Ontario

ONTARIO AGRI-FOOD RESEARCH INITIATIVE

CALL FOR FULL PROPOSALS (2020/21)

October 2020

Research and Innovation Branch
Ontario Ministry of Agriculture, Food and Rural Affairs
1 Stone Road West, Guelph, Ontario N1G 4Y2
Email: research.omafra@ontario.ca

Ontario Agri-Food Research Initiative webpage

CANADIAN AGRICULTURAL PARTNERSHIP
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Section 1. Initiative Overview

1. 1. Objectives

Research is a key contributor to the success of the agri-food sector, strong rural communities, and the health and safety of food, people, animals and the environment. The Ontario Agri-Food Research Initiative, under the Canadian Agricultural Partnership, offers funding for research that stimulates innovation to support the growth and competitiveness of Ontario's agri-food sector, promote food safety and strengthen rural communities. New knowledge and technologies help Ontario's agri-food sector businesses address challenges and expand market opportunities locally and globally.

The initiative builds on the success of Ontario's New Directions (ND) and Food Safety (FS) Research Programs. Research previously funded through the ND and FS Research Programs has generated valuable new information and novel/improved technologies that are impacting Ontario's agri-food industry. Details on OMAFRA-funded research and innovation projects can be found by searching Research and Innovation Project Summaries.

The Canadian Agricultural Partnership (the Partnership) is a five-year federal-provincial-territorial initiative to strengthen the agriculture, agri-food and agri-products sectors, and increase its competitiveness, prosperity and sustainability.

The Partnership supports projects in the following key priority areas, with research and innovation continuing to be a focus across all programming:

- Economic development in the agri-food and agri-products sectors.
- Environmental stewardship to enhance water quality and soil health.
- Protection and assurance to reinforce the foundation for public trust in the sector through improved assurance systems in food safety and plant and animal health.

1. 2. Research Priorities

Priorities for the Ontario Agri-Food Research Initiative can shift annually and reflect key opportunities and challenges facing the agri-food sector and rural communities. This Call for Proposals is focused on food safety, plant health and

protection and sustainable production systems. See Section 3 for a full description of the research priorities, focus areas and research questions. A Full Proposal must clearly demonstrate how one or more of the stated research questions is addressed.

For general program enquiries, please contact Rajib.hazarika@ontario.ca; 519-400-9482.

1. 3. Project Duration and Funding

Project Duration: Up to 19 months.

Project Start: A project cannot start prior to the date that OMAFRA approves the project. This date will be confirmed in the Research Funding Agreement. Eligible costs can only be incurred, invoiced and paid for on or after the start date.

Project End: Projects must be completed no later than January 31, 2023.

Funding Available: Maximum of $150,000 in eligible costs per project (including a research maximum overhead up to 25%).

The applicant's organization must ensure that sufficient funding is secured to complete the project. If a project exceeds the approved budget, the applicant's organization must raise the additional funding required to complete the project; additional funds will not be provided from this Initiative.

There will be a 10 per cent holdback of reimbursement until a Final Report for the project is received and approved by OMAFRA. The Final Report submitted for the project must include a certification that the project has been completed within the project timelines stated in the Research Funding Agreement, and the project must fulfill all other requirements stated in the Agreement.

Leveraged Funds/Co-Funding (Cash and In-kind): OMAFRA strongly encourages applicants to obtain leveraged funds for this Initiative. The Ministry funds demand-driven research that is valued by the end-user and has ready receptors in policy, programs or the marketplace. Both cash and in-kind contributions from Co-Funders qualify as leveraged funds (see Section 2.11).

1. 4. Who May Apply

We invite universities and colleges, not-for-profit research institutions, and for-profit and not-for-profit groups/organizations (including agri-food commodity groups), with demonstrated capacity to perform quality research, to submit a Full Proposal. Lead Applicants must be located in Ontario and the proposed research must benefit Ontario's agri-food system and/or rural communities. Researchers outside the province of Ontario may collaborate on research projects. **Federal, provincial, and territorial government researchers, departments, ministries or agencies, and any employees thereof, are not eligible to receive funding from this Initiative but are eligible to collaborate on research projects.**

Project collaborators may include but are not limited to: for-profit entities, not-for-profit entities, government and non-government organizations, universities and colleges, and research institutions.

Note: Researchers who have received funding from OMAFRA but have outstanding required reports are not eligible for funding under this Initiative until OMAFRA has received and approved the outstanding reports.

1. 5. How to Apply

The Research Management System (RMS) is OMAFRA's on-line system for managing applications of Ministry-funded research programs and initiatives. Registering and logging into the RMS will take you to your Researcher Workbench where you can access all of the documents you need to understand and apply to this initiative.

The 2020-21 Ontario Agri-Food Research Initiative call for proposals is a single stage application process (Full Proposal submission).

An **Intent** to submit a Full Proposal step has been implemented to support peer review and review committee planning in advance of the submission deadline. This step requires that applicants complete a small number of fields in the 'General' and 'Peer Review' tabs in advance of the Full Proposal submission deadline. There is no 'submit' button or additional requirements for the Intent process; simply ensure those two tabs are completed by the date below to signal your Intent to submit a Full Proposal to the program. Applicants can continue to work on their application form until their application is completed and submitted on or before the Full Proposal submission deadline. Participation in the Intent process is recommended but not mandatory.

Note on Internet Browsers: The Research Management System works well in a variety of browsers, but some functionalities may not work well in Internet Explorer.

1. 6. Timelines

Intent to Submit deadline: 14:00 hrs EST on Thursday, December 10, 2020.

Submission deadline: 14:00 hrs EST on Friday, January 8, 2021.

Note: Applicants should check with their institution regarding deadlines for internal review.

Notification of the Status of Full Proposals: Spring, 2021.

Project Start (for the purpose of developing project milestones): Spring 2021. Actual start dates may vary but projects must be completed by January 31, 2023.

Final Report Deadline: 60 days following project completion and no later than March 31, 2023.

1. 7. Proposal Review

Relevance Screen

A pre-screening of proposals will be undertaken to determine the following:

- Eligibility of the Lead Applicant and their organization.
- Completeness of the proposal.
- Fit within stated research priorities (see Section 3).

Panel and Peer Review

Full proposals that pass the Relevance Screen will be evaluated by both Peer Reviewers and Review Panels. The proposal title and abstract may be shared by OMAFRA with third parties for the purpose of finding expert reviewers who are not in a conflict of interest with the proposal. All reviewers are required to declare any conflict of interest and to sign a confidentiality agreement prior to accessing

and reviewing any submission. Once reviewers are selected, they have access to the entire proposal for evaluation purposes.

Review Panels will evaluate the proposals according to the following criteria:

1. The project's fit within the research areas of focus that are described in Section 3 and that are aligned with key research priorities under the Canadian Agricultural Partnership.
2. The project's anticipated significance and benefit in addressing the program priorities.
3. Quality and clarity of experimental design and project work plan. The review committee must understand the step by step process the project will use to achieve stated milestones.
4. The capabilities of the researcher and research institution to produce the anticipated outcomes to benefit Ontario.
5. The contribution(s) from collaborators and the impact on the quality of research attained and the networks established.
6. The effectiveness of the knowledge translation and transfer plan. Who are the target audiences/ users of your research, how will they be involved, how will the users benefit from the research and what methods will be used to reach these audiences?
7. The completeness and appropriateness of the proposed budget, evidence of stakeholder support and level of matching funds from eligible sources (requested and confirmed).

In addition, OMAFRA may conduct a literature search to determine if the proposed research topic has been sufficiently investigated elsewhere.

Peer Reviewers will assess the benefits, scientific merit and overall quality of proposals.

Applicants whose full proposals are selected for funding will be notified via email. Funding is contingent on the applicant's organization signing a Research Funding Agreement with the Government of Ontario and on the applicant's compliance with all the terms and conditions in the Research Funding Agreement and the award notification.

1. 8. Intellectual Property

Title to all intellectual property resulting directly from research funded through the Ontario Agri-Food Research Initiative will remain with the research institution or the institution's designate.

The Lead Applicant must report to OMAFRA any third-party IP contributions to the research project.

Any background intellectual property to be used in the project must be identified to OMAFRA and covered under a written agreement between the research institution and the owner of the background intellectual property.

The research institution must grant the Government of Ontario a non-exclusive, fully paid, royalty free, unencumbered license without time or territory limit to use and sublicense to any ministry of the Government of Ontario, any Agency, Board or Corporation thereof, (including any authorized agent of any of the above), all Newly Created Intellectual Property and any of the Recipient's Intellectual Property needed to utilize the Newly Created Intellectual Property. The granted license and any sublicenses Government of Ontario grants shall be for the purposes of non-commercial uses, education, research, policy development, non-commercial publication and non-commercial breeding purposes by the licensed or sublicensed entity.

The Lead Applicant must disclose any new intellectual property developed by them during the research project and identify any technology capable of being commercialized to Government of Ontario. This information must be included in the project's final report.

Commercialization and protection of the intellectual property is the responsibility of the research institution or its designate. The research institution or its designate will retain revenues generated from patents, licenses or royalties with the exceptions and exclusions noted in this section.

With 24 hours notice, Government of Ontario or its representatives reserves the right to audit project progress as it relates to commercialization of intellectual property.

Section 2. How to Complete the Application Form in RMS

2. 1. Online Application Template in RMS

Applicants must register and login to OMAFRA's online Research Management System (RMS) to access the application template and submit a proposal. If you have not used the RMS in the past, please register here to obtain login information. If you are registered in the previous version of RMS but believe you have not used the most recent version of RMS, you should use the "forgot password" feature to update your password. For any issue with registering or logging in, please contact the RMS Administrator at RMS@ontario.ca.

Registering and logging into the RMS will bring you to your Researcher Workbench where you will select the Agri-Food Research Initiative. Click on "Determine Eligibility" to confirm your eligibility to apply for funding and to open an application template. If you have used RMS in the past, please note that there are changes that may require additional time to complete the on-line application. Of particular note is the team member invitation process which requires action from both researcher and team members in advance of the submission deadline.

Instructions and tool tips (denoted by) are available in the RMS Application Template. In addition, tip sheets are available on the RMS Researcher Workbench Home page ('Help' icon).

The Full Proposal application consists of several sections that are navigated via tabs across the top of the on-line application in the RMS. All tabs must be completed. The majority of application instructions are provided in the RMS, but some additional guidance is provided below.

2. 2. Proposal Details

Applicants should take note of the following when developing their proposal and completing the application template.

Literature Review

- The literature review should provide a summary of relevant research and clearly identify the research gap.
- Where appropriate, the literature review should also provide the rationale for the experimental approach and the methods to be used.

Methodology and Deliverables

- These fields have word limits and the system will truncate the text if the limit is exceeded.
- Make sure that enough detail is provided about the experimental plan for reviewers to understand how the project objectives will be achieved, and to evaluate the appropriateness of the methods chosen and statistical soundness of the approach (where appropriate).

2. 3. Lead Applicant

Calculating the FTE (Full Time Equivalent) for the Project:

- Record the amount of time that you (and your team members) are devoting to your project per year.
- Select a yearly average if the amount of time will vary over the life of the project.
- Use the X.XX format (i.e. FTE=1.0 or 0.30).

2. 4. Co-Applicant (Optional)

Definition

- A Co-Applicant is a researcher or partner that plays an important, well-defined and ongoing role in the development and implementation of the proposed research project.
- The Co-Applicant must accept the terms and conditions before the Lead Applicant can submit the application. Only the Lead Applicant can submit.
- One Co-Applicant allowed per project. A Co-Applicant is optional.
- The Co-Applicant must use their own workbench to edit the application and accept the terms and conditions.
- Only one person can edit a given application at a time - please exit the proposal when finished.

2. 5. Research Priority Selection

- First, identify the specific research question your proposal will address from Section 3. Select the Research Priority and Research Focus Area associated with that question from the drop-down lists in the RMS.
- Note: All OMAFRA research focus areas are listed in RMS, but not all have research questions associated with them for the 2020-21 Ontario Agri-Food Research Initiative call. Please ensure you are selecting the correct priority and focus area based on the research question you selected from Section 3.
- Please also ensure you clearly identify the specific research question (from Section 3) you are addressing in the 'Alignment with OMAFRA Priorities' field in the 'Proposal Details' tab of the RMS application.

  Research proposals that do not specifically address any of the stated research questions may be screened out prior to the peer and panel review.

2. 6. Inviting Research Team Members

Team members and Highly Qualified Personnel are identified in their respective tables in the Team tab in the RMS. The process of inviting team members is described in the application template and in the tip sheets. Co-applicants, Delegates (described below) and all Collaborators should confirm their participation in the project and be registered in RMS by the Full Proposal submission date.

A Delegate (optional – limit of one) is an individual whose only role is to assist the Lead Applicant in the creation and editing of the application and progress reports (for awarded projects). A Delegate must be part of the Lead Applicant's organization. A Delegate, while not formally a team member, is identified and invited from the team member tab in RMS. Delegates that play an active role in the research project must also be identified and invited as a Collaborator or identified in the HQP table in the RMS (this is important for performance measure reporting).

There is no limitation placed on the balance of the team composition, but all team members should play an active role as collaborators in the implementation of the project (advisory, researcher or knowledge broker). Eligible team members may include individuals from:

- The Lead Applicant's institution (researchers and other support staff, e.g. technicians);
- Other University, College or research institutions;
- Private businesses;
- Industry / commodity organizations;
- Indigenous organizations and communities;
- Non-government organizations; and
- Federal, provincial or municipal government departments or agencies.

The FTE (full-time equivalent) you report in the team member table should reflect the total average annual time that each individual will contribute to the project.

2. 7. Highly Qualified Personnel (HQP)

Under the Ontario Agri-Food Research Initiative, highly qualified personnel (HQP) are 1) undergraduate students and 2) graduate students or post-doctoral fellows receiving training through the proposed research. These HQP are captured separately from team members in the RMS. Please provide details on all HQP that will be involved in the project, regardless of their stipend funding source. Highly Qualified Personnel do not need to be invited. Proposals can move forward without specific persons identified as HQP if the positions are not yet filled. In this case, use TBD as the first and last name within the HQP table and complete all other fields except for e-mail address.

2. 8. Submitting Your Application

All applications are required to have an individual assigned to the role of "Approver". Lead Applicants should inform the OMAFRA contact person (for the relevant Priority Area - see Section 3) of the name and contact information of the Approver so that they may be entered into the RMS (if not already in the system).

- For research institutions, this is typically a member of the institution's Research Office.
- For other organizations and private companies, the Approver will typically be a senior executive. Alternatives should be discussed first with the OMAFRA contact person.

Note: The RMS system will not allow you to submit an application after the submission deadline.

2. 9. Knowledge Translation and Transfer (KTT) Plan

The KTT tab in the application consists of two tables: KTT User Audiences and the KTT Plan. Instructions for completing these two tables are in RMS.

Knowledge Translation and Transfer with key target audiences and end users of research are an essential components of OMAFRA-funded research projects. Proposals should include a carefully developed KTT plan. There are several resources available to assist you in creating your KTT plan which have been developed for OMAFRA-funded research programs. Visit the KTT Services and Resources page to access these resources.

- Growing Knowledge Translation and Transfer in Ontario: A Manual of Best Practices: This manual outlines a collection of best practices in agri-food and rural KTT that can help guide you through the development of your KTT plan.
- KTT Plan Checklist: A practical tool based on the Alliance KTT plan template. These guidelines, prepared by Alliance funding program reviewers, ensure your proposal covers key aspects of KTT planning.
- KTT Example Plans: Examples of complete KTT plans to help provide ideas of innovative KTT activities as well as questions to consider as you answer each section.

Please refer to Section 3 and contact the KTT Research Analyst identified in the specific research question if you have any questions about these resources or the KTT section of your proposal.

2. 10. Supporting Documentation

Supporting documentation should be in PDF format and may include:

- Team Member Supporting Documentation
    - CVs of the Lead Applicant and Co-Applicant
- Proposal Details Supporting Documentation
    - Relevant articles demonstrating industry needs

    - One-page diagram which illustrates the Methods described in the proposal
    - References for your Literature Review
- Other Supporting Documentation
    - Letters of support
    - Confirmation of leveraged funding
    - Award letters to be leveraged with this proposal

2. 11. Co-Funders

Definition

- A Co-Funder is a person or organization that contributes financial or in-kind support to the project.
- Both cash and in-kind contributions are eligible and co-funding is encouraged. Co-funding demonstrates industry and end user support for a project, which helps build a strong rationale for the research.
- Review committees will take into account the level and nature of partner support that could reasonably be expected for particular types of projects.
- All partner support needs to be fully documented and considered essential to directly carry out the work of the project. Applicants must provide support letters from their Co-Funders, confirming all types of support.

2. 12. Budget

a. Salaries of Lead Applicant and Team Members

Guidelines regarding the eligibility of salaries as direct costs to the Ontario Agri-Food Research Initiative are described in part b. Direct Operating Expenses. As with all budget items, applicant organization contributions need to be fully described in the budget notes, and valued reasonably and appropriately. OMAFRA reserves the right to determine the eligibility of all contributions and expenses on a case-by-case basis.

In-Kind Support is defined as items necessary to the success of the project that would have to be purchased from funds within the project budget if they were not provided by a co-funder.

Examples of in-kind support include goods and services, access to equipment and research facilities, and scientific and technical staff time contributing directly to the project.

The in-kind support must be described so reviewers may determine the appropriateness of the supports' estimated financial value. OMAFRA will only recognize contributions that are essential to the successful completion of the project.

b. Direct Operating Expenses

Use the table in RMS to allocate the funds that you recorded in the 'Sources of Project Funding' section of the application template.

Eligible and Ineligible Expenses

The eligible and ineligible expenses listed below are not exhaustive but provide a guideline for developing project budgets under the Ontario Agri-Food Research Initiative. OMAFRA reserves the right to determine the eligibility of salaries and other expenses on a case-by-case basis.

Some project costs that are ineligible for direct funding under the Ontario Agri-Food Research Initiative may be provided by Co-Funders. These contributions need to be described in the justification section of the budget template.

Please contact research.omafra@ontario.ca with any questions regarding eligibility of budget items (either as direct project expenses or as matching contributions).

Salaries

- Eligible Expenses:
    - Actual salary cost for employing experts to contribute directly to the project, such as:
        - trainee salaries, e.g. graduate and summer students, and Post-Doctoral Fellows.

        - contract technicians and other staff contributing directly to the project outcomes.
        - self-funded staff (i.e. individuals supported directly from research grants).

- Ineligible Expenses:
    - Salaries of permanent staff whose compensation is not specifically dependent on on-going research project funding.
    - Individuals with permanent academic appointments.
    - Individuals with Provincial, Federal or Municipal government employment.

Note: Salary costs of individuals involved in the investigative work of the project that are ineligible as direct project costs can be reported as in-kind contributions to the project (for example, salary costs of federal or provincial government/agency technicians). Time must be valued reasonably and based on the FTE contribution to the project.

Materials and Supplies

- Eligible Expenses:
    - Material and supplies, at fair market or company book value, as follows:
        - research supplies and disposables required for the project e.g. petri dishes, reagents, etc.
        - KTT and technology transfer related costs such as the organization of workshops and communication materials.
        - publication costs e.g. peer reviewed journals.

- Ineligible Expenses:
    - Common use items not specific to the project.
    - Any alcoholic beverages.
    - Support for meetings/events that would occur regardless of project funding.

Ontario's Research Station Fees (Agricultural Research Institute of Ontario (ARIO) Research Stations)

Note: There are no overhead fees calculated on research station fees.

- Applies to applicants who are requesting use of ARIO research stations.
- OMAFRA subsidizes 92% of the cost of research station use; this is calculated automatically in RMS and is recorded as an in-kind contribution. An additional 8% needs to be paid for by contributions from other funders.
- For further information on research station use and costs, please contact research.omafra@ontario.ca.

Equipment Leases and Purchases

- Eligible Expenses:
    - Equipment leases and rentals to conduct the project.
    - Equipment purchases (up to a maximum of $10,000) that are essential to the project, that would not otherwise be acquired, and that will be purchased early in the life cycle of the project (usually in the first year). Note: Equipment purchases should not be funded by other government sources at 75 per cent or more.
    - Applicants must explain how the equipment will continue to support public benefits after the project is completed, and must demonstrate an estimate of fair market value for use of the equipment.
- Ineligible Expenses:
    - Purchase of common use items not directly related to the investigative work necessary to achieve project outcomes (e.g. computers, office equipment).

Travel

- Eligible Expenses:
    - Travel necessary to carry out the project (e.g. travel to research stations and field plots).
    - Travel to conferences and other KTT activities where project information is being presented.

- Ineligible Expenses:
    - Any alcoholic beverages.
    - Travel costs (flights, mileage, accommodation, meal allowances etc.) for participants in workshops and meetings who are not part of the core project team.

Note: In order to be eligible, travel and meal costs must be identified and approved as such in the application for an approved project.

Eligible funding for travel expenses for an approved project may be claimed when the most economical transportation and accommodation (e.g., single accommodation in a standard room) is chosen.

The maximum eligible costs for personal vehicles driven within Ontario are:

Number of Kilometres	Southern Ontario ($/km)	Northern Ontario ($/km)
0-4,000 km	0.40	0.41
4,001-10,700 km	0.35	0.36
10,701-24,000 km	0.29	0.30
More than 24,000 km	0.24	0.25

Reimbursement for meal expenses is subject to the maximum eligible cost value set out in the tables below. Original, itemized receipts are required, and the eligible cost value will not exceed the actual amount spent. Taxes and gratuities are included in the maximum eligible cost value.

Reimbursement is for restaurant/prepared food only and not available for alcohol purchases.

Maximum eligible costs for meals in Canada (CAD):

Meal Type	Maximum eligible costs
Breakfast	$10.00
Lunch	$12.50
Dinner	$22.50

Maximum eligible costs for meals outside of Canada (CAD):

Meal Type	Maximum eligible costs
Breakfast	$20.25
Lunch	$19.85
Dinner	$50.00

Indirect Costs or Overhead

- Other indirect eligible expenses include meeting rooms, space or facilities, as long as the applicant can provide an estimate of the fair market value for use of the space.
- Applicants may use the indirect cost (or overhead) rates set by their organizations up to a maximum of 25% of eligible direct project operating costs.
- The per project funding maximum of $150,000 includes any indirect costs (overhead). E.g. For a $150,000 project using a 25% indirect cost rate:
    - Direct costs = $120,000 ($150,000/1.25)
    - Indirect costs = $30,000 ($120,000 × 0.25)

Other Ineligible Expenses

- Costs incurred before the approval of the project by OMAFRA or after the project completion date identified in the Agreement.
- Costs incurred in preparing an application.
- Any cost not specifically required for implementation of the project.
- Normal costs of establishing, expanding or operating a business or organization.
- Goods or services provided by federal or provincial government departments or agencies
- Deposits (prepayments) for which goods or services are not yet fully received.
- Costs for training and skills development projects (i.e. outside of the research project) that fulfill any academic requirements towards completion of a diploma or degree.

- Mentoring and coaching, unless otherwise indicated in the Research Funding Agreement.
- Honorariums.
- Membership costs.
- Any travel or in-kind costs beyond those provided for in this Guide.
- Consultant and other contractor expenses for any hospitality (e.g., provision of food or beverages at events), incidentals or food.
- Hospitality (e.g., venue rental, food, beverages, AV, etc.).
- Purchase of land, building or facilities.
- Purchase of vehicles, transportation equipment, mobile material handling equipment (powered or unpowered), and construction and agriculture machinery.
- Financing charges, loan and lease interest payments, bank fees and charges as well as debt restructuring or fundraising.
- Gifts and incentives.
- Permits and approvals.
- Legal fees.
- Costs related to activities that promote Ontario products explicitly over those of another province or territory.
- Costs related to activities that directly influence or lobby any level of government.
- Taxes, including Harmonized Sales Tax.
- Any refund or rebate the applicant receives or is eligible to receive.

Justification of Budget Items

- Use the boxes to provide more details about expense items.
- Reviewers use this information to evaluate the appropriateness of budget items and to help determine the overall value for money for the project

2. 13. Uploading Documents for Your Application

All supporting documents MUST be in PDF FORMAT in order to be included in the PDF version of your application. Please note that reviewers only have access to the PDF version of your application and not the application template.

Important Note About PDF Files:

PDF files that have **security restrictions** in place such as Content Copying, or Extraction have been encrypted. **These encrypted files cannot be included** in your application. The security settings can be viewed by opening the PDF and clicking File> Document Properties >Security (steps may vary depending on the version of your PDF reader).

The PDF documents must be regenerated without the restrictions for them to be appended properly to your application.

2. 14. Suggested Peer Reviewers

Please suggest a minimum of 5 (and ideally up to 8) peer reviewers who may be contacted to review the full proposal. Ensure the suggested reviewers **are not in conflict of interest and can actually review your proposal.**

Definition of Conflict of Interest:

A conflict of interest is defined as a conflict between your suggested peer reviewer's duties and their responsibilities with regard to the review process, and that person's private, professional, business or public interests.

Eligibility criteria for peer reviewers:

1. They are not related to or employed by the lead applicant, co-applicant or any other member of the research team or the co-funders (people or organizations) of the project.
2. They have not co-authored a journal article or other publication with the lead applicant or co-applicant, or any other member of the research team or the co-funders (people or organizations) of the project during the past 2 years.
3. They will not benefit monetarily or in any other way from the funding of this project.

4. They are not in conflict in any way with the lead applicant, co-applicant or any other member of the research team or the co-funders (people or organizations) of the project.

2. 15. Declaration

The 'Declaration Section' of the application serves as an electronic signature of both the Lead Applicant and his/her Co-Applicant (if applicable).

Both **Lead Applicant** and **Co-Applicant** (if applicable) **are required to check boxes that state they have read and accepted the terms and conditions** outlined in the application form and in the Call for Full Proposal document.

Note:

- The Co-Applicant must access the proposal from their own workbench to check the acceptance box.
- The Lead Applicant cannot submit the application until the Co-Applicant has accepted the terms and conditions.
- Only one (1) person can edit the proposal at a time so remember to exit the proposal when you are finished.

Freedom of Information and Protection of Privacy Act

The applicant(s) acknowledges that the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), on behalf of the Agricultural Research Institute of Ontario (ARIO), is bound by the Freedom of Information and Protection of Privacy Act (Ontario), as amended from time to time, and that any information provided to it in connection with this application, the proposed project, and any agreement that may be entered into with the ARIO, is subject to disclosure in accordance with that Act or pursuant to an order of a court or tribunal or a legal proceeding. OMAFRA may also share this proposal application and any supporting information in order to evaluate the application for funding.

Notice of Collection of Personal Information

Any personal information on this form, such as information regarding the education and employment history of the lead applicant and research team members, is necessary to assist in assessing the qualifications of a proposal for

funding under the Ontario Agri-food Research Initiative. The information is collected under the authority of the Ministry of Agriculture, Food and Rural Affairs Act, R.S.O. 1990, c. M.16. Questions as to the collection of this information may be directed to research.omafra@ontario.ca.

Where any personal information related to team members is submitted, the applicant acknowledges that he/she has obtained the consent of these individuals to submit the information for the purposes of the evaluation of the application for funding. The applicant will provide evidence of the consent of these individuals to OMAFRA upon request.

Section 3. Research Priorities

This section contains the details and scope of the research priority and focus areas of this call. Applicant must first identify a specific research question from this section that will help to select the focus area and priority area in the online (Research Management System) application template. Each research question is accompanied by a description of the research problem and desired outcome to help focus the proposal.

3.1 Research Priority Area: Food Safety

OMAFRA contacts: Susan Healey, susan.healey@ontario.ca;
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a. **Research Focus Area**: Performance Measurement

RIB ID: 2020.010

Research question: What innovative solutions and practical applications would be most effective to support behavioural change to increase adoption of food safety best practices along the value chain?

Research problem/gap: Inspections reveal lack of compliance with a range of mandated procedures; rates of voluntary adoption of BMPs (best management practices) are likely even lower. For instance, there is evidence that BMPs are not consistently practiced in slaughter plants and plants that make RTE meats; one example is the correct dehiding of carcasses, a critical factor in pathogen-free meat. The reasons for the low rate of adoption of some BMPS are not well understood but may include factors such as cost, lack of appropriate training tools/educational materials, etc.

Desired outcomes: Project results will help to identify innovative and practical solutions that will encourage the adoption of BMPs for enhanced food safety.

b. **Research Focus Area:** Prevention and Control

RIB ID: 2019.060

Research question: How can current interventions for Salmonella, Campylobacter and other pathogens in the Ontario poultry and other livestock production and processing chain be improved to further reduce the risks to food safety?

Research problem/gap: The presence of Salmonella and other pathogens in Ontario poultry and other livestock is a continuing problem that requires significant work. Some jurisdictions that have more stringent measures in place have reduced the incidence of salmonella in live and processed poultry. Research findings could inform provincial operational protocols as well as prospective federal regulatory changes.

Desired outcomes: Results would provide evidence to revise or introduce new operational procedures to reduce and mitigate pathogen load in Ontario poultry and other livestock, and to inform prospective federal regulatory changes or industry requirements.

c. Research Focus Area: Validation of Detection Methods

RIB ID: 2019.065

Research question: What is the value of using metagenomics and other CIDTs (Culture-Independent Diagnostic Tests) in pathogen detection or surveillance compared to conventional culture methods, particularly in primary production?

Research problem/gap: DNA testing is expected to replace conventional culture methods for detecting and undertaking surveillance of pathogens in food. Conventional methods take longer and have lower specificity. The economic and other impacts of replacing traditional testing with metagenomics and other CIDTs is not yet well understood, and research will allow Ontario to better prepare for and leverage these new technologies.

Desired outcomes: Technological advancement in detection and surveillance methodologies will inform government policies and industry practice. These methods could provide same-day flock pathogen testing results allowing for expeditious decisions.

d. **Research Focus Area**: Climate Change Resiliency

RIB ID: 2020.009

Research question: What are the risks associated with climate change, specifically foodborne human pathogens and toxins, plant pathogens, and animal pathogens moving into areas where they were not previously an issue, including Ontario? How can these risks be mitigated?

Research problem/gap: Climate change is facilitating the movement of some types of pathogens (e.g. fungi) to new areas, and the production of toxins (such as mycotoxins) in areas where they have not previously been observed. Understanding which pathogens/risks are of most concern, and in which crops/ foods/feed etc. is an important knowledge gap.

Desired outcome: This research would identify economically important crops with the highest risks associated with climate change, allowing for targeted interventions that would reduce economic losses to the agriculture and food sector, and to the provincial economy.

3.2 Research Priority Area: Plant Health and Protection

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a. **Research Focus Area**: Biology of Current and Emerging Pests

RIB ID: 2020.064

Research question: How can we implement more efficient risk analyses and research on management of emerging pests that threaten the biosecurity of greenhouse farms? How can sanitation protocols (e.g. new technologies and/or processes) assist with this goal throughout the production cycle?

Research problem/gap: New and emerging pests are constantly appearing and better ways to identify and manage them before they become an issue are needed. Risk management strategies to deal with emerging pests due to the effect of climate change and

other factors are needed. The effects and impact of sanitation on improving biosecurity should be a part of these studies. For example, biosecurity in field can also impact nearby crops (e.g. cull piles impacting nearby crops)

Desired outcome: Research outcomes will improve the identification, tracking, monitoring and management of new pests entering Ontario and protect the biosecurity of our greenhouse crops.

b. Research Focus Area: Integrated Pest Management

RIB ID: 2020.062

Research question: Can mating disruption strategies, including puffer systems and sterile insect release be implemented in Ontario for control of key horticulture pests? (e.g. codling moth, oriental fruit moth, apple maggot, apple leafcurling midge, San Jose scale, Delia maggot flies, cucumber leaf beetle).

Research problem/gap: Due to the loss of broad-spectrum control products, increase in environmental stewardship and concerns with resistance management, non-chemical alternatives are needed. Preliminary work with regional puffer systems and sterile insect release has been done in NE and NW United States but has not been validated in the Ontario climate and topography. Due to the life cycle of leafcurling midge and San Jose scale, these pests would be excellent candidates for mating disruption.

Desired outcome: Research outcome would identify new tools and strategies to manage key pests.

RIB ID: 2020.063

Research question: Can new applications or IPM technology techniques such as fixed sprayer systems, storage fogging, sanitation, drones or automated pest monitoring be implemented in horticulture and field crops to provide efficiencies in labour, reduce worker exposure and minimize re-entry restrictions? What are the economics of these technologies?

Research problem/gap: New technologies to aid horticultural crops with spraying, scouting and identification have recently been developed. Many of these technologies have great potential

to increase the effectiveness of our IPM programs, reduce worker exposure and improve labour efficiencies. Before they can be utilized widely, we need to evaluate if they will work in the Ontario context and where they fit within our current IPM recommendations.

Desired outcome: Research outcomes will include updated IPM recommendations which incorporate these new technologies.

RIB ID: 2020.075

Research question: How does the occurrence and distribution of pesticide resistant pests (weeds, pathogens and/or insects) impact the effectiveness of existing management practices? What new or improved management practices can be implemented that would reduce selection pressure on crop protection tools?

Research problem/gap: With the loss of several key pest management tools expected in the next few years, there will be an increased reliance on crop protection materials that have a high risk of developing resistance. Pathogens, insects and weeds that have developed resistance to crop protection material can threaten production, including pests which are not yet in Ontario but have potential to expand into Ontario crops.

Desired outcome: Research outcomes will strengthen recommendations on pesticide use as well as best management practices to reduce the occurrence and spread of resistant pests.

c. Research Focus Area: Climate Change Resiliency

RIB ID: 2020.102

Research question: How can we implement more efficient risk analyses and research on management of emerging pests that threaten outdoor horticulture and field crop farms? How can the resiliency of the sector be improved to better manage new invasive species resulting from shifting climate zones?

Research problem/gap: New and emerging pests are constantly appearing and better ways to identify and manage them before they become an issue are needed. Risk management strategies to deal with emerging pests due to the effect of climate change and other factors are needed.

Desired outcome: Research outcomes will improve the identification, tracking, monitoring and management of new pests entering Ontario and protect the biosecurity of our outdoor horticulture and field crops.

d. **Research Focus Area**: Innovative/Disruptive Technology Development

RIB ID: 2020.076

Research question: How can automation and data management software (e.g. vision systems, scouting software) improve pest detection and plant health decision making for horticulture and field crop growers to improve Integrated Pest Management efficiency? What are new or more effective on-farm plant pest diagnostic techniques and tools for difficult-to-detect pests or pests that require early diagnosis and intervention?

Research problem/gap: Efficient IPM is about "tweaking" programs to reduce input and labour costs, which are significant in crops with low profit margins. There is a need to see how automation and data management can be applied to IPM as well as production. On-farm diagnostic tools and techniques are needed to improve the effectiveness of IPM programs. More efficient IPM will improve pest detection and control outcomes (e.g. finding pests at lower levels, using fewer biocontrol agents/pesticides due to earlier detection).

Desired outcome: Outcomes would include efficiency/savings research results/reports highlighting improvements to pest detection and outcomes; reports of reduced pesticide use due to better management and planning of IPM programs through data analysis; BMPs on how automation best fits into a systems wide IPM program.

3.3 Research Priority Area: Sustainable Production Systems

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a. **Research Focus Area**: Analysis of BMP Adoption

RIB ID: 2019.012

Research question: What are the social, behavioural and economic barriers to the adoption of Best Management Practices in different productions systems (field crops, horticulture and livestock)?

Research problem/gap: Adoption of BMPs and participation in BMP cost share programs is limited to a certain segment of the farm population. More information is needed to understand the barriers to broader uptake. Is it the message, the messengers, market conditions, risk, uncertainty etc.?

Desired outcome: A research publication/report which outlines key barriers, and suggestions for how to overcome these barriers, whether for program design, communications, or other approaches and tools not currently in our government toolbox.

RIB ID: 2019.018

Research question: What kinds of incentives, disincentives or other policy tools are most likely to prompt a change in customer behaviour (e.g. a financial or other incentive) to reduce the amount of green bin waste that is generated at food service establishments?

Research problem/gap: There needs to be a better cost/benefit analysis of food wastage in ICI sectors such as the food service industry. Increased knowledge of lost money by customers and food service establishments could lead lead to a reduction in food wasted.

Desired outcome: Decrease in food waste in food service establishments.

RIB ID: 2019.019

Research question: How can landowners who do not participate in Environmental Stewardship programs be engaged to improve the environmental stewardship of their lands?

Research problem/gap: How do we encourage new entrants to agri-environmental programs? What do we know about those who have never or seldom participated in government or other agri-environmental programs? What are the tools, information and communication tactics and strategies to reach producers who have never shown any interest in these programs?

Desired outcome: A better understanding of target audiences, and a strategy to target and increase enrollment in agri-environmental stewardship programs using new approaches.

b. **Research Focus Area**: Environmental Impacts of Management Practices

RIB ID: 2019.023

Research question: What barriers affect the recovery, processing and distribution of organic food waste for use as an organic amendment on farms? How can transportation costs and other challenges be overcome?

Research problem/gap: Food and organic wastes are often distant from many farms needing soil amendments. Such soil amendments are often not widely available or are available at prices too high for widespread use. There needs to be greater understanding of the organizational approaches that would enable efficient acquisition of organic amendments by individual farmers without high transaction costs.

Desired outcomes: Increased amount of recovered organic food wasted used as a soil amendment.

RIB ID: 2019.024

Research question: What are the barriers for municipalities/private processors to begin accepting and processing certified compostable products? Are there other opportunities to up-cycle organic waste materials currently being sent for composting or anaerobic digestion? What system changes would be required for compost facilities to stream compostables at the front end (currently facilities are designed to manage food waste and will need upgrades to process compostable products and packaging, as they are slower to compost than food waste)?

Research problem/gap: Compostable products and packaging such as cutlery, cups, take-out containers and coffee pods are not accepted in municipal organic waste collection systems in Ontario.

Desired outcomes: Help support food processors and businesses invest in environmental solutions that the public is asking for.

Removal of barriers through honest conversation with all partners.

RIB ID: 2019.025

Research question: What compostable packaging options can the food and beverage processing sector rely on to successfully reduce waste? What are the barriers to ensuring certified compostable products and packaging are diverted from disposal and how can they be overcome? To what extent are consumers willing to pay a premium to acquire a compostable version of a product (or the packaging used for a product) versus a conventional one made from non-compostable materials?

Research problem/gap: There is considerable difficulty assessing and understanding whether compostables properly compost, or the cross-contamination with non-compostables, and the result of micro plastics contaminating compost or digestate and thus our agricultural fields.

Desired outcomes: Better understanding of soil quality required for end products from compost and digestate.

c. Research Focus Area: Innovative/Disruptive Technology Development

RIB ID: 2020.081

Research question: How effective are agricultural biologicals from plant and soil microbiomes for plant protection, for increasing crop productivity and for substitution of synthetic fertilizers and pesticides? What measures (e.g. environmental, economic, plant health) can be used to verify the effectiveness of these biologicals?

Research problem/gap: Agricultural biologicals in the context of clean technologies as bioproducts include microbials, plant extracts, and other organics. This is a rapidly expanding area of research that utilizes indigenous microorganisms as an agricultural bioresource to improve crop productivity and provide environmental benefits. Plant and soil microbiome presents an opportunity to develop clean technologies for increasing the sustainability and productivity of agriculture in the face of climate change. The use of beneficial microorganisms for crop inoculants

can improve nitrogen fixation, as well as promote growth and resistance to disease and stress (endophytes).

Desired outcomes: Outcomes will result in the development of bio stimulants, inoculants, biofertilizers, and microbials for enhanced crop performance, with effectiveness measured in terms of environmental, economic and plant health benefits.

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