methods to measure yield on farm
- Improvements to intensive grazing systems
- Different methods for making/storing forages

Project Title	Project Lead	Status
Requirements for increasing pasture utilization and developing benchmarked targets for ruminant production systems for Ontario	Kim Schneider *(University of Guelph)* & Christine O'Reilly *(OMAFA)*	In progress
Improving the production efficiency & sustainability of pasture systems by optimizing grazing management plans to reduce the need for pasture renovation via a farmer-focused decision support system, informed by high-resolution mapping of pasture productivity, using a vehicle mounted Gryphon Pasture Canopy Scanner (GPCS).	Eric Lyons *(University of Guelph)*	In progess
Building an Application Programming Interface to make data collected on livestock farms available for analysis and decision making related to competitiveness and sustainability	John Cant *(University of Guelph)*	In progress

Genetics

Topics of interest:

- Alternatives to alfalfa
- Identify options for:
    - Climate change resilience
    - Reduced alfalfa winterkill
    - Palatability
    - Extending the grazing season
    - Improved digestibility
- Increase yield, yield potential, and disease resistance

Project Title	Project Lead	Status
Comparative performance of galega and alfalfa	Tarlok Singh Sahota *(Lakehead University)*	In progress
High-throughput breeding (directed evolution) to improve reliability of probiotics in the field: Applying the strategy to reduce nitrogen and water in turfgrass	Manish N. Raizada *(University of Guelph)*	Completed
Developing and assessing switchgrass varieties for optimizing soil health improvement and for use as forage and in crop rotation systems	Adam Gillespie *(University of Guelph)*	In progress
Investigating the potential of switchgrass and big	Caroline Reisiger	In progress

bluestem varieties for forage and hay production in southern Ontario	*(University of Guelph)*	
Exploring the potential of plant-derived flavonoids to improve crop performance in response to abiotic and biotic stress	Luis Eduardo Peña Barrena *(University of Guelph)*	Completed
Evaluation of silage corn varieties	Tarlok Singh Sahota *(Lakehead University)*	In progress
Evaluation of sorghum-sudangrass varieties	Tarlok Singh Sahota *(Lakehead University)*	In progress

Appendix E: Stacey Domolewski Presentation

2025-12-10

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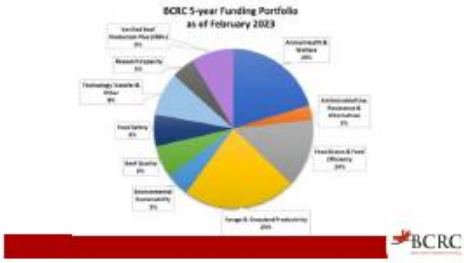

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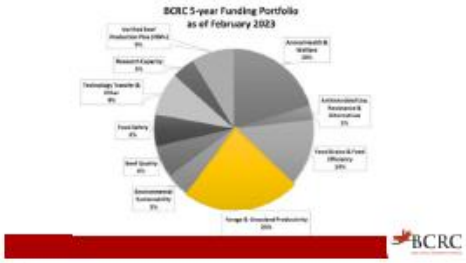

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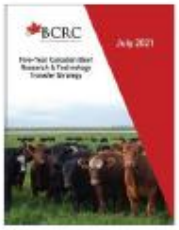

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Forage & Grassland Productivity Outcomes and Priorities

- Is weed/brush encroachment the only issue?
- How to we improve productivity on these pastures so they compete with other commodities?
- Do native/naturalized pastures always need to be managed different then tame pastures?

BCRC

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- Variety trials – are they valuable?
- Is yield the only priority when it comes to annual forage breeding?
- What else do we need to know about cows on cropland?
- Do we know enough about polycrops?

BCRC

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- Value of national forage breeding
- Hay specific management?
- Soil quality indicators?

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How are forages being used by beef producers?

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Rotational grazing

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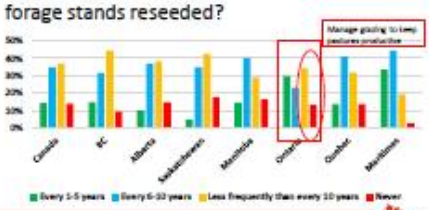
In general, how often are your tame perennial forage stands reseeded?



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16

Land tenure

Region	Area Owned		Area rented/leased from government		Area rented/leased from others	
	2021	Change from 2016	2021	Change from 2016	2021	Change from 2016
Canada	59.6%	↑	17.6%	↓	22.7%	↑
MT	60.9%	↓	12.2%	↑	26.9%	↑
SK	51.9%	↓	18.3%	↑	29.8%	↑
ON	65.0%	↓	18.9%	↑	16.0%	↓
MB	40.1%	↓	15.2%	↑	44.7%	↑
QC	55.8%	↓	17.4%	↓	26.8%	↑
AB	57.8%	↑	18.9%	↓	23.2%	↓
BC	54.3%	↑	14.4%	↓	31.6%	↑

Source: Statistics Canada, 2017 & 2021.

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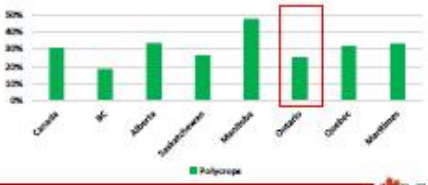
17

Adoption: polycrops



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18

Adoption: polycrops

Region	2017 (% of FMA respondents)	2021 (% of FMA respondents)
Canada	33	36
BC	29	27
ON	33	36
MB	4	6
SK	-	5
AB	2	4

Source: CIG, 2024

Ontario (% of 2020 Ontario Cover Crop Survey respondents)
Oats – 63%
Fall rye – 41%
Radish – 39%
Red clover – 31%
Peas – 28%
Crimson clover – 22%

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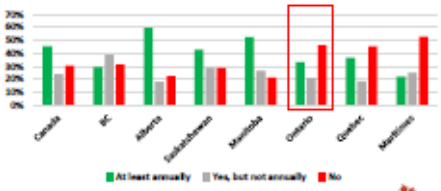
19

Do you test your feed for quality?



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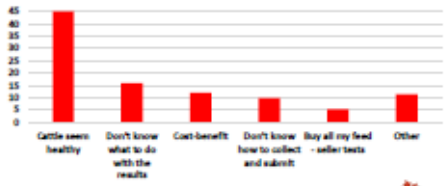
20

Top reason for not testing feed



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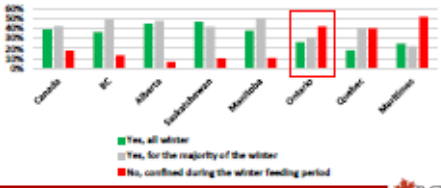
21

Do you feed in an open field or pasture during the winter for your cows?



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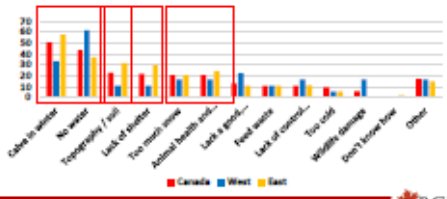
Top 3 reasons for not feeding in an open field



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Stacey's hot take

- Capacity is limited
  - What can we outsource? (take what we learned from other places)

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Stacey's hot take

- Capacity is limited
  - What can we outsource? (take what we learned from other places)
  - What makes sense to do nationally?

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25

Stacey's hot take

- Capacity is limited
  - What can we outsource? (take what we learned from other places)
  - What makes sense to do nationally?
  - When do we need an Ontario specific solution?

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26

Questions?

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27

Forage U-pick

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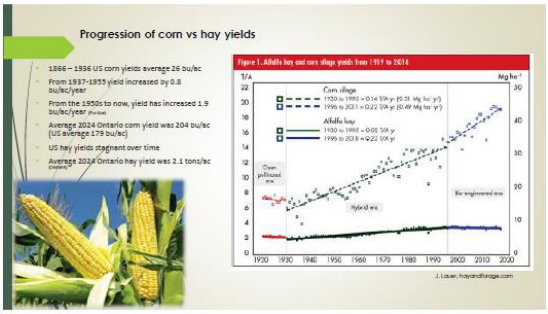
Appendix F: Birgit Martin Presentation



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