2024

# Food, Agricultural and Resource Economics (FARE)

## GRADUATE STUDENT SYMPOSIUM

**Presented by the University of Guelph and OMAFRA**

**MARCH 26, 2024 • 9:00AM - 2:45 PM**

1 Stone Rd W Conference Centre & Virtual (Microsoft Teams)

# SYMPOSIUM AGENDA

## 9:00 AM - 2:45 PM

**9:00 AM**     **OPENING REMARKS & LAND ACKNOWLEDGEMENT - Alfons Weersink, FARE Graduate Program Coordinator**

**9:10 AM**     **Nicholas Bannon -** Assessing the Effect of Climate Change on Canadian Farmland Values: A Ricardian Approach *

**9:30 AM**     **Justina Assuah -** Growth in Urban Development and its Impact on Farmer's Investment in Agriculture Lands: The Case of Investment in Cover Cropping on Farmland in Ontario *

**9:50 AM**     **Esther Metieh -** A Product/Sectoral Level Analysis of COVID-19's Impact on Canada's Agri-Food Exports: Did FTAs Mitigate this Impact? *

**10:10 AM**     **Promesse Essolema -** E-Commerce Resilience in Canada's Agrifood Trade Amidst COVID-19 *

**10:30 AM**     **BREAK**

**10:40 AM**     **Tu Anh Chung -** Assessing Menu Labelling and Placement Interventions for Sodium Reduction in Ontario Restaurants Using a Randomized Control Trial

**11:00 AM**     **Caitlin Kroetsch -** Encouraging Acceptance of Gene-Edited Food: Communication Strategies

**11:20 AM**     **Cinthia Zarate Chirinos -** Changing Behaviors of Decision-Markers in the Perishable Food Supply Chain: A Laboratory Experiment

**11:40 AM**     **Mariam Abu-El-Magd -** The Impact of Loyalty Points on Canadian Consumer Preferences for Low Sodium Bread *

# SYMPOSIUM AGENDA

## 9:00 AM - 2:45 PM

**12:00 PM**    **Xinyan (Yoko) Yang -** Food Prices and Intimate Partner Violence (IPV)

**12:20 PM**    **LUNCH BREAK**

**12:50 PM**    **Stephen Duff, Senior Economist, OMAFRA** - Farm Income and Commodity Market Situation and Outlook

**1:20 PM**    **Roy Ahiati -** Assessing The Long-Term Profitability of Nitrogen Fertilization Rate Strategies *

**1:40 PM**    **Obed Sappor -** The Economic and Environmental Impact of Nitrogen Inhibitors in Corn Production: A Study in Ontario. *

**2:00 PM**    **Susan Subedi -** Analysis of Cost & Benefit Associated with a Wildfire Monitoring Satellite in Canada

**2:20 PM**    **Awards Ceremony**

## Assessing the Effect of Climate Change on Canadian Farmland Values: A Ricardian Approach *

**Presenter:** Nicholas Bannon
**Advisor:** Brady Deaton

This project estimates the effect of climate change on Canadian farmland values using a unique data set of 60,000 parcel-level sales between 2017-2022. The parcel level data supports a regression approach to estimate the relationship between farmland values and climate variables with unique controls for non-agricultural influences – i.e., census division fixed effects and proximity to urban areas. Our results suggest that by 2070, climate change will significantly increase Canadian farmland values.

## Growth in Urban Development and its Impact on Farmer's Investment in Agriculture Lands: The Case of Investment in Cover Cropping on Farmland Ontario *

**Presenter:** Justina Assuah
**Advisor:** Brady Deaton

This study is conducted to identify the impact the proximity of farmland to urban development has on investment in cover crops. The use of farmland for non-farming purposes has a significant effect on the activities of farmers including investment decisions. Based on how close farmland is to urban development, the alternative uses of farmland for non-farming activities increase. The study employed the probit model to estimate the result and data from the 2022 Farmland Value and Rental Survey on Ontario farmers was used for the study. The study found that farmers will be willing to invest in cover cropping if the farmland is further from urban development. The government's decision to allocate land for societal needs is a great contribution to meeting the sustainable use of agricultural farmlands. The study also informs farmers on which farmland they should invest in for either agricultural or non-agricultural practices.

## A Product/Sectoral Level Analysis of COVID-19's Impact on Canada's Agri-Food Exports: Did FTAs Mitigate This Impact? *

**Presenter:** Esther Metieh
**Advisor:** Sylvanus Kwaku Afesorgbor & Andreas Boecker

We conduct a product and sectoral analysis of the impact of COVID-19 on Canada's agri-food exports, while highlighting the mitigating role of Free Trade Agreements (FTAs). The study utilizes a gravity model with monthly export from Canada to 216 partners spanning 2018 to 2022. The research investigates the nuanced impacts of COVID-19 variables— cases, deaths, and stringency index— on various segments of agri-food exports: bulk, intermediate, high-value, crop, horticulture, livestock, food, and beverages, within Canada's agri-food industry. It also examines how FTAs with Canada may have acted as a buffer against these impacts. Findings primarily indicate an overall insignificant impact on total agrifood exports from both exporter and importer sides yet reveal diverse significant positive and negative impacts within specific sectors and product dimensions. The comparison between FTA and non-FTA countries demonstrates less pronounced negative effects and more substantial positive influences on certain segments of agrifood exports. This study will aid in the development of targeted support policies for vulnerable agri-food products and sectors and contribute to broader discussions on supply chain resilience and economic stability in times of global disruptions. It will offer valuable insights for policymakers on the effectiveness of FTAs in safeguarding trade of specific agri-food commodities during global crises and provide guidance for future trade policy and FTA negotiations. The findings also imply a need for diversified trade strategies that account for the variability in pandemic responses across different markets.

## E-Commerce Resilience in Canada's Agri-Food Trade Amidst COVID-19 *

**Presenter:** Promesse Essolema
**Advisor:** Sylvanus Kwaku Afesorgbor & Andreas Boecker

The COVID-19 outbreak has sparked an unprecedented global health crisis and economic downturn, impacting various sectors. The distinctive effects on agrifood trade, marked by unique policy measures disrupting the supply chain, set it apart from previous viral outbreaks. This research investigates the impact of the COVID-19 pandemic on Canada's agri-food trade, with a specific focus on the resilience of e-commerce. Utilizing monthly data spanning from 2018 to 2022, including agrifood export data, domestic e-commerce statistics, UNCTAD's e-commerce readiness rankings, COVID-19 indicators, and Policy stringency index measures, the study aims to understand how the pandemic has affected Canada's role as a major global player in the agrifood industry and to identify strategies for mitigating its adverse effects. By analyzing this comprehensive dataset and employing the Poisson Pseudo Maximum Likelihood method applied to the gravity equation, the research finds that increased e-commerce significantly boosts agrifood exports and helps mitigate the negative impacts of the pandemic on Canada's international trade. The findings highlight the importance of supporting and facilitating e-commerce initiatives within the agrifood sector to enhance resilience against future disruptions. They underscore the need for policy measures that foster innovation, digitalization, and adaptation to changing market dynamics. By emphasizing e-commerce's role in buffering against disruptions, changing consumer behaviors, and evolving trade regulations, the research provides valuable insights for policymakers and stakeholders in the agri-food industry. It underscores the significance of maintaining Canada's competitiveness in international trade and ensuring the continued growth and sustainability of the agrifood sector in a post-pandemic world.

## Assessing Menu Labelling and Placement Interventions for Sodium Reduction in Ontario Restaurants Using a Randomized Control Trial

**Presenter:** Tu Anh Chung
**Advisor:** Brady Deaton

This study investigates the influence of sodium labeling variations and dish positioning on consumer dietary decisions in restaurant settings, with a particular focus on sodium intake. The research is of significant food and public health policy relevance, offering evidence crucial for the development of effective nutritional labeling regulations in Ontario. Utilizing an online Randomized Controlled Trial, the study finds that Daily Value and High Sodium labels significantly reduce the sodium content ordered by consumers. Additionally, the analysis reveals heterogeneity among different demographic groups, highlighting interaction effects that indicate varied responses to sodium labeling. These results contribute to a nuanced understanding of the factors that influence dietary decisions, providing valuable insights for public health policy and behavioral economics.

# ABSTRACTS

## Encouraging Acceptance of Gene-Edited Food: Communication Strategies

**Presenter:** Caitlin Kroetsch
**Advisor:** Mike Von Massow

This research, supervised by Professor Michael Von Massow, is funded by Genome Canada and aims to investigate factors influencing consumer perceptions of gene-edited products with a focus on beef and milk products. Gene editing presents a promising solution to the global challenge of feeding a growing population while minimizing environmental impact and maintaining affordability. However, consumer hesitancy towards gene-edited products remains a significant barrier to adoption. Previous research shows that exposing consumers to more information about gene editing practices can increase consumer adoption. This research investigates the most impactful way to present gene edited information to consumers. The study focuses on the role of language complexity and communication medium in shaping consumer perceptions. It was found that while complexity of information does not significantly impact consumer perceptions, the medium of communication plays a crucial role. Audio messages were identified as the most effective medium in positively influencing consumer perceptions, followed by video and written formats. Additionally, consumers exhibiting food technology neophobia are less likely to purchase gene-edited products. Overall, this research demonstrates that informational messages can positively influence consumer perceptions, even consumers with high levels of neophobia. These findings hold policy relevance for stakeholders in the agri-food industry by providing insights into effective communication strategies to bridge consumer acceptance gaps for gene-edited food products. By understanding the impact of language and medium, policymakers can better position gene-edited products to address food security challenges while fostering consumer acceptance.

# ABSTRACTS

## Changing Behaviours of Decision Makers in the Perishable Food Supply Chain: A Laboratory Experiment

**Presenter:** Cinthia Zarate Chirinos
**Advisor:** Mike Von Massow

This thesis project, under the guidance of Dr. Mike von Massow, explores the economic impact of decision-makers purchasing behaviours concerning locally grown products. The main goal is to benefit the Canadian food industry while fostering sustainable and efficient systems for businesses of all sizes. Through an incentive-compatible laboratory experiment conducted with participants from the University of Guelph, this study aims to determine the relationship between managerial – or individual - incentives, ordering behaviour within the fresh produce market, risk preferences, and the professional background of decision-makers. The research questions investigate the impact of managerial incentives on ordering behaviour, the potential of using a Normal distribution for demand forecasting to mitigate demand chasing, the varying effects of incentives across different critical ratios of products, and the influence of risk preferences on decision-making within the examined supply chain model. This research seeks to provide valuable insights for businesses to enhance the performance of those responsible for purchasing from local suppliers. By understanding the dynamics of ordering processes, businesses can improve the efficiency of their systems, reducing food waste and enhancing economic outcomes for the stakeholders involved. Secondly, the project holds significant policy relevance, contributing to the development of sustainable distribution chains that can benefit local communities, even those with limited resources to optimize their operations effectively. In conclusion, this thesis project serves as a connection between supply chain and behavioural economics, with results that can potentially lead to practical solutions to real-world challenges.

## The Impact of Loyalty Points on Canadian Consumer Preferences for Low Sodium Bread *

**Presenter:** Mariam Abu-El-Magd
**Advisor:** Michael Von Massow (main) & Yu Na Lee (co-supervisor)

Bread is a widely consumed staple food in the Canadian diet. However, bread leads the bakery products category as a top contributor to sodium intake for Canadians. One in four Canadians was affected by high blood pressure, resulting in an economic burden of $13.9 billion in 2022. This research examines Canadians' preference for low sodium bread and explores the impact of loyalty points and a low sodium label on their choice of bread. A discrete choice experiment was conducted online, administered by Qualtrics, collecting stated choice data from 1249 respondents, a representative sample of the Canadian population. The mixed logit model results indicate a preference amongst participants for low sodium bread and a positive willingness to pay for the low sodium attribute. Overall, participants valued loyalty points close to their actual dollar valuation, and females were responsive to loyalty points especially when it was strictly assigned to the low sodium option. The impact of the low sodium label varied depending on the sociodemographic characteristics of participants and their attitude towards healthy eating. In conclusion, the Canadian bread market is in need of adapting to the population's preference change and providing new low sodium alternatives for its consumers. Loyalty points or a low sodium label can be utilized separately as tools to reduce Canadians' sodium consumption depending on the targeted group. However, combining the low sodium label with loyalty points hindered both tools' impact on consumers' preference for low sodium bread.

## Food Prices and Intimate Partner Violence (IPV)

**Presenter:** Xinyan (Yoko) Yang
**Advisor:** Yu Na Lee

More than one in four women undergo intimate partner violence (IPV) at least once in their lifetime. IPV is a global public health issue with both short-term and long-term implications for the development of women and society. Recently, we have witnessed a global trend of increasing food prices and the cost of living crisis. In this paper, I explore the relationship between food prices and Intimate Partner Violence (IPV). Using data from four Sub-Saharan African countries (Mali, Nigeria, Uganda and Zambia), I estimate the impact of rising food prices and price volatility to see whether increases in food prices or price volatility are related to higher incidences of IPV for women. Preliminary results indicate that both food prices and price volatility are associated with a higher probability of a female experiencing any type of IPV – either physical, emotional, or sexual – although variations exist among different types of violence or countries

## Assessing The Long-Term Profitability of Nitrogen Fertilization Rate Strategies *

**Presenter:** Roy Ahiati
**Advisor:** Alfons Weersink

Nitrogen (N) fertilization rate is critical in crop production because a deficit in N applied affects crop yield while an excess N affects the environment. Fertilization at the Maximum Economic Rate of Nitrogen (MERN) has been viewed as a one of key strategies to address the dilemma. However, MERN, as a strategy, is unavailable ex ante. As such, alternative N rates would involve a strategy that concurrently enhances emissions reduction without significantly affecting crop yield and profitability. This study adopts the DeNitrification- DeComposition (DNDCv.CAN) model and the profit maximization model to estimate and evaluate the long run profitability and environmental damage of N rates strategies.
The results show that the motive of the farmer affects the optimal N application rate. The average N rate to maximize crop yield (180kg N/ha) is higher than the average N rate to maximize profit (165kg N/ha). Factors others than N application, like weather, play a significant role in crop, N2O emissions, and profitability of N rates. The results also show evidence of the existence of flat pay-off functions with an average difference of 62kg N/ha between the upper and lower limits. Furthermore, to switch from MERN to SMERN, a farmer would need to sacrifice an average of $174.00/ha of their profit to reduce N2O emission costs by $7.31/ha. Of the 17 ex ante N rate strategies the study identified and examined, the results show that the AgriSuite rate was the next best socio-economically viable N application strategy. Firstly, higher N fertilization rate observed in crop production may be partly explained by farmers incentive to maximize crop yield. Moreover, the existence of a flat pay-off indicate a lower cost of inaccurate N decisions. This undermines the need for precise N recommended rate efforts, as the risk of significant losses is minimal.

**The Economic and Environmental Impact of Nitrogen Inhibitors in Corn Production: A Study in Ontario.***

**Presenter:** Obed Sappor
**Advisor:** Alfons Weersink

This study evaluates the economic and environmental impacts of using nitrogen inhibitors in corn production in Ontario. It employs a bioeconomic modelling framework that integrates yield and environmental nitrous oxide (N2O) data from the Denitrification Decomposition (DNDC) model with a profit maximization model. Results indicate increasing corn yields with fertilizer application up to a plateau; specifically, for UAN, the yield plateau occurs at 150 kgN/ha, with yields marginally higher when inhibitors are included. Urea, however, shows no yield difference with or without inhibitors. The use of inhibitors reduced N2O emissions from 0.0216 to 0.0198 kgN/ha. Economic analysis reveals the highest returns at a 150 kgN/ha rate for both UAN and urea, with slightly reduced net returns upon introducing inhibitors. When factoring in emissions costs, inhibitors enhance financial returns for UAN, suggesting a lower optimal rate of 120 kgN/ha, while for urea, the highest returns remain at 150 kgN/ha without inhibitors, albeit the profitability gap narrows. These findings underscore the nuanced role of inhibitors in balancing environmental and economic outcomes in agriculture, suggesting that while inhibitors might not universally increase private benefits, they can be economically viable and environmentally beneficial, particularly for UAN, when emissions costs are considered. This highlights the potential for policy incentives to encourage environmentally friendly farming practices.

## Analysis of Cost & Benefit Associated with a Wildfire Monitoring Satellite in Canada

**Presenter:** Susan Subedi
**Advisor:** Alfons Weersink

The increasing frequency of wildfires due to climate change pose significant economic challenges to all sectors of Canadian society including agriculture. This study examines the economic impact of Canada's WildFireSat mission, a novel satellite system designed to support wildfire management in Canada, focusing on wildfire related cost including suppression expenditures, water treatment costs, evacuations, and timber losses from escalating wildfires in these recent years. This research integrates these cost into an existing economic models, conducting a cost-benefit analysis of possible cost savings in relation to investments into the satellite system. The finding aims to enhance the wildfire management strategies, particularly in the face of increasing challenges, guiding sustainable solutions for Canada's economic resilience.