

4th Biennial Agriculture Symposium

# Our Food. Our Future.

Growing Opportunities in Agriculture through Innovation and Collaboration  
Corner Brook Civic Centre, November 20-22, 2018





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# Newfoundland and Labrador Agriculture Industry Overview

## The Potential

Newfoundland and Labrador has an abundance of pristine land and water, a temperate climate and high amounts of precipitation that give us several advantages for food production. As the world's population increases, it is expected that demand on the world's food supply will increase significantly which will undoubtedly put pressure on global access to food. It is believed that in the coming years, as climate change renders current agricultural producing areas less viable, northern regions such as Newfoundland and Labrador will have a fundamental role to play in helping feed the world.

The cool, maritime climate of Newfoundland and Labrador has been shown to be highly suited to the production of grain, oilseeds, vegetables, and berries, all of which meet or exceed the nutritional quality of other jurisdictions. Currently, many opportunities exist within the province's agriculture and agrifoods industry to increase production levels of many agricultural products. While 90 per cent of the food available is currently imported, there is a flourishing fresh food culture with

strong consumer demand for fresh local product. Beyond fresh product, there are also countless opportunities for value-added products with the additional benefit of Newfoundland and Labrador's access to export markets. Due to its geographic location, the province is a stage for global market access with secondary processing and export potential abounding.

While developing and expanding the provincial agricultural industry is the key objective, it is imperative to do so in an environmentally, financially, and socially responsible manner. This is why environmental sustainability is an essential component for growing the agriculture industry in Newfoundland and Labrador.

The fact that we are still in the developing stages of growing an agriculture industry allows this province the opportunity to incorporate sustainable innovative practices that were not known and/or available when other jurisdictions were at the same stage of development. This often enables us to incorporate knowledge in many cases from the beginning, from the conversion of forested, virgin ground to productive agricultural lands.



## The Current Industry Snapshot

The 2016 Census of Agriculture reported 407 farms producing a wide variety of crops and livestock products throughout Newfoundland and Labrador. The trend towards fewer but larger farms continues not only throughout Newfoundland and Labrador, but across Canada. Between 2011 and 2016, the total number of farms in the province declined by 20 per cent, with land in production declining 5.6 per cent. Cropland area totaled 19,619 acres in 2016. The leading uses of cropland are hay (79.2 per cent), field crops (8.4 per cent), fruit and berries (4.4 per cent), vegetables (4.1 per cent), and sod and nursery (3.8 per cent). Crop farming accounted for 62 per cent of farms in 2016 and animal production accounted for 38 per cent.

In 2017, the provincial farm cash receipts rose to \$138.3 million, a 4.8 per cent increase over 2016. The greatest rate of growth in 2017 occurred in greenhouse and nursery operations which experienced a 10.4 per cent increase in the value of production, reaching \$10.3 million. The supply managed commodities including (dairy, chicken, and eggs) remained the largest three commodities in 2017 accounting for 70.4 per cent of farm cash receipts. Even with these industries producing 100 per cent of supply managed food products for local residents, we cannot be considered fully secure in these commodities as we are heavily reliant on imported livestock feeds from the mainland as inputs for these industries. Due to the high cost of shipping, livestock feed remains the largest expenditure for farmers at \$46.1 million or 34.1 per cent of total operating expenditures in 2016.

As a workforce, the average age of farmers within the province is 55 years with 58 per cent of the farmers being over the age of 55. The industry is relatively small and underdeveloped compared to other provinces, with farms ranging in size from some of the largest commercial operations in the country to small family farms selling directly to consumers. Newfoundland and



Labrador has the highest proportion of farms with direct marketing in Canada (34.1 per cent) in 2015, selling at least one agricultural good directly to consumers. This diversity also applies when looking at the wide range of farm types found in the province, encompassing everything from vegetables, floriculture, and berries to dairy, poultry, beef, sheep and more.

## Government Commitments

“The Way Forward” document, released on November 9, 2016, is government’s roadmap for sustainability and growth in Newfoundland and Labrador. It was highlighted in that document that the province is only approximately 10 per cent self-sufficient in its non-supply managed food requirements. To address this food security issue, government has committed to doubling food self sufficiency in this province to 20 per cent by 2022, partially by enhancing access to Crown lands (Action 1.12) for agriculture purposes.





As part of this increased access to Crown Land for agricultural purposes, the Department of Fisheries and Land Resources identified 62 areas of interest totaling approximately 64,000 hectares for agricultural use. To date, 19 of those areas – a total of 15,500 hectares – have been reserved for development. This land is advertised on the government website at: [www.faa.gov.nl.ca/agrifoods/land/obtaining\\_land/requests\\_for\\_proposals.html](http://www.faa.gov.nl.ca/agrifoods/land/obtaining_land/requests_for_proposals.html)

“The Way Forward – Realizing Our Potential” was a second phase document (released May 24, 2017) that provided an update on progress to date and identified key actions for the 2017-18 fiscal year. Under Focus Area 1: A Stronger Economic Foundation, Action 2.19: Increase Newfoundland and Labrador’s Food Self Sufficiency to at least 20 per cent by 2022, it is stated that the Wooddale Tree Nursery would become the Centre for Agriculture and Forestry Development which will not only include the production of tree seedlings for silviculture, as well as include fruit and vegetable crop propagation and research activities that advance and diversify the agriculture sector.

These documents and announcements were followed by the October 2017 launch of The Way Forward on Agriculture— Sector Work Plan. This plan was developed through stakeholder engagement and partnerships between the provincial government, Memorial University of Newfoundland- Grenfell Campus, the Newfoundland and Labrador Federation of Agriculture, and Food First NL. Our collaborative efforts will cultivate the conditions necessary to foster new and expanding agricultural business activity, generate additional employment opportunities within the industry, and increase food self-sufficiency in the province.



4<sup>th</sup> Biennial Agriculture Symposium

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Growing Opportunities for Agriculture through Innovation and Collaboration

# Agenda

November 20–22, 2018

Corner Brook Civic Centre



## Tuesday, November 20<sup>th</sup>

**3:30 pm** | Tour of Functional Foods Laboratory, Grenfell Campus  
Meet at the Grenfell Campus, MUN Arts and Science atrium (entrance with flags out front)

**7:00 pm- 9:00 pm** | Registration, Networking, Trade Show and Poster Viewing, Cash Bar

## Wednesday, November 21<sup>st</sup>

**7:30 am** | Registration, Trade Show, Poster Viewing, Registration – Breakfast

**8:30 am** | Government of Newfoundland and Labrador  
Memorial University of Newfoundland, Dr. Gary Kachanoski, President  
Agriculture and Agri-Food Canada, Melvin Wheaton  
Newfoundland and Labrador Federation of Agriculture, Merv Wiseman, President  
Food First NL, Kristie Jameson, Executive Director

### Innovating the Food System in Newfoundland and Labrador

**9:00 am** | **A Call for Collective Action to Advance the Food System in Newfoundland and Labrador**  
Kristie Jameson, Executive Director, Food First NL

**9:15 am** | **Agriculture Knowledge and Innovation Systems in Newfoundland and Labrador**  
Sabrina Ellsworth, Manager, Agriculture Research, Fisheries and Land Resources

**9:30 am** | **Collaboration and Innovation in the Northern Ontario Ag-Scape**  
Stephanie Vanthof, Manager, Northern Ontario Agriculture Farm Innovation Alliance

**10:00 am** | **Panel Session**  
Sabrina Ellsworth (Fisheries and Land Resources), Kristie Jameson (Food First NL), Stephanie Vanthof (Northern Ontario Agriculture Farm Innovation Alliance)

**10:30 am** | **Networking Break: Trade Show and Poster Viewing**

### Sustainable Northern Agriculture

**11:00 am** | **Building Sustainable Soil Management into Food Production Systems in Newfoundland and Labrador**  
Dr. Dan Pennock, Department of Soil Science, University of Saskatchewan

**11:30 am** | **Food in the North. Taking Back our Food Chain. Innovation and Disruption**  
Sonny Gray, CEO, North Star Agriculture, Yukon

**12:00 pm** | **Panel Session**  
Dr. Adrian Unc (Grenfell Campus, MUN), Dr. Daniel Pennock (University of Saskatchewan), Dr. Julia Wheeler (Agriculture and Agri-Food Canada), Jamie Jackman (MUN-Labrador Institute)



12:30 pm		<b>Lunch (to be provided): Trade Show and Poster Viewing</b>
1:30 pm		<b>Northern Agriculture: An Innovative Approach</b> Shae-Lynn Roberts and Jessica Poole, Researchers, The Coasters Association, Quebec
2:00 pm		<b>Panel Session</b> Melvin Rideout (Rideout's Farm Inc.), Des Sellars (Nature's Best Farm), Sonny Gray (North Star Agriculture), Shae-Lynn Roberts (The Coasters Association)
2:45 pm		<b>Networking Break: Trade Show and Poster Viewing</b>
<b>Diversifying and Growing Food and Food Products</b>		
3:30 pm		<b>Adapting to Changes and Supporting Diversification in Icelandic Agriculture</b> Karvel Lindberg Kavelsson, Manager of the Icelandic Agriculture Advisory Centre
4:00 pm		<b>Farming through the Seasons, a Family Collaboration</b> Susan Lester, Farmer, Lester's Farm Market
4:30 pm		<b>Panel Session</b> Des Sellars (Nature's Best Farm), Rodney Reid (Exploits Meadow Farm), Chris Oram (Mark's Market), Susan Lester (Lester's Farm Market)
5:00 pm		<b>Tour of Functional Foods Laboratory, Grenfell Campus, Memorial University of Newfoundland</b> Grenfell Campus, meet at Arts and Science atrium (entrance with flags in front)
7:00 pm - 9:00 pm		<b>Banquet: Taste some of the finest locally produced foods/beverages made in Newfoundland and Labrador.</b> <b>Grenfell Campus, Arts and Science atrium (entrance with flags in front).</b> Cash bar to open at 6:30 pm.

## Day 2: Thursday, November 22<sup>nd</sup>

8:00 am		<b>Breakfast</b>
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### Diversifying and Growing Food and Food Products continued

8:30 am		<b>Broiler Production: More than Just Chicken</b> Darrin Didychuk, President and General Manager Country Ribbon Inc.
9:00 am		<b>Panel Session</b> Adam Blanchard (Five Brothers Cheese), Lloyd Warford (Cranberry Association of NL), Shae-Lynn Roberts (The Coasters Association), Dr. Raymond Thomas (Grenfell Campus, MUN), Dr. William Newell (Navigate), Karvel Lindberg Kavelsson (Icelandic Agriculture Advisory Centre)



## The Future of Food and Farming

**9:45 am | Can We Learn Entrepreneurship?**  
Dr. William Newell, Navigate Incubator, College of the North Atlantic- Corner Brook Campus

**10:00 am | Networking Break. Feature: Secondary Processed Local Food and Product Sampling, Trade Show and Poster Viewing**

**10:30 am | The Future of Food – Entrepreneurship and New Farmers**  
Kim McConnell, AdFarm, Calgary, Alberta

**11:00 am | Growing a Farm: New Farmer Education in the 21st Century**  
Dr. Gary Stephenson, Professor, Oregon State University

**11:30 am | Becoming a Farmer in Newfoundland and Labrador**  
Matthew Carlson, Young Farmers Coordinator, Newfoundland and Labrador Federation of Agriculture

**11:45 am | Bridging the Divide: How Diversity Can Support the Province's Agriculture Sector**  
Justin Campbell, Diversity Outreach Coordinator, Association for New Canadians, Sarah Thompson, Project Manager, Association for New Canadians

**12:00 pm | Panel Session**  
Matthew Carlson (Newfoundland and Labrador Federation of Agriculture), Justin Campbell (Association of New Canadians) Dr. Gary Stephenson (Oregon State University), Lori Haycock (Gros Morne Farm and Market) Kim McConnell (AdFarm), William Newell (Navigate)

**12:30 pm | Lunch: Trade Show and Poster Viewing**

## Food Access: Marketing and Distribution

**1:30 pm | Building Local Food Systems through Co-operation**  
Peggy Baillie, Consultant and Farmer, Local Food and Farm Co-ops, Ontario

**2:00 pm | Setting the Table: Bringing Multiple Stakeholders Together to Change the Food System**  
Alicia Lake, Executive Director, Pan Cape Breton Food Hub Co-op

**2:30 pm | Networking Break in room, 15 minutes**

**2:45 pm | Panel Session**  
Krista Chapman (Three Mile Ridge), Sarah Crocker (Seed to Spoon), Sean Dolter (The Greenhouse)

**3:30 pm | Panel Session**  
Byron Bellows (Colemans), Brad Walsh (Atlantic Grocery Distributors Ltd.), Melvin Rideout (Rideout's Farm Inc.), Kent Fudge (Mountain View Farm)

**4:00 pm | Summary and Next Steps**  
Dr. Ivan Emke, Honorary Research Professor, Grenfell Campus, Memorial University of Newfoundland

**4:15 pm | Closing Remarks**



## Speaker Profiles and Presentation Abstracts

### Kristie Jameson

Executive Director  
Food First NL  
kristie@foodfirstnl.ca

Kristie is the Executive Director of Food First NL, a non-profit organization that aims to increase access to healthy food in Newfoundland and Labrador. Kristie sits on the Advisory Boards for Farm to Cafeteria Canada, and the National Collaborating Centre for the Determinants of Health, and is a founding member of both the St. John's Farmers' Market Cooperative and the St. John's Food Policy Council. Kristie holds a Baccalaureate of Commerce with Honours from the University of Guelph. She is an alumna of the Governor General's Canadian Leadership Conference (2015) and was a nominee for the YWCA's Women of Distinction Award (2016).



### A Call for Collective Action to Advance the Food System in Newfoundland and Labrador

Food Security--the idea that all people have access to enough, healthy, safe, and culturally-appropriate food--is a complex issue in Newfoundland and Labrador.

Newfoundland and Labrador relies heavily on outside food sources. Numerous communities lack full grocery stores, leaving residents dependent on convenience stores or transportation to the closest grocery store to buy food. Many households struggle to afford enough healthy food and depend on food banks to access food. Residents living in remote regions of the province also face barriers accessing healthy wild food. With so many challenges facing the people of this province, it is not surprising that Newfoundland and Labrador has the lowest rate of consumption of vegetables and fruits in Canada, as well as the highest rates of diabetes and other diet-related health challenges.

The complexity of this issue demands a multifaceted and collaborative response, one that cuts across the private, public, and community sector. In recent years, there has been incredible growth in interest and action on advancing food security and the food system in the province, including bold leadership, aggressive targets, and more coordinated, collaborative action to advance this issue.

During this session, Kristie Jameson will provide an overview of the Newfoundland and Labrador food system, highlight current initiatives underway across Newfoundland and Labrador, and speak to the importance of collaborative, innovative approaches to strengthening our local food system and improving food security in the province.



## **Sabrina Ellsworth, M.Sc., P.Ag.**

Manager of Agricultural Research  
Department of Fisheries and Land Resources  
sabrinaellsworth@gov.nl.ca

Sabrina Ellsworth was born and raised in the Bay of Islands on the west coast of Newfoundland. Sabrina's passion for agriculture started from her upbringing in a rural community surrounded by family who hunted, fished, grew, and preserved most of what they ate. With this way of life imbedded in her roots, Sabrina pursued her formal agricultural education out of province at the Nova Scotia Agricultural College (Dalhousie University, Faculty of Agriculture) where she received a Bachelor of Science Degree (Animal Science) in 2002 and a Master of Science (Environmental Science) in 2005. She has since worked with the Nova Scotia Department of Agriculture, Atlantic Swine Research Partnership, and Nova Scotia Soil and Crop Improvement Association as a Research

Associate and program coordinator with the Greenhouse Gas Mitigation and Shelterbelt Programs. Since returning to Newfoundland in 2008, Sabrina has held several positions within the Provincial Government: Alternative Feeds Coordinator, Crop Specialist, Soil Fertility Specialist, Manager of the Institute of Biodiversity, Ecosystem Science and Sustainability and now, for the last six years, Manager of Agricultural Research with the Department of Fisheries and Land Resources.



## **Agricultural Knowledge and Innovation Systems in Newfoundland and Labrador**

Innovation within agriculture research and development is not a linear process. It is a framework built of many actors, with farmers at the centre. On a daily basis we interact with farmers, extension specialists, researchers, seed companies, NGOs and government. The old linear model of technology transfer/knowledge mobilization/dissemination (from researcher to the user) is outdated and is being replaced with an interactive model of networking systems that integrate knowledge, production, adaptation, advice and education. This Systems concept way of thinking is the latest progression in the field of agriculture. Many countries around the world such as the EU, New Zealand, Sweden and the Netherlands have adopted this approach as they understand the value of coordinated and integrated agricultural research efforts.

Sabrina will introduce the Agriculture Innovation Systems concept and how it is being adopted here in Newfoundland and Labrador. She will identify the actors who are generating the knowledge in this field, talk about the common voice we share, the capacity they bring to the table, and current synergies. Finally she will talk about the ways in which the gap between knowledge generation and adoption can be addressed with this innovative framework in mind.



## **Stephanie Vanthof**

Administrator

Northern Ontario Farm Innovation Alliance

nofia.on@gmail.com

Stephanie is the Administrator for the Northern Ontario Farm Innovation Alliance, a non-profit organization that works to advance agriculture in Northern Ontario. She builds and manages projects that address a variety of agricultural initiatives and works to showcase Northern Ontario agricultural opportunities to a broader audience.

Stephanie was raised on a dairy farm in Northern Ontario and has experienced first-hand the unique challenges and opportunities faced by both large and small farms in Northern Ontario. Her education includes a Master of Science in Geography and Environmental Studies from the University of Toronto and a Bachelor of Environmental Science in Environment and Business with a diploma in Human Resource Management from the University of Waterloo.



## **Collaboration and Innovation in the Northern Ontario Ag-Scape**

The Northern Ontario Farm Innovation Alliance has worked over the last few years to develop partnerships and alliances with stakeholders to grow the agricultural industry across Northern Ontario, managing projects that impact the farmers' commercial operation while meeting unique district and sectoral needs. Northern Ontario has a large geography, which can pose a challenge to integrated, collaborative solutions to agricultural needs, but the North also has an innovative, diverse agricultural industry. Several collaborative projects, led by NOFIA and others, will be examined through the lens of an agricultural innovation system to showcase how these projects have resulted in successes across Northern Ontario. This includes strategic research to improve the viability of the northern dairy processing strategy, value-chain product development to develop new markets and improve access to existing markets, and industry-driven funding that supports innovative processing through micro grants. Further, an overview of who and how NOFIA works with in the Northern ag-scape, and the opportunities and challenges that exist will be presented.



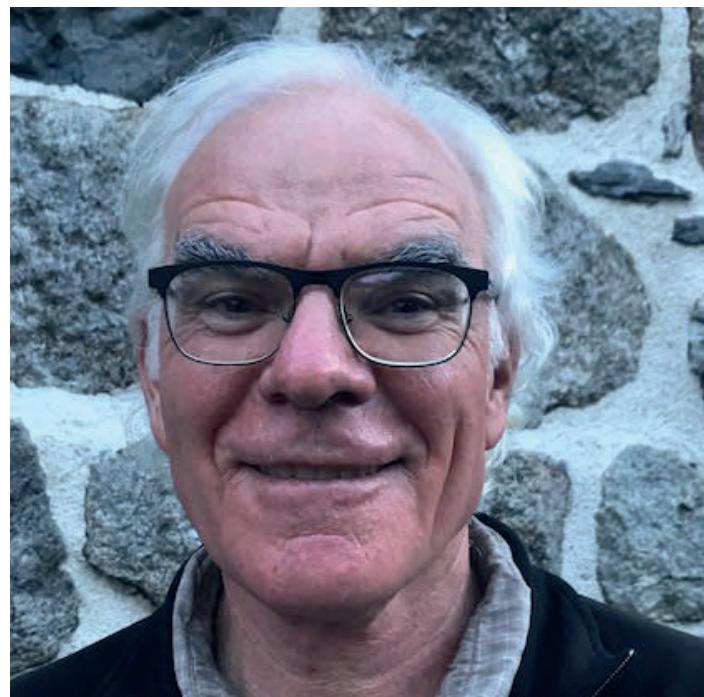
## Dr. Dan Pennock

Professor

University of Saskatchewan

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Dr. Dan Pennock is a Professor Emeritus in the Department of Soil Science at the University of Saskatchewan in Canada and a Fellow of the Canadian Society of Soil Science. He has published in the areas of soil erosion, human-induced soil organic carbon change, precision farming, and the dynamics of greenhouse gas emissions from agricultural, forest and wetland soils. He served on the Intergovernmental Technical Panel on Soils (ITPS) of the Food and Agriculture Organization of the United Nations from 2013 to 2018. As part of his work for the ITPS and the FAO he has authored the initial drafts of the World Soil Charter, the Voluntary Guidelines for Sustainable Soil Management, and the recent Global Assessment of the Impact of Plant Protection Products on Soil Functions and Ecosystems. He was also the regional coordinating author for the chapter on North America in the 2015 Status of the World's Soil Resources report and lead author of the Technical Summary of that report.



## Building Sustainable Soil Management into Food Production Systems in Newfoundland and Labrador

Sustainable soil management (SSM) is widely acknowledged as a key element in achieving food security but it has been difficult to assess whether a given production system is indeed sustainable. In the past five years the Food and Agriculture Organization of the United Nations has adopted a scientifically based definition of SSM as well as an assessment protocol that can be adapted to specific production systems such as those in Newfoundland and Labrador. The new definition of SSM recognizes that the possible negative effects of soil management on water and air quality must be assessed along with changes to the soil itself. This broader approach to assessment differs from the soil health perspective, which is typically much more soil focused. The FAO assessment approach could provide the basis for a regionally relevant SSM certification program that would allow producers who adopt the approach to be rewarded for their efforts.



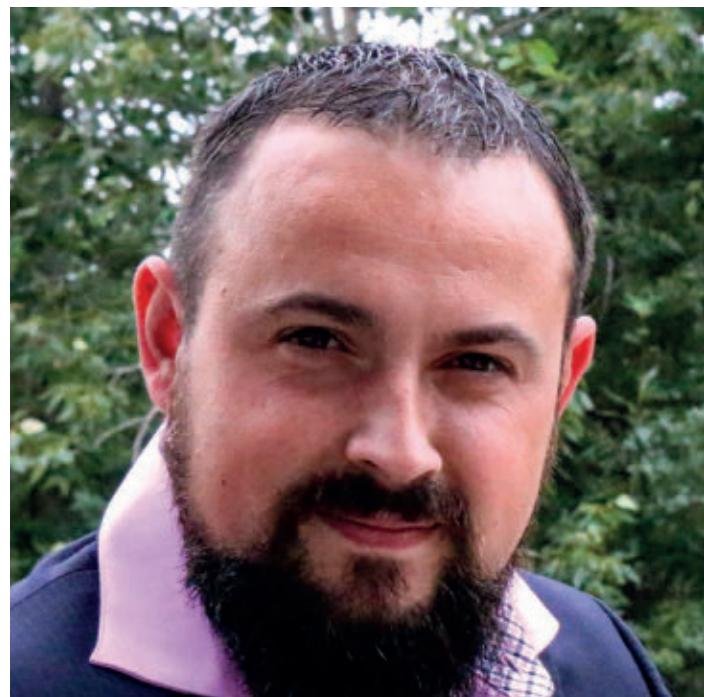
## Sonny Gray

CEO of North Star Agriculture

Business Strategist and Developer, Entrepreneur; Farmer.

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Sonny has a keen eye for identifying overlooked opportunities that exist in the North and turning them into successful business ventures. Originally raised on a farm in QC, Sonny has set his sights on building local agriculture infrastructure North of 60. As an active member of the Yukon Agricultural Association, Sonny has been a part of the Agriculture Industry Advisory Committee, a stakeholders group that helps guide the territorial government's agriculture policy, among other activities. Sonny has recently been elected President for the Yukon Agricultural Association where his mandate is to represent Yukon Agriculture within various levels of government while supporting Yukon farmers. Sonny has 14 years of entrepreneurial experience within the Yukon with several successful service-based businesses to his credit within Whitehorse, including Sirius Security, Yukon Clean, Gray Management Services and North Star Agriculture. Sonny also owns and operates Flat Creek Farms a 78-acre piece of paradise that feeds his family of five boys and supplies food to the North in the form of fresh eggs, chicken, pork, lamb and quail, etc.



## Shae-Lynn Roberts

Researcher

The Coasters Association

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Shae-Lynn was raised on the Lower North Shore of Quebec and has always been deeply attached to its 15 small communities. She left the region to attend post-secondary education at Heritage College in Gatineau for two years and then obtained a bachelor's degree in environmental science at McGill University. Shortly after finishing her degree, Shae-Lynn had the privilege to move back to the Lower North Shore and work in her field of study at the Coasters Association, a local non-profit, through an internship program. Since then she has been hired by Centre d'expérimentation et de développement en forêt boréale (CEDFOB) to help increase their presence in the region and assisting with the execution of projects. She currently works very closely with the innovations surrounding northern apiculture and small fruits agriculture.



## **Jessica Poole**

Researcher

The Coasters Association

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Jessica, from St. Paul's River, Quebec, is currently working with the Coaster's Association and the Lower North Shore Solidarity Bio Products Cooperative to aid in the development of the bio-economy using its valuable and unique resources. With a keen interest in the environment and an inherit of small town pride, she focused on aquatic ecology, graduated from the University of Guelph with a Bachelor of Environmental Science, and wanted to return home. Jessica fortunately had the opportunity to work towards a Masters of Environmental Science from the Université du Québec à Trois-Rivières, which included studying a local seaweed species on the Lower North Shore. Research focused on identifying its chemical characteristics and optimizing extraction methods that are applicable to rural communities. The production possibilities of a seaweed industry are wide, ranging from food and cosmetic use, to agricultural fertilizing products. Developing this industry locally would improve the rural socio-economy and even supply the Nordic agriculture initiatives. Future development is also in the works to collaborate with fish processing plants to research the opportunities of using by-products for agricultural purposes.



## **Northern Agriculture an Innovative Approach**

The Coasters Association is a representative and responsive organization. Its vision is to enhance the quality of life on the Quebec Lower North Shore by creating and supporting community development and community leadership. A need for sustainable northern agriculture has been a global issue for quite some time and the Coasters supports a variety of initiatives surrounding this topic. There are currently several projects that are working with trials of small fruits productions, honey berries, lingonberries, and cloudberry, all being cultivated to create more sustainable and regular yields for these high-value products. Three of the key partners will participate in the symposium to help share the work happening on the Lower North Shore of Quebec, Centre d'expérimentation et de développement en forêt boréale (CEDFOB), the Lower North Shore Bio-Products Solidarity Cooperative and the AGRO Project Manager Gros-Mécatina. They will share their process of transitioning from a traditional wild harvest to an innovative commercial agricultural production and viable sales market, and look forward to developing more industries and partnerships to create an agricultural industry that is responsive to the needs of northern rural communities.



## Karvel Lindberg Kavelsson

Manager

Icelandic Agriculture Advisory Centre

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### Education

MPM (Master of Project Management). Reykjavík University,  
B.Sc. in Agricultural Science from the Agricultural University  
of Iceland and as a guest student with Den Kongelige  
Veterinær og Landbohøjskole in Kobenhavn (KVL)

### Work related to agriculture

2013 – present: Manager for the Icelandic Agricultural  
Advisory Centre

2011-2013: Consultant for pigs and poultry

1999- 2010: Pig farmer, co-owner and manager for farm  
that had 530 sows and slaughter pigs

Over the last 20 years, a member of many committees and  
boards related to agriculture and management for my local  
community.



## Adapting to Changes and Supporting Diversification in Icelandic Agriculture

Icelandic agriculture has changed dramatically over the last 30 years, in a number of significant ways.

- In general, fewer farms each producing more, combined with technological advances, has resulted in fewer direct jobs in farming. This development has affected rural development and rural social structure in many areas.
- The importing of agricultural products has increased in the last few years. A recent ruling obligates the state to allow the importing of raw meat (until now it has allowed only the import of frozen meat). This will have a profound effect on the agricultural sector.
- The consumption of agricultural products has changed in the last few years. Icelanders are now consuming less lamb and other traditional foods but more white meat (chicken and pork). The increase of tourists visiting Iceland and the expansion of the tourist industry has, on the other hand, resulted in many farmers seeing opportunities in the direct marketing of local products and services in combination with tourism. We have many examples of farmers starting up restaurants on the farm where they sell their products. Technical improvements make more time for farmers, and they therefore have possibilities to think about new ways to improve their businesses.

RML, the agricultural advisory service, is a company that is owned by the Icelandic Farmers Association. Its role is to ensure that farmers have access to an impartial, high quality advisory service, regardless of where they are located or the type of agriculture they are running on their farm. The big changes in agriculture in Iceland (discussed above) provide the challenge of developing the advisory service in sync with those changes. One of the most relevant topics now relates to the effect of climate change and how the agricultural sector can contribute and react to the challenges.



## **Susan Lester**

Farmer

Lester's Farm Market

lestersfarmmarket@hotmail.com

Susan Lester is a sixth generation farmer on her family farm, Lester's Farm Market. Located in St. John's, Newfoundland and Labrador the family farm grows over 100 different varieties of fruits and vegetables on 120 acres of land. 2018 marks their 24th year selling directly to their customers through their market. Both of her parents, Mary and John, came from farming families, so naturally Susan and her brothers are following in their farming footsteps.

From a young age, Susan was always passionate about sharing knowledge, teaching, and engaging others. Due to this interest she went to Memorial University and completed her Bachelor of Arts with a major in English, minor in biology, followed by a Bachelor of Education primary/elementary. She also holds a master gardener certificate from Dalhousie.

Like many farmers, Susan wears many hats throughout the day. From speaking to customers through social media, to running the kids programs, to planting in the greenhouses, to hiring new staff, her days are never the same! Susan is a proud farmer and is an ag-vocate for people of all ages. She is extremely honoured to be here today to speak about her family, her family farm, and why she chose the farming lifestyle.

### **Farming through the Seasons, a Family Collaboration**

Susan will be walking you through her family's farm business – how it changed over the years, how the five members of her family work together, and how they use their strengths to create a farm and product they are proud of. She will also discuss what she has brought to the table and how you can always incorporate your interests and passions into anything that you chose to do.



## **Darrin Didychuk**

President

Country Ribbon Inc.

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Darrin was born in rural New Brunswick and is a graduate of Dalhousie Agriculture Economics program. He started his career as a professional agrologist within Nova Scotia where he spent several years working to support core agriculture and agribusiness with Nova Scotia Department of Agriculture, Farm Credit Corporation and Royal Bank of Canada. He also worked seven years outside of agriculture in corporate finance with the Royal Bank, specializing in manufacturing, software, telecommunications and cross border loan syndications.

Darrin spent the next 17 years as the President and CEO management level managing businesses in the \$50 to \$700 million range with employee size from 200 to 700 employees with industries such as hydroponic produce production, trucking and distribution, energy generation and farm/consumer equipment. Geographically, he covered all Atlantic Canada, Ontario, Manitoba, Saskatchewan and Alberta and has experience in mergers and acquisitions, USA cross border trade disputes, marketing, branding, product development, corporate restructuring, and finance.

He is the President of Country Ribbon Inc., hired to manage and develop the grain and feed, farm production and processing divisions.

Darrin is married with two adult children. Spouse Kim is a native Newfoundland from Pasadena and has a degree in education, a degree in plant science and master's degree in biology.

### **Broiler Production: More than Just Chicken**

Darrin's presentation will focus on the rebuilding of the foundation of the agriculture infrastructure needed to support the existing level of broiler production for the consumers of Newfoundland and Labrador for the next 30 years. He will also touch on grain imports, feed production, processing, secondary processing opportunities, and the impact of federal and provincial government regulation and support.



## Dr. William Newell

Manager of the Navigate Business Incubator  
College of the North Atlantic (CNA)  
wnewell@grenfell.mun.ca

Dr. William (Billy) Newell is originally from an entrepreneurial family in Corner Brook, and is the manager of the Navigate Business Incubator. He holds a PhD in management from Aarhus University in Denmark, a M.Sc. in International Retail Marketing from the University of Surrey, and an MBA from Memorial University. Billy also enjoys teaching entrepreneurship through a variety of experiential methods that aim to develop sustainable and innovative business models.



## Can We Learn Entrepreneurship?

What makes entrepreneurs entrepreneurial, and is this something we can learn? This talk will explore one researcher's answer to this question, and show how we as farmers, funding agencies, and other community members can become more entrepreneurial in our everyday thinking. It will also quickly outline how Navigate helps entrepreneurs in the Western Region of Newfoundland.



## Kim McConnell

Founder, AdFarm, Calgary, Alberta  
Kim.McConnell@adfarmonline.com

Kim McConnell was the founder and former CEO of AdFarm, one of the largest agricultural marketing communications firms in North America.

Over the years, Kim led many national and international brand and marketing assignments and has been the catalyst behind many major industry ventures, including an initiative to build greater public trust in food and farming.

Kim is also the recipient of many national business awards including "Agri-Marketer of the Year" and the Canadian Youth Business Foundation "Mentor of the Year." In 2012 he was inducted into the Canadian Agricultural Hall of Fame. And in 2017 he was appointed a Member of the Order of Canada, Canada's highest civilian award.

Kim is a director on a number of corporate boards as well as community and industry boards including Calgary Stampede Foundation, 4-H Canada and the Canadian Centre for Food Integrity.

Kim lives on an acreage on the edge of Calgary and is passionate about agriculture, food, youth and the entrepreneurial spirit.

### The Future of Food - Entrepreneurship and New Farmers

Kim will provide his perspective on the future of food and the agriculture industry and the increasingly important challenge of adapting to increasing consumer demands and concerns. As a mentor to a number of entrepreneurs, he will offer his views on the importance of new farmers and new business entrants and their role in enhancing a sustainable and resilient agriculture industry.



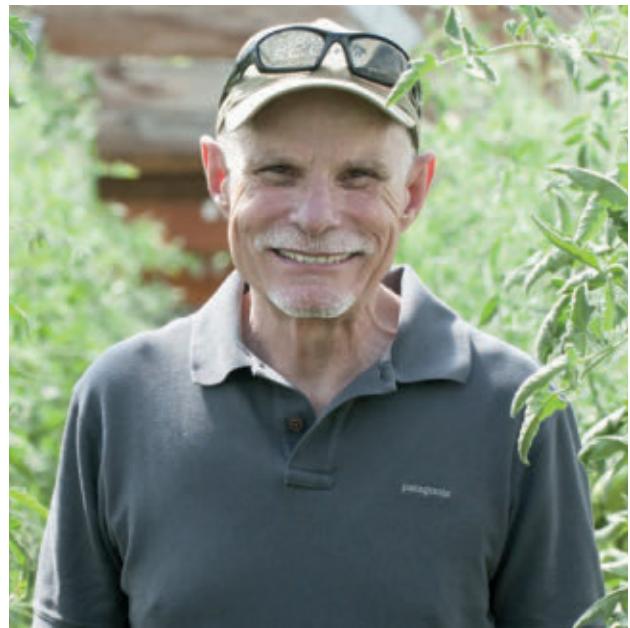
## Dr. Garry Stephenson

Professor

Oregon State University

garry.stephenson@oregonstate.edu

Garry Stephenson is a professor in the Department of Crop and Soil Science at Oregon State University and director of the Center for Small Farms and Community Food Systems. The center includes 15 faculty and program assistants located across the U.S. State of Oregon who provide educational outreach and applied research for small and mid-scale farmers. The center's work emphasizes organic and sustainable farming, and community-based food systems. Its programs include new and beginning farmer education, women's agricultural networks, and applied research related to organic farming, cropping adaption to climate change, food policy, and more.



Garry's background includes working as a printer, farmer, and research technician on university research farms, and growing peaches and cane berries while operating Garry's U Pick. He has been associated with the Oregon State University Extension Service since 1986. His research interests span alternative farming and marketing including agroforestry, transition to organic farming, farmer's markets, and beginning farmer education. His academic training includes a masters degree in animal science from Oregon State University and PhD in agricultural anthropology from the University of Oregon.

## Growing a Farm: New Farmer Education in the 21st Century

Historically, farming skills have been learned within multi-generational farm families. Although this continues to be the case, many people without farming experience are interested in learning how to farm and operate a farm business. In addition, there are indications of the need to train new farmers to replace the high number that will retire in the future.

This presentation provides an overview of programs designed to train new farmers in the U.S. State of Oregon. These efforts are occurring in the exciting context of a movement by food advocates and consumers to re-localize regional and community food systems, a demand for fresher and healthier food choices, a youth movement to enter farming as a career and a form of activism, and in some regions, to rebuild lost food systems.

Highlighted are educational programs by the Oregon State University Center for Small Farms and Community Food Systems and its partners. These programs emphasize entrepreneurship and community building along with the conceptual and pragmatic aspects of operating a farm business. Included is a brief case study of new farmers re-localizing a food system, a framework for designing education to fit new farmer stages of development, a demonstration of online instructional and experiential educational tools, and the use of farmer networks to build a comprehensive educational program.



## Matthew Carlson

Young Farmers Coordinator

Newfoundland and Labrador Federation of Agriculture

mcarlson@nlfa.ca

Matthew Carlson is the Young Farmers Coordinator with the Newfoundland and Labrador Federation of Agriculture (NLFA). He has been with NLFA since 2007 and moved into his current position in 2015.

### Becoming a Farmer in Newfoundland and Labrador

This presentation will take attendees through the opportunities and challenges of starting a farm in Newfoundland and Labrador. It will highlight the resources available for young farmers, such as the New Farmer Guide, the Newfoundland and Labrador Young Farmers' Forum Mentorship Pilot Program and give a preview of the land matching interactive map that we are currently developing.

With the provincial "The Way Forward on Agriculture" progressing on its 43-point plan to double provincial food production by 2022, it is important that people inside and outside of the agriculture industry understand how new entrants can join the agriculture industry and what resources are available.

The presentation will also highlight the provincial young farmers' initiative and feature some of the work taking place in that program, funded through the Canadian Agricultural Partnership (CAP).



## **Justin Campbell**

Diversity Outreach Coordinator  
Association of New Canadians (ANC)  
jcampbell@ancnl.ca

With an appropriately diverse background in business, government, and non-profit, Justin manages the ANC's Diversity Outreach Program, which builds cultural intelligence (CQ) among thousands of people each year in communities across Newfoundland and Labrador. Justin has travelled to 14 different countries and has a decade of experience teaching, presenting, and facilitating workshops on topics related to business and human rights. CQ Certified by the global Cultural Intelligence Center, he also holds a Bachelor of Humanities in Human Rights and a Master of Arts in Political Science, both from Carleton University in Ottawa.



## **Sarah Thompson**

Project Manager

Association of New Canadians

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Sarah Thompson is the project lead for “Bridging the Divide - Connecting and Preparing Refugees for the Province’s Agriculture Industry,” which is funded by the Workforce Innovation Centre. Prior to undertaking this project, Ms. Thompson worked with the Association for New Canadians Language Training Centre providing one-on-one employment counseling as well as workplace English as a Second Language (ESL) classes to prepare newcomers for the Canadian workplace. In this role, Sarah discovered a shared untapped employability skill that exists among many newcomers. They were all farmers. This project marries two of Sarah’s desires for this province: food security, and a culturally and economically richer Province to live in, through diversity.



## **Bridging the Divide: How Diversity Can Support the Province’s Agriculture Sector**

There is a growing need to support agricultural producers if the province is to reach its goal of doubling food self-sufficiency by 2022. While the knowledge needed to meet this goal already exists, challenges remain. Key among these is the likelihood that some family farms may close as the desire to continue to operate in the industry wanes among the current generation. One possible solution is to engage the newcomer community, as they may have the background, knowledge, and desire to farm. This may have several advantages for the agriculture industry including access to reliable skilled labour; the diversification of products, including secondary and value-added products; the opportunity to learn new skills; and the potential to diversify markets.

As research has shown that newcomer retention is directly related to their ability to successfully integrate socially and economically, the Association for New Canadians has undertaken several innovative projects to help facilitate retention. One such project is Bridging the Divide, a collaborative pilot project between the ANC and Grenfell Campus, Memorial University of Newfoundland, is designed to provide newly arrived refugee farmers with the language, cultural, and safety training necessary to succeed in a four-month farming placement throughout the province. The project also aims to ensure that the agriculture industry has the necessary cultural competency to receive these newcomers. This presentation will include a demographic overview of the changes impacting the agricultural industry, information on how best the agricultural industry can prepare for succession planning, and a discussion on the need for the agricultural industry to adapt to cultural diversity.



## Peggy Baillie

Consultant and Farmer

Local Food and Farms Co-Ops, Ontario

peggy@localfoodandfarm.coop

Peggy has been working to improve access to local food for over 15 years. As the North East Regional Coordinator for the Local Food and Farm Co-ops, she supports the Co-op Field Schools and Trade Routes Project, cultivating more co-operative food culture in Northern Ontario. She also operates a mixed organic farm with her partner Eric, in Warren, Ontario, raising artisanal chicken, vegetables and seeds, and supports local food initiatives such as the development of regional farmers' markets and food security initiatives. With over 15 years' experience working with the food sector, Peggy has unique expertise in the field of local food production, marketing and distribution.



## Building Local Food Systems through Co-operation

Building robust local food systems requires collaboration. Co-operatives are successful structures for system development in rural and urban settings. Learn from a number of successful examples from Northern Ontario where the co-operatives structure has been used to build resilient local food systems, scale up local farms, and develop new infrastructure.



## Alicia Lake

Executive Director

Pan Cape Breton Food Hub Co-op

manager@pancapebretonfoodhub.ca

Alicia Lake is from Cape Breton Nova Scotia. She has a great deal of experience in community and co-operative development, particularly in the areas of housing and local food. Alicia is a graduate of Cape Breton University, holding undergraduate degrees in community studies and political science, as well as an MBA in community economic development. She has published several studies that explore the role of co-operatives in local food, affordable housing and the economy. Alicia is the founder of the Baddeck Community Market, and the 50 per cent Local food club, an initiative that asks Nova Scotians to source half of their food from local sources in September. Alicia is currently the executive director of the Pan Cape Breton Food Hub Co-op.



## Setting the Table: Bringing Multiple Stakeholders Together to Change the Food System

The Pan Cape Breton Food Hub Co-op is a multi-stakeholder co-operative of consumers and producers that aims to make it easier to get local products into the hands of local eaters. This dynamic organization uses an asset-based community development approach to facilitate an online marketplace for local foods. This presentation will document the history and successes of the Food Hub, and will demonstrate what is possible when multiple stakeholders come to the table to create action based solutions to complex problems.



## Panelist Profiles

### Dr. Adrian Unc

Agronomist, Soil Scientist and Environmental Microbiologist  
Grenfell Campus, Memorial University of Newfoundland

#### Research Areas:

- Soil quality and health
- Soil plant relationships
- Soil in extreme environments
- Soil-plant interactions, including endophyte research
- Microbial contaminant transport
- Agriculture under climate change
- Microalgae for biomass and bio-products

#### Publications

Google Scholar profile: <https://scholar.google.com/citations?user=G7453PcAAAAJ&hl=en>

### Dr. Julia Wheeler

Plant Eco-Physiologist  
Agriculture and Agri-Food Canada, Research and Development Centre, St. John's, NL

#### Research Areas

- Plant ecology and eco-physiology
- Growth and productivity in northern climates with short growing seasons
- Plasticulture
- Cold tolerance in crop species
- Plant-plant interactions
- Plant-fungal mutualisms
- Plant responses to climate change

#### Publications

Google Scholar profile here: [https://scholar.google.ca/citations?hl=en&user=IEDmwEoAAAAJ&view\\_op=list\\_works](https://scholar.google.ca/citations?hl=en&user=IEDmwEoAAAAJ&view_op=list_works)

### Dr. Raymond Thomas

Associate Professor  
Grenfell Campus, Memorial University of Newfoundland

#### Research Areas

- Functional Foods Production, safety, preservation and sensory perception
- Secondary processing of agricultural raw materials, low value or waste products
- Environmental stress physiology
- Functional foods and brain health
- Lipidomics in stress physiology, agriculture and food production
- Analytical Chemistry and Chemometrics

#### Publications

Research gate: [https://www.researchgate.net/profile/Raymond\\_Thomas](https://www.researchgate.net/profile/Raymond_Thomas)  
Twitter: <https://twitter.com/BERILipidGroup?lang=en>



## Jamie Jackman

Program Coordinator

Labrador Institute, Memorial University of Newfoundland

The Labrador Institute (LI) of Memorial University is a leading centre of research, education, and policy, by and for the North. It has a strong commitment to place and respond to the needs and priorities of Labradorians. Along with a broad range of partners and community stakeholders, the LI is working to develop a regionally centred experimental and educational farm to support leading-edge research and enhanced food production in Labrador. The Pye Centre for Northern Boreal Food Systems will see the university working closely with Indigenous organizations, local farmers, and community groups to address issues related to high levels of food insecurity, barriers facing current farmers, low numbers of new farmers and precarious food networks, and more, by employing an integrated food systems approach to research and education in areas of farming, fishing, and foraging in the region.

## Melvin Rideout

General Manager

Rideout's Farm Inc. and Rideout's Dairy Inc.

Rideout's Farm was started in 1946 by Melvin's grandfather, Alexander (Sandy) Rideout, as a land settlement from WW2. Melvin Rideout Sr. formed a partnership with his father Alexander in 1965. The farm included a beef and vegetable operation. In 1990 Rideout's Farm diversified to include a dairy operation. A short time later, Rideout's Farm Inc. and Rideout's Dairy Inc. operated as separate companies owned by a group of family shareholders. Rideout's Farm Inc. is now a grain, forage and mixed vegetable operation with over 600 acres in production, and Rideout's Dairy Inc. is producing 9750 liters of milk per day with a total heard size of 520 cows including replacement stock, growing 400 acres of forage and close to 100 acres of grain. The Rideout's are now into their third generation with the fourth generation working on the farm. Melvin is the general manager of the two operations, Rideout's Farm Inc. and Rideout's Dairy Inc.





## Des Sellars

Owner/Operator  
Nature's Best Farm

Desmond Sellars (B.Sc, B.Ed, M.Ed) has been involved in growing fresh vegetable produce in Central Labrador since 2009. His cropping approach relies on a combination of intensive farming methods aimed at producing nutrient-dense, pesticide-free vegetables. In 2009 he and two business partners established Central Labrador Agrifoods. Since that time he has established his own business - Nature's Best Farm. Mr. Sellars is vice-president of the Lake Melville Agricultural Association. He continues to promote sustainable food production in various venues including schools, college and community organizations. In addition, he supports ongoing research by the Labrador Institute (Memorial University of Newfoundland) on the utility of biochar as a soil enhancer. Most recently, he has been involved in work leading to the future establishment of the Pye Centre for Northern Boreal Food Systems. He is the Lake Melville delegate to the Newfoundland and Labrador Federation of Agriculture and works on a number of provincial committees to facilitate the implementation of the Agricultural Work Sector Plan especially as it relates to providing a context for the development of greater food self-sufficiency/food security in Labrador.

## Rodney Reid

Owner/Operator  
Exploits Meadow Farm

In 2012, Rodney Reid and life partner Brad Smith decided to start the process of pioneering their own farm in the central region, Exploits Meadow Farms. Rodney was raised on a farm owned by his great uncle and agriculture was always close to heart; however, he moved away from it during his 20's. Rodney returned to farming in his mid 30' after returning to school for a Bachelor of Science. This is the third year from when the first trees came down and the access road was constructed. This past spring, they had their first lamb crop, with 30 acres in production for pastures and forage, 100 breeding ewes and more to come. They are also beekeepers and have 20+ hives growing annually and used for pollination services and value-added products. As part of being a progressive farmer, Rodney volunteers with various industry boards, such as Newfoundland and Labrador Young Farmers Forum, Newfoundland and Labrador Federation of Agriculture, Newfoundland and Labrador Beekeeping Association, Sheep Producers of Newfoundland and Labrador and is an elected representative for Newfoundland and Labrador and Nova Scotia of the Canadian Young Farmers Forum.



## Chris Oram

Owner/Operator  
Mark's Market

Chris Oram attended Nova Scotia Agriculture College and complete his degree of Bachelor of Science (Agriculture) Plant Science in 2011. He then returned home to Wooddale and now manages Mark's Market, operated by Chris, Kayla, Dick and Arlene Oram. They started with direct sales in 2001 after selling wholesale since 1990 and built their new market for the 2015 season. Mark's Market grows a variety of traditional and non-traditional Newfoundland vegetables.

<https://m.facebook.com/marksmarketfarm/>

## Laurie Haycock

Gros Morne Farm and Market

Gros Morne Farm and Market is a new, small-scale market farm in the Gros Morne area. It is owned and operated by Boyd Maynard and Laurie Haycock.

The vision for the farm is to provide a wide variety of fruits, vegetables and herbs that are high in quality, fresh, and nutrient dense. Using no-till farming practices and organic growing methods, they strive to provide a

sustainable source of locally grown produce, all while minimizing the carbon footprint of food production in their region.

## Krista Chatman

Owner/Operator  
Three Mile Ridge

Started in 2007 by Krista Chatman, previously farmed by her grandfather, William Reader, under the business name Highway View Farm, in the 1950's until he retired. For 30 years, the farm was only used for forage by her father, Boyd Reader. Krista returned to it, while taking care of her young family and her grandparents. Growing a few vegetables was potentially a way to earn some money without having to leave the kids or her grandparents. It evolved into growing food to feed people and now it is helping others grow as well. What started as one acre in crop is now almost 20 acres in vegetables 11 years later. Together Krista and her husband David manage all of the day-to-day operations of the farm and their onsite farm market, with plenty of help from their parents and family members. They now grow a variety of crops including traditional root crops and other specialty crops.

Krista is a founding member, managing director and the market manager of the new Farm and Market in Clarenville.

## Byron Bellows

Produce Manager  
Colemans Grocery

Colemans is the largest independent retailer in Atlantic Canada with 12 stores, offering services to a number of other independent retailers with a full line up from distribution centres for fresh produce, meats, grocery and frozen foods.



## **Brad Walsh**

Buyer

Atlantic Grocery Distributors Ltd.

Atlantic Grocery Distributors Ltd. (AGD) is a locally owned and operated wholesale and foodservice distribution company owned by president and CEO, Dave Powell. The company's head office is located in Bay Roberts with a second location, Fowlow's Atlantic Wholesale Ltd., in Port aux Basques. AGD is the largest wholesale distributor to independent grocers in Newfoundland and Labrador and serve over 2,000 foodservice and retail operations.

AGD's impressive distribution center consists of grocery, foodservice, produce, fresh and frozen meats, general merchandise, hardware supplies, patent medicines, packaging, cleaning supplies and more, including: signature brands, Atlantic Best Meats, Golden Crust Bakery and Atlantic Restaurant Supplies.

AGD is the supplier of choice for over 200 franchise stores operating under retail banners of Foodex, Food Stop, and Value Grocer. The company also supplies and operates two corporately owned full-service supermarkets, Powell's Supermarkets and two Breaktime restaurants.

## **Sean Dolter**

Owner/Operator

The Greenhouse

Sean Dolter started his first career as a natural resource planner and managed the Model Forest program in Newfoundland and Labrador until 2014. Sean and his wife, Kim Thistle, own and operate The Greenhouse, a full-service garden centre. As part of their business operation they run a Community Supported Agriculture program that direct markets to families and restaurants. Sean is also a consultant and recently completed a

Regional Agriculture Strategy for Humber Valley and is an advocate for regionalized distribution systems for small farms.

## **Adam Blanchard**

Owner/Operator

Five Brothers Artisan Cheese

Five Brothers Artisan Cheese is Newfoundland and Labrador's only cheese producer. A home-based business started in 2011, Five Brothers expanded to the Goulds in 2015 to keep up with demand. Five Brothers produces a variety of cheeses for restaurants, retail outlets and farmers markets across the province. Five Brothers uses only 100 per cent Newfoundland milk and prides itself in working with other local businesses.

## **Lloyd Warford**

Program Manager

Cranberry Association NL

Lloyd grew up and worked on the family vegetable farm in Pleasantview, Newfoundland and Labrador. In 1972, he went to work with Newfoundland Farm Products in Bishop's Falls which later became Central Vegetable Products, where he worked in management for 20 years. After leaving Central Vegetable Products he went to work for Fishery Products International in Triton for 11 years and held three management positions, Cost Analysis, Office Manager and Production Manager. In 2009, he went to work for the Town of Grand Falls-Windsor after the mill shut down in 2008, and now works for the Cranberry Association NL as the Program Manager. The Cranberry Association NL was incorporated in May of 2013 to help shape the future of the cranberry industry in this province to assist cranberry farmers in continuous training and provide support whenever needed.



# Tradeshow, Posters and Booth Displays

## Sustainable Northern Agriculture

### Aquaculture Waste as a High-Quality Soil Amendment for Agriculture

Richard Tingskou<sup>1</sup>, Adrian Unc<sup>2</sup>

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<sup>1</sup>Department of Fisheries and Land Resources, Agriculture and Lands Branch, Corner Brook, NL

<sup>2</sup>Grenfell Campus, Memorial University of Newfoundland, Corner Brook, NL

In the aquaculture industry the growth of fish produces a large amount of waste referred to as recirculating aquaculture system solids (RAS or fish waste). One facility can produce approximately 65 metric tonnes (MT) per year that must be disposed of in an environmentally sustainable manner. With proposed aquaculture

expansion, this could result in the production of 700-800 MT of RAS per year. Currently fish hatcheries are paying for the disposal of this byproduct, which is expected to increase as expansion progresses. Fish waste has traditionally been known to be a good source of nitrogen (N), phosphorus (P), and other nutrients required for plant development. Depending on the nutritive value of the RAS, the agriculture industry in Newfoundland and Labrador could find a valuable repurpose for this waste material. The Agriculture Production and Research Division in the Department of Fisheries and Land Resources is conducting a greenhouse trial to investigate the value RAS as a soil amendment and fertilizer source in improving crop development and soil health. Application of RAS waste in agriculture may contribute to closing nutrient cycles in fish farming and lead to the integration of two local industries. With the expansion of agriculture in Newfoundland and Labrador there will be a greater demand for added nutrients such as N and P. To increase economic and environmental sustainability in both industries it is crucial that these valuable nutrient resources are diverted from landfills and are instead recovered and utilized.



### Impact of Biochar Application on Physicochemical Properties in Sandy Soil of Happy Valley-Goose Bay

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Biochar is one of a progression of materials alluded to as dark carbon since it is created by thermochemical change of the biomass material under an assortment of conditions. Sandy soil, low CEC, high soil acidity, low organic matter contents and low nutrient and water



holding capacity are the primary soil related problems that hinder successful crop production in Happy Valley-Goose Bay. Biochar, a carbonaceous substance produced from pyrolysis of biomass is reported to enhance soil fertility and crop productivity when applied to marginal agricultural lands. The objective of this present study is to determine the effect of biochar on soil physical and chemical properties when utilized as a soil amendment. The goals of the study are to assess the impacts of biochar application on (i) the physicochemical properties of soil, (ii) beet yields, and (iii) CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> emissions from soil. The experiment was established using a biochar and different types of fertilizers. Biochar application led to increase the soil carbon sequestration, CEC and pH. Although biochar addition had significant positive impacts on many soil properties, singly applied biochar did not help the crop growth or increased crop yields.

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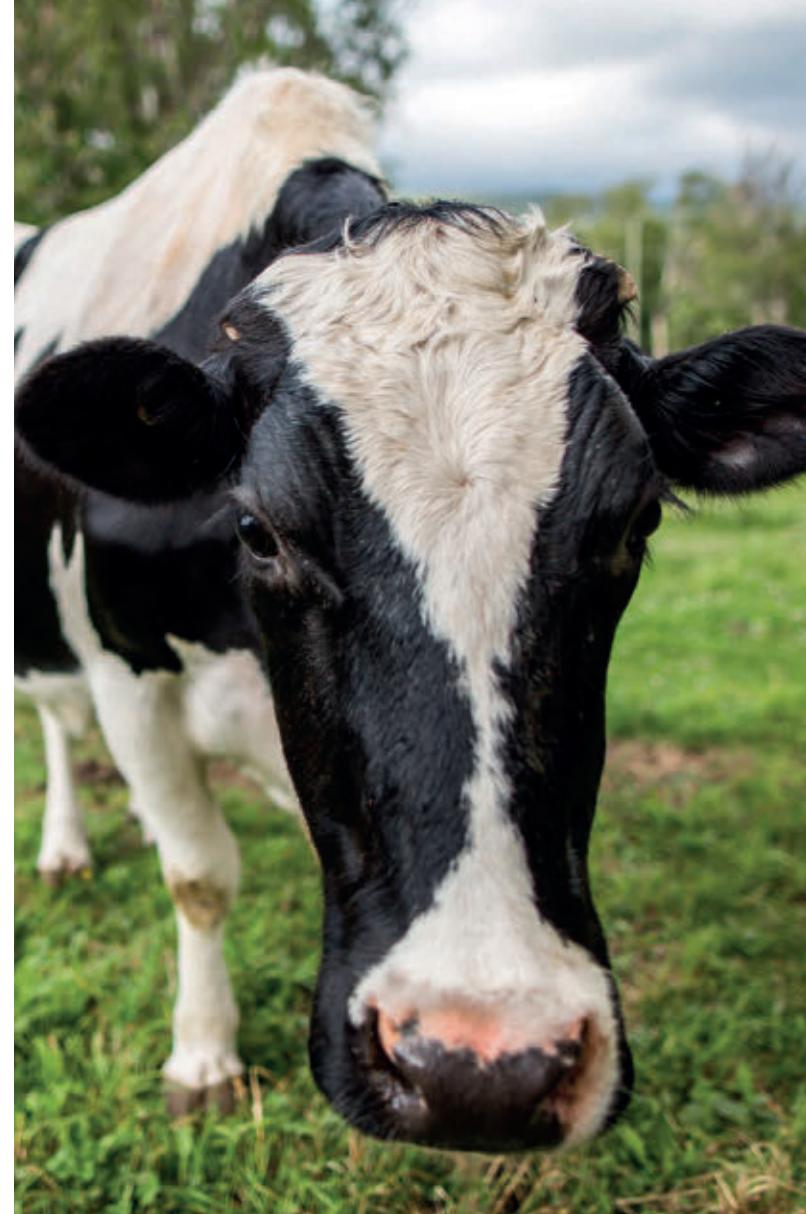
### Baseline Soil Fertility Assessment for Newfoundland Farm Soils as Inferred from the Standard Soil Tests

Amana Kedir

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Memorial University of Newfoundland, St. John's, NL

Podzolic soils are considered to have low fertility, and thus usually receive significant amounts of fertilizers, both mineral and organic, to bring them to a state that can support consistent productivities. Phosphorus, nitrogen, and potassium are the three macronutrients that have been applied to land according to the expert recommendation. Limestone is also regularly recommended for curtailing the impact of soil acidity on crop productivity. Routine soil tests carried out on samples collected by farmers and knowledge of the intended crop are used to inform such recommendations. We assessed the relationship between soil test results, crop and recommendations to understand the current



state of soil fertility and fertilization in Newfoundland using exploratory statistical tools. Several conclusions can be drawn from this analysis: 1) there is a need to understand phosphorus speciation across soil management types and evaluate the best soil test capable of describing soil phosphorus dynamics for both limed and non-limed soils. 2) nitrogen budget approaches are recommended as it is possible to reduce the costs with nitrogen fertilizers on fertile soils. 3) an evaluation of the fertilization protocols, especially where manure added to land, is valuable and thus strongly recommended.



## Greenhouse Gas (GHG) Emissions from Forage Cropping Systems During Winter in Eastern Newfoundland

Riad Eissa<sup>1,2</sup>, Jianghua Wu<sup>1,2</sup>, David McKenzie<sup>3</sup>, Lordwin Jeyakumar<sup>3</sup>

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It is extensively understood that human activities, including agriculture, are causing significant changes to the global climate due to increased emissions of anthropogenic greenhouse gases (GHG) including carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), and methane (CH<sub>4</sub>). Environment and Climate Change Canada (2015) reported that Canada's total greenhouse gas (GHG) emissions were 722 Megatons (Mt) of carbon dioxide equivalent (CO<sub>2</sub> eq) with eight per cent of the total coming from the agriculture sector, mainly from livestock and inorganic nitrogen fertilizer applications

which accounted for 42 per cent and 22 per cent of total agricultural emissions respectively. Newfoundland and Labrador accounted for two per cent of the total GHG emissions from Canada. Most estimates of the GHG emissions in Canadian agriculture were based on growing season measurements during the snow-free period. The continuous year-round eddy-covariance measurements have shown that winter season GHG emissions may be a significant component of the annual budget. Therefore, more studies are needed to examine the winter season GHG emissions in agricultural systems. In this study a closed chamber method was used to carry out GHG measurements in a forage field crop at the St. John's Research and Development Centre (RDC) experimental farm to estimate incremental GHG emissions during the winter of 2017/2018. We hypothesized that the frozen soil layers were not preventing gas diffusion to the soil surface, whereas, snow-covered ground may isolate soil from depressed air temperature and winter cold, functioning as an insulated layer, which would allow microbial communities to be still active and continual in the cold season. Our primary results suggest the significance of winter GHG emissions in estimating the seasonal and annual GHG budget.



## Edge-of-Field Agricultural Water Treatment Method

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Agriculture and Agri-Food Canada, Research and Development Centre, St. John's, NL

With increasing amounts of nitrogen (N) being added to farmland in the form of fertilizer and manure to optimize crop yields, and more broadly, to meet the growing demands for food, feed and energy, there are public concerns regarding its possible negative impact on the environment. To tackle these challenges, scientists from Agriculture and Agri-Food Canada's St. John's Research and Development Centre established wood chip bioreactor systems to improve water drainage and protect the environment. The bioreactors receive drainage water from approximately four acres of land containing 12 tile-drained experimental plots. Plots (22 m x 60 m) were sown with forage mixtures including timothy (*Phleum pratense* L.), meadow fescue (*Festuca pratensis* Huds.), alfalfa (*Medicago sativa* L.), smooth bromegrass (*Bromus inermis* Leyss.), and tall fescue (*Festuca arundinacea* Schreb.) which were treated with one of two different methods of liquid dairy manure applications (broadcast and banded). The initial results indicate a nitrate removal rate of more than 50 per cent in the wood chip bioreactors. This promising result indicates that wood chip bioreactors can reduce nitrate levels in tile drain systems in a cool climate. Efforts are also underway to characterize the microorganisms that are responsible for denitrification in this system. This project will develop new knowledge about wood chip bioreactors in terms of their capability to remove nitrate and other pollutants from drainage water and will develop knowledge about the microbiome that drives their functionality.



## Assessing Potential Uses of Multi-Coil and Multi-Frequency Electromagnetic Induction Sensors for Agricultural Soils in the Western Newfoundland

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The ground-based electromagnetic induction (EMI) sensors play a major role in shallow soil characterization in precision agriculture. The EMI sensor measures soil apparent electrical conductivity as a proxy of subsoil properties. Rapid soil moisture content (SMC) prediction by EMI is preferable over other geophysical methods for large-scale field applications. As well as the knowledge about the depth sensitivity (DS) of the EMI method is essential for near-surface investigations. The apparent magnetic susceptibility is a desirable property



to investigate DS of EMI method in shallow soils. Two different types of EMI sensors were used in this study namely CMD MINIEXPLORER (multi-coil) and GEM-2 (multi-frequency). The potential uses of the both EMI sensors have been assessed through two different studies at the Pynn's Brook Research Station, Pasadena, western Newfoundland; (i) comparing the accuracy of SMC estimation in a shallow sandy loam-podzol using both EMI sensors (ii) investigating the DS of multi-coil and multi-frequency EMI sensors using small metallic and non-metallic buried targets in shallow soils. The field SMC was predicted by simple linear regression models. Root mean square error (RMSE) range of 3.73 - 7.07 per cent was found between measured and EMI estimated SMC for both sensors. Results also showed that the CMD MINIEXPLORER was better at predicting SMC than GEM-2. The second study revealed that the CMD MINIEXPLORER was a more accurate and reliable sensor to detect small metallic targets in the shallow soils than the GEM2. It can be concluded that the CMD MINIEXPLORER is a more suitable EMI sensor compared to the GEM2 to investigate SMC variability in a large-scale field with a relatively known DS of tested shallow (agricultural) soil in western Newfoundland.

## PET and PPT Trend Analysis and Forecast Models for Water Balance in Newfoundland: A Proposed Study

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Grenfell Campus, Memorial University of Newfoundland

Having an inevitable effect of the changing climate on precipitation (PPT), potential evapotranspiration (PET) and resultant water balance can pose threats to agriculture in Newfoundland and Labrador, Canada. The Government of Newfoundland and Labrador's initiative to increase the agricultural production from the current 10 per cent to 20 per cent by the year 2022 would be a challenging task unless PPT, PET and resultant water balance trends are predicted for the future. A similar study for the entire boreal regions of the world found an increasing trend of PET until 2099 based on global climate modeling approach by King et al. (2018). Yet, it is necessary to conduct detailed weather data analyses to obtain potential trends to support the government's initiative at local levels. This research is proposed to predict the PPT and PET and resultant water balance at a higher spatial resolution for the Island of Newfoundland



using historical weather data, hypothesizing that both will have positive trends due to increasing global temperature.

The output of this study has two aspects: (i) short-term - to put forward a significantly more accurate model to forecast the weather patterns in terms of monthly and annual PPT, PET, and water balance for the next 10 - 20 years, and (ii) long-term - to use the predicted data for decision making in selecting correct cropping systems to maximize agricultural production.



## Nondestructive and Simultaneous Monitoring of Water Table and Soil Moisture in Agricultural Fields Using Ground Penetrating Radar

Chameera Illawathure<sup>1</sup>, Mumtaz Cheema<sup>1</sup>, Adrian Unc<sup>1</sup>, Vanessa Kavanagh<sup>2</sup>, Lakshman Galagedara<sup>1</sup>  
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Knowledge of spatiotemporal variation of water table depth (WTD) and soil moisture content (SMC) is essential for precise water management and to control groundwater contamination in agriculture. Water table demarcates the boundary between saturated-unsaturated soils. On the other hand, SMC in unsaturated soil is a key factor that helps plant growth through water and nutrient uptake. Direct methods to measure both WTD and SMC are destructive and therefore continuous measurements are not feasible in terms of ground disturbance, time, labor and cost. Ground Penetrating Radar (GPR) can be used to measure SMC and to locate the WTD as a high-resolution subsurface image provider. Although large-scale mapping is difficult, GPR has the potential to measure both SMC and WTD simultaneously, but the best

practical approach is yet to be developed. Objective of this study is to calibrate a GPR based methodology to monitor spatiotemporal variation of SMC and WTD simultaneously at large field scale. We conducted a field study at Pynn's Brook Research Station, Pasadena, Western Newfoundland. In total, 332 GPR surveys were carried out throughout the growing seasons of 2017 and 2018 using 1000, 500, 250 and 100 MHz GPR center frequency antennas. Real-time WTD and SMC were recorded using sensors installed in a shallow borehole and shallow soil, respectively and connected to a data logger. SMC data were also collected occasionally using time-domain reflectometry (TDR) probes and gravimetric samplings. Weather data were collected continuously using an automated mini-weather station located at the site. We developed a method to measure SMC in the root zone rapidly and accurately (Root mean square error, RMSE  $\leq 0.03 \text{ m}^3\text{m}^{-3}$  comparing with TDR measurements). Further, RMSE of GPR estimated WTD when comparing with data logger measurements are 0.04 m (100 MHz) and 0.08 m (250 MHz). Detailed analysis and interpretations are being carried out.





## Fly Ash from Pulp and Paper Mill: A Potential Liming Material for Western Newfoundland Soils

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Most agricultural soils in the Western Newfoundland are strongly leached under natural conditions and they are acidic with loamy texture, needs large amount of limestone to modify present soil pH to be productive. There is a significant cost for farmers due to this high lime requirement. Failure to add lime to acidic soils reduces crop yields and wastes much of the farmers' fertilizer investment. There is a high potential for wood ash to be used as an alternative liming material in agricultural lands. Presently, Corner Brook Pulp and Paper Ltd (CBPPL) mill produces a substantial amount of ash and is being disposed of at the local landfill site with significant annual cost. This study was conducted

to assess the potential of fly ash from CBPPL as an alternate liming material. The required soil for this study was sampled from an agriculture land area in the western agricultural center and research station, Pynn's brook and the pH of the soil sample was 5.5. The composite sample of fly ash was collected from CBPPL mill during the month of October 2017. By adding varying amounts of ash, the required ash application rate was calculated (15g ash per kg soil) to increase the soil pH between 6.5 to 7. Heavy metal concentration of the fly ash, and mixture of soil and ash was analyzed, and the result was compared with Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines. Over the sampling period the chemical analysis showed that the heavy metal concentrations of the fly ash and mixture of soil and ash were consistently below the CCME Canadian Soil Quality guidelines. Consequently, it was concluded that the ash was suitable substitute for lime. Continuous sampling and analysis will be required to monitor the quality of ash.



## Agriculture and Agri-Food Canada

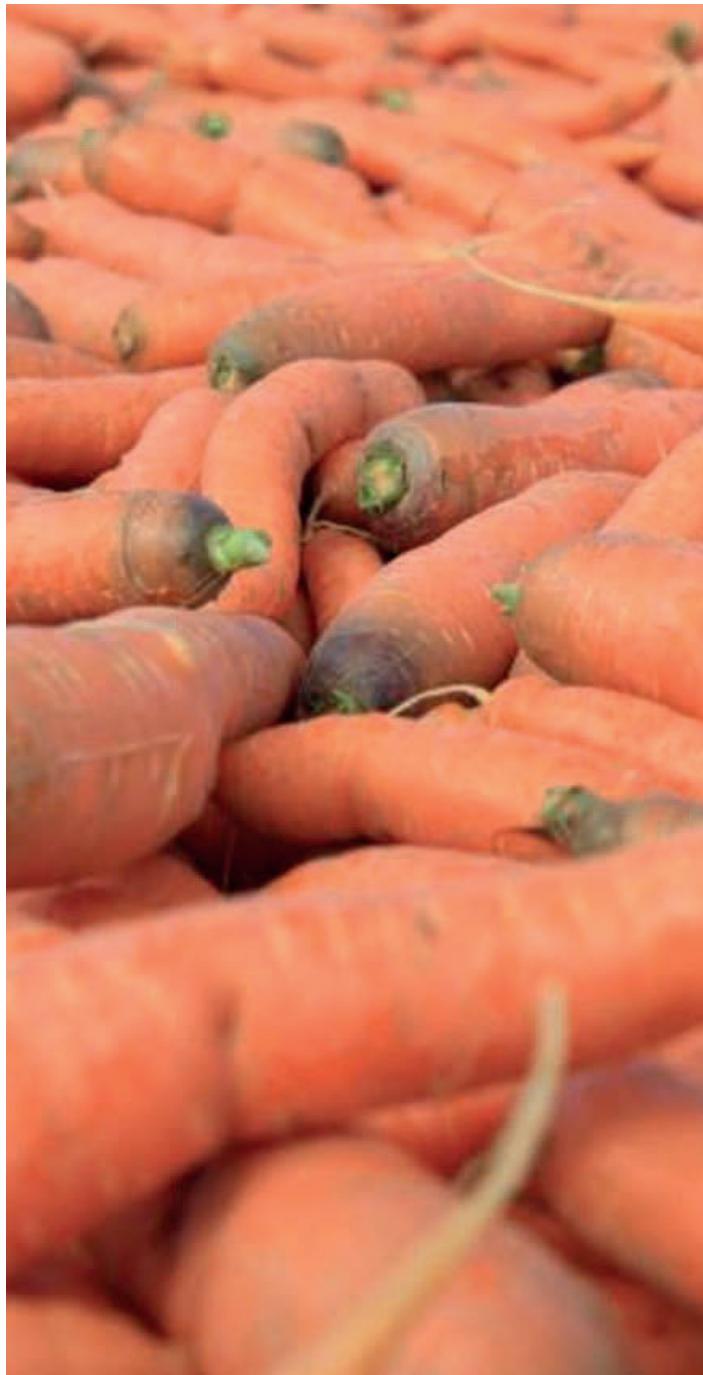
Peter Murphy

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Agriculture and Agri-Food Canada's (AAFC) mission is to provide leadership in the growth and development of a competitive, innovative and sustainable Canadian agriculture and agri-food sector. In order to achieve this, AAFC has a network of 20 research and development centres across Canada, including the St. John's Research and Development Centre (St. John's RDC), which was established in 1935.

The St. John's RDC is a leader in the research, development and technology transfer of agricultural innovations that support sustainable and productive boreal-northern primary production, with a special emphasis on Newfoundland and Labrador. Research is focused on the sustainable production of horticultural (berries and vegetables) and forage crops, the development of sustainable cropping systems, biodiversity and genetic enhancement of berry crops, and innovative clean technologies and environmental practices for a boreal-northern environment.

created to serve as the travelling pavilion. Collectively, these products function to increase public awareness of our local agriculture industry, and demonstrate opportunities and supports that exist for prospective, new and existing farmers in this province.



## Department of Fisheries and Land Resources

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The Department of Fisheries and Land Resources and the Newfoundland and Labrador Federation of Agriculture have partnered to create a travelling pavilion as part of the newly developed Agriculture Sector Work plan. An agri-truck and promotional booth have been



# Diversifying and Growing Food and Food Products

## Beef Genetic Enhancement Demonstration Trial

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Newfoundland and Labrador is in a unique agricultural situation due to its climate and growing conditions. Being an island has imposed restrictions associated with agriculture, including the high cost of imports such as livestock feed and breeding animals. Increased shipping costs associated with bringing breeding stock in from mainland Canada has led many local livestock producers to decrease or eliminate their beef herds and has been one of the main reasons for the substantial reduction in availability of genetic stock in Newfoundland and Labrador. In the fall of both 2016 and 2017, five bred Hereford beef cows were shipped to the province and placed on farms where they will remain for a five-year period. At the end of this period, carcasses from both the Hereford and crossbred animals will be compared for taste, quality, and dark cut time. Preliminary data indicated that Hereford calves born in 2017 had a 12 per cent higher birthweight than the crossbred calves, at 10

days a 17 per cent higher weight, but by day 30 the gain had reduced to a 6 per cent higher weight than the local comparison calves. It is anticipated that the introduction of Herefords will increase the availability of locally sourced purebred breeding stock and the quality of meat and meat products. Should this project prove successful other beef breeds could be introduced, which will further expand available genetics and potentially transform the beef industry in Newfoundland and Labrador.

## Cranberry Varietal Assessment

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Cranberry (*Vaccinium macrocarpon* Ait.) cultivation has expanded substantially in Newfoundland and Labrador since its introduction in the 1990s with over 400 acres currently in production. To be competitive, local growers use varieties that not only perform well agronomically, but are also desirable for the market in terms of color and taste. Vine material of three new cranberry research varieties acquired from Rutgers University was propagated at the Centre for Agriculture and Forestry Development in Wooddale. Mullica Queen, Crimson Queen, and Demoranville are currently being evaluated during a multiyear trial for yield, berry size and color, plant hardiness, pest resistance, and optimal harvest date. The objective is to determine if new varieties can outperform the predominantly grown Pilgrim variety under local conditions. In 2014 peat plugs of vine material were planted in seven 14 foot by 24 foot beds – two beds of each new variety and one of Pilgrim (control). Plugs were planted as per industry standards at a rate of one per foot squared and data collection began



in 2018. Fruit yield for Pilgrim, Crimson Queen, and Demoranville was 8002.6 lb, 5922.0 lb, and 9934.0 lbs, respectively. Mullica Queen recorded the highest yield at 17339.1 lb/ac. The average 10 berry weight and size was greatest for Crimson Queen at 22.6 mm and 185.2 mm, respectively. Each of the three new varieties flowered and ripened approximately two weeks ahead of Pilgrim during the first week of October. Data from the 2018 season are currently being analyzed.

## New Half-High Blueberry and Lingonberry Cultivar Trials

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Lowbush blueberry (*Vaccinium angustifolium* Ait.) and lingonberry (*V. vitis-idaea* L.), also known as partridgeberry in Newfoundland and redberry in Labrador, are two popular wild berries harvested in Newfoundland and Labrador. Both are local favorites included in jams, wines, etc. and there is a growing secondary processing market for berry products that are exported all over the world. In Newfoundland and Labrador the lowbush blueberry is the most common commercially grown small berry fruit. Managed from wild stands., latest census data reported 1062 acres in production with a yield of just over 10,000 Tonnes valued at \$150,000. There is no commercial production of lingonberry in Newfoundland and Labrador. Both types of fruit are high in antioxidants and fiber and are thought to have anticancer properties. New hybrids of blueberry and lingonberry were developed at Agriculture and Agrifood Canada in St. John's using in-vitro technology. The hybrids are being evaluated during multiyear field trials for agronomic and qualitative

traits. The objective is to evaluate new hybrids that may be commercially viable while maintaining locally desired traits of color and taste. In 2013, 1080 cultivars of two year old blueberry hybrids and were planted in Wooddale with two commercial variety controls. In 2015, 328.5 pounds of fruit/acre was harvested with an average production of 214 grams/plant. Cultivar 8 was the highest yielding plant with 1,286 grams. Yields were lower in 2016, with 158.5 pounds of fruit/acre harvested and an average per plant yield of 149.8 grams. The top producer that year was Cultivar 22 with 943 grams. In 2017 yields were higher and 752.6 pounds of fruit/acre was collected with an average yield of 414.7 grams/plant. Cultivar 15 exhibited superior yields during that season with 2040.4 grams. In 2015, 32 cultivars of one year old lingonberry hybrids and were planted in Pynn's Brook; Sussi and Sanna were measured as controls. First data collection will begin in 2019.

## High-Value Animal Feed Production in Newfoundland and Labrador

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Mixed farming (crops and livestock) is a common practice in Newfoundland and Labrador where the land base is limited (one per cent) and seasons are cool and short. Typical cultivated feed crops include perennial forages and low-value oat and pea blends. Annual high-value feed crops such as cereal grains and oilseeds have not been grown and these requirements are imported, making it the largest on-farm expense for livestock farmers. Cereal grains wheat and barley and the oilseed canola are known cool climate crops that can be successfully cultivated in Newfoundland and Labrador and can contribute to considerable cost savings over importation. Local grains and oilseeds research





trial yields are comparable to other regions in Atlantic Canada with barley at 1.2 tonnes per acre, winter wheat 1.75-2.0 tonnes per acre, spring wheat 1.2-1.4 tonnes per acre, and canola 0.75 tonnes per acre. Trials in dairy have already indicated that these feeds can be used as a direct substitution for other grains (with the exception of corn) and for soymeal, resulting in increased cost savings and milk production. Additionally, the canola oil can be incorporated directly into the feed as a fat source, substituting palm fat and increasing the milk fat composition. Current assessments are focusing on establishing beneficial management practices and increasing production and efficiencies.

## Wine Grapes and Malting Barley: Feedstocks for a Growing Industry in Newfoundland and Labrador

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The beverage industry in Newfoundland and Labrador is in the process of a major transition with over 20 craft breweries, three distilleries, and five specialty

wine producers. Local and national adoption of these products has been overwhelming with many suppliers unable to keep up with demand. In 2016 Canadians spent over \$22 billion on alcohol, with over \$450 million spent in Newfoundland and Labrador. While the market continues to expand, sourcing of local ingredients has been a limiting factor despite being a key component to the marketing strategy. Ingredients such as wine grapes and malting barley show potential for cultivation in Newfoundland and Labrador and may be used as local high-quality feedstocks for the industry. Beginning in 2013 wine grape assessment trials have been investigating the potential of red and white grape types to survive Newfoundland and Labrador winters and reach appropriate Brix levels or sugar contents (18°BX for white and 22°BX for reds). Several varieties, i.e. white grapes Geisenheim and Petit Milo and red grapes Maréchal Foch and Maquette, have proven successful in sites across Newfoundland and Labrador and are being investigated for suitability in the industry. Malting barley trials commenced in 2017 with the planting of 10 acres of the variety Cerveza, and after successful harvesting product was supplied to a distillery later that year. The grain has already been incorporated into commercial products that may be purchased across the province. Trials will continue to assess the potential for these crops as feedstocks to the vibrant and upcoming Newfoundland and Labrador specialty beverage market.



## Apple Orchard Demonstration Trial

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Traditionally in Newfoundland and Labrador, homeowners have planted apple trees in their backyards for personal consumption. Though it is known that apple trees can grow well in the province, there are currently no apple orchards in commercial production. The prevalence of apple scab, which infects foliage, blossoms, and fruits of apple trees, has been a deterrent as severely infected trees become defoliated and infected fruit are not marketable. Newly developed varieties of apple trees that are resistant to this disease can minimize labour and capital while increasing economic profitability. Scab-resistant apple varieties will be assessed to increase production and supply parent material to fruit growers in the Newfoundland and Labrador agriculture industry. Providing a solution to this disease will promote and diversify the Newfoundland and Labrador fruit industry

and increase the supply of nutritious locally grown produce. Eight different apple trees on dwarf rootstock were planted at two sites for demonstration purposes. From these orchards the goal is to determine fruit size and yield of different varieties, and to provide scab-resistant grafted apple whips to commercial growers in Newfoundland and Labrador to develop a commercial apple industry.

## Incorporation of Local Annual Legumes into Livestock Feed

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Faba beans and soybeans have recently been introduced to Newfoundland and Labrador as part of a comprehensive research program into assessing novel annual high-quality feeds. These legume crops serve as a way to diversify current forages grown in the province while providing farmers with flexibility in crop selection. Preliminary trials of soybean and faba bean have demonstrated both legumes provide high quality silages. The objectives of this project are to quantify the effects of a short two year corn-legume rotation on future crop yields and to evaluate the potential of faba bean and soybean as an annual legume crop in Newfoundland and Labrador climate and edaphic conditions. Approximately six hectares of land was used at each site to assess yields, feed quality, and impacts on soil quality. Preliminary results show that faba beans outperform soybeans during development and yield a higher biomass at harvest. Soybeans resulted in a higher quality silage than faba beans with a high protein content and improved digestibility. Both legumes were of higher quality than the typically grown annual silage crop of oats and peas and provided a valuable feed resource for trial participants.





## Newfoundland and Labrador Provincial Seed Potato Program

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The cultivation of potatoes for human consumption has been ongoing since Newfoundland and Labrador was first settled and to this day makes up a large portion of our diet. In 1972 the province opened the Newfoundland and Labrador Provincial Seed Potato Program (NLPSP) with the goal of supplying local producers with high quality seed potatoes of varieties adapted to the Newfoundland and Labrador climate. Seed potato is produced in a four-year cycle starting from in-vitro plantlets and ending four generations later with the production of elite class seed potato ready for sale. In 2018 the NLPSP officially moved its farm operations to the Centre for Agriculture and Forestry Development in Wooddale, Newfoundland and Labrador. Newer facilities in Wooddale allowed for double cropping of nuclear class seed potato in the greenhouse

and automation of the water and fertility system. The initial assessment of newly cleared land at the Wooddale site is favourable with soil pH and textures conducive to high yields with little amendments required. Irrigation facilities in the field will also be beneficial with the potential to substantially increase yields.

## Non-Traditional Vegetable Transplant and Research Program

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Traditionally vegetable production in Newfoundland and Labrador has been defined by the cool, short growing season and the scarcity of agriculturally viable mineral soils. Due to these challenges the crop diversity and extent of crop production has been limited. To aid with this issue, the province of Newfoundland and Labrador introduced the Non-Traditional Vegetable Transplant Program with the aim of producing high quality vegetable



transplants for sale to producers in the province. Transplanting field crops promotes early maturity, greater yield, and the ability to produce a wider variety of crops verses direct seeding. Despite these advantages, not all producers have access to greenhouse facilities to produce transplants. The program used four greenhouse units, with a combined bench space of approximately 8,000 ft<sup>2</sup>. For the pilot run, non-traditional, cool season crops were selected and included yellow onion, brussel sprouts, kale, leek, kohlrabi, and asparagus. Transplants were grown for 6-10 weeks depending on crop requirements. Planting media was developed using peat moss mined on-site, perlite, and then neutralized with lime. In total 250,000 transplants were produced and distributed to 25 vegetable farms across the province. Early responses from producers indicate satisfaction with transplant quality. In addition to the production of transplant material the province is also researching beneficial management practices for these crops, focusing on season extension technologies to further develop methods for increased production and wider crop diversity.

order to more thoroughly understand the diseases that impact both wild and managed stands of these plants, farms and wild sites throughout the island of Newfoundland and Labrador were visited during the growing seasons of 2016, 2017, and 2018. For blueberries, the most commonly observed disease was Septoria blight (*Septoria* sp.), with *Valdensinia* blight (*Valdensinia heterodoxa*), Exobasidium leaf and fruit spot (*Exobasidium* sp.), red leaf (*Exobasidium* sp.), and witches' broom (*Pucciniastrum goeppertianum*) also very common in both managed and wild plants. The most commonly observed disease in cranberry was leaf and twig death provisionally attributed to *Lophodermium oxyccoci*. In partridgeberry, distinctive disease symptoms that have been provisionally attributed to *Mycosphaerella stemmata* are the most common, and red leaf/red stem (*Exobasidium* sp.) has also been observed. This baseline information about the most prevalent diseases in this province will be used to direct future research towards sustainable management solutions.

## Somatic Embryogenesis – A Noble Technique for Blueberry Micropropagation

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## Foliar and Fruit Diseases of *Vaccinium* Plants in the Province of Newfoundland and Labrador

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Plants in the genus *Vaccinium* are generally small, woody shrubs that produce a variety of culturally and economically valuable fruits. These plants, which are native to northern, boreal regions in Canada including the province of Newfoundland and Labrador, include *V. angustifolium* (lowbush blueberry), *V. macrocarpon* and *V. oxycoccos* (cranberry), and *V. vitis-idaea* (known by many names, including partridgeberry, redberry, and lingonberry), to name only a few. In

Blueberries (*Vaccinium* spp. L., family: Ericaceae) are clonally propagated, diploid ( $2n=2x=24$ ), tetraploid ( $2n=4x=48$ ) or hexaploid ( $2n=6x=72$ ), woody perennial herbs with small fruits. These plants are distributed widely all along the Northern hemisphere. The cultivated blueberries have high economic importance due to their health-promoting properties. Blueberry contains high amounts of antioxidants, including phenolic compounds like phenolic acids, anthocyanin, proanthocyanidin, and flavonoids, which have the tremendous capability of free radical scavenging. This may prevent cancer,



diabetes, heart and neurodegenerative disorders, and promote antimicrobial activity in colon and esophagus. In Newfoundland and Labrador, wild blueberry germplasm is managed and harvested commercially on a large scale. Micropropagation techniques became a multi-billion-dollar industry which allows the production of pathogen-free genetically similar plants. Large numbers of elite blueberry genotypes are maintained and multiplied efficiently through micropropagation techniques to meet the increasing demand of high quality blueberries. Somatic embryogenesis (SE) is a plant tissue culture technique, which develops root and shoot meristem simultaneously from a somatic cell. In this study, two plant growth regulators such as, thidiazuron (TDZ) and zeatin were used in a nutrient medium to develop plantlets of two lowbush blueberry genotypes in a multi-step SE process. This efficient regeneration system has the potential for the use of commercial blueberry micropropagation in a cost-effective manner.

accelerate development and increase yield. PCS can also alter the environment for plant pathogens, changing the likelihood of developing different diseases. However, relative to temperate climates, PCS have been less frequently evaluated for production in Northern systems. There is also a need to develop PCS for challenges unique to these regions, where high winds and spring snow can damage PCS designed for temperate zones. We are currently evaluating multiple PCS treatment combinations in field production of common bean (*Phaseolus vulgaris*, variety provider).

Over three years (2018-2020), we will evaluate the effects of PCS treatments (field, plastic mulches, low tunnels, mulch  $\times$  tunnels) and three seedlings (early, middle, and late spring) on production of common bean. We will evaluate the effects of PCS and seeding date on phenology (emergence, flowering, and harvest dates), establishment success, growth and dry mass allocation, disease incidence and severity, and overall yield.

## Plasticulture Systems for Field Production of Green Bean in Boreal-Northern Climates

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Northern and remote communities have poor year-round access to fresh produce. In short, cold summers, field-based agricultural systems alone are insufficient to grow many vegetable crops at all, or to grow them in an economical way. This results in limited local supplies of produce, and high prices due to transportation costs. There is thus a need to develop strategies for growing nutrient-rich food year-round in these communities. The overall objective of this research project is to evaluate the use of plasticulture systems (PCS) for field crop production in a cold climate with a short growing season. PCS have been used to extend growing seasons,

## Characterization of Blueberry Hybrids at Morphological, Biochemical and Molecular Levels

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The Blueberry (*Vaccinium* L. spp.) is a health promoting perennial flowering shrub ranging from one to 10 feet in height. Out of five major types of blueberries, lowbush blueberry (*V. angustifolium* Ait.) is native to North America and has height less than 1.5 feet. Though low yielding, this type of blueberry is very important because of the high amount of antioxidants present in them as compared to other types. Half-high blueberry cultivars, on the other hand, range from three to four feet tall and





have larger berry size with higher yield. However, they do not have high amount of antioxidants as lowbush blueberry and, most importantly, they are not adapted to growing conditions here in Newfoundland because they are too tall for the snow cover. Crossing half high blueberry cultivars with lowbush clones have resulted in hybrid genotypes. Fifty-six out of these hybrids were studied for morphological characteristics such as height of the bush, width of the bush and vigor. Data was also recorded for the earliness of flowering. The results show substantial variation among the hybrids suggesting those suitable for selection. Further, these hybrids will be studied at biochemical and molecular level in order to select high-yielding hybrids suitable to grow in Newfoundland and Labrador and in similar climates of Canada.

## Atlantic Canada Organic Regional Network

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Atlantic Canada Organic Regional Network (ACORN)

ACORN exists to enhance the viability and growth of the Atlantic Canadian organic agricultural community through a unified regional network. Since 2000, ACORN has been the key organization for information on organic agriculture, eating organics, and connecting all the parts together. From seed to farmer to consumer, ACORN works to bring the whole picture together—making food choices healthier and more environmentally responsible.



# The Future of Food and Farming

## (Re)-Imaging Agricultural Policy in Newfoundland and Labrador: Farmer Attraction and Retention Interventions in Focus

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Boreal areas have their peculiar natural challenges to agriculture and food production, but the situation may be more than just mother nature's limitations. Among other rising challenges to the agriculture and food production efforts in Newfoundland and Labrador is the demographic decline; manifested in aging and decline in farmer populations. The decline in farmer populations has necessitated deliberate policy interventions to attract and retain people in the agricultural sector. While these interventions – policies, programs, plans,

programs, strategies are evident in Newfoundland and Labrador, like many other places, there exists limited research to examine the focus, challenges, and how they impact on the state of farming. To advance research and policy in farmer attraction and retention, we examined current and recent interventions that aim to attract and retain farmers in Newfoundland and Labrador. In doing so, we highlight some structural issues in policy design, approach, and implementation in the province. We employ semi-structured interviews and policy document reviews to assess interventions and reveal that efforts are manifest in education and capacity building, resource/informational support, institutional support schemes, procedural changes and financial incentivizing. We argue that, it is not the lack of efforts that undermine farmer attraction and retention, but structural challenges in intervening policies resulting from lack of attention to motivations and farmers' views in design process. Policy recommendations to strengthen interventions, and implications of such efforts to development of Newfoundland and Labrador are drawn at the end.



## Navigate Small Business

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Navigate aims to champion a culture in which entrepreneurship is celebrated, and future generations recognize and seize innovative opportunities to create economic impact for the Corner Brook area and Western Newfoundland. Through the entrepreneurship centre, makerspace, and business incubator, Navigate offers three main services: business counselling to help entrepreneurs in the idea stage of their ventures, a workshop that features everything needed to make a prototype of a product, and a working space for new businesses who need a supportive environment which includes meeting rooms, phones, video conferencing services, and training.

### Programs and Contact Information:

Program	Financial Officer	Phone/Fax	Email Address
Agriculture Growth and Innovation Agriculture Processing and Value-Added	Ed Reid	Phone: 709.637.2992 Fax: 709.637.2030	edreid@gov.nl.ca
Mitigating Agricultural Risks	Natasha Vater	Phone: 709.637.2679 Fax: 709.637.2030	natashavater@gov.nl.ca
Future Farms Agriculture Land Development Advancing Public Trust	Craig Blanchard	Phone: 709.637.2893 Fax: 709.637.2030	craigblanchard@gov.nl.ca
Environmental Sustainability and Climate Change Agriculture Business	Autumn Gale	Phone: 709.637.2095 Fax: 709.637.2030	autummngale@gov.nl.ca



## Provincial Agrifoods Assistance Program

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The Provincial Agrifoods Assistance Program (PAAP) provides financial assistance to eligible applicants involved in primary production or secondary processing

activities that will improve the economic viability of the agriculture and agrifoods industry; promote commercialization and growth in the sector; and enhance the competitive capability of the agriculture and agrifoods industry. The program may also provide selective assistance to regional pastures, agribusinesses, and agricultural groups for initiatives that support the priorities of the program. In 2018-19 funding will be provided for eligible activities including land development and agriculture infrastructure.

### Contact Information:

Program	Financial Officer	Phone/Fax	Email Address
Provincial Agrifoods Assistance Program	Louis Fequet	Phone: 709.637.2096 or 709.638.2077 Fax: 709.637.2589	louisfequet@gov.nl.ca

## The Department of Tourism, Culture, Industry and Innovation

Brent Decker

Department of Tourism, Culture, Industry and Innovation (TCII),  
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The Department of Tourism, Culture, Industry and Innovation is the lead for the economic, culture, and innovation agenda of the Provincial Government. We provide insight, intelligence, innovation, and investment services for businesses and communities to create a strong, vibrant business community and regional economies.

The Regional Development Fund (Non-Commercial) provides support by way of non-repayable contributions to organizations for the development and implementation of economic initiatives with respect to regional and sectoral development, diversification, innovation and key emerging sectors. The four key themes of projects intended for funding are: infrastructure, capacity building, marketing and research.

The Business Investment Fund (Commercial) provides term loans and equity investments to small and medium-sized enterprises in strategic growth sectors as identified by TCII. The fund is also available to businesses which have export potential and require assistance to enter or expand in external markets.

The Investment Attraction Fund is designed to attract large-scale businesses and foreign direct investment (FDI) to the Province of Newfoundland and Labrador. It provides customized financial assistance to inward investors in support of establishing a business in the province or expanding a business as a result of FDI.

Research and Development (R&D) programming helps to reduce the technical and financial risk of pre-commercial R&D projects for businesses where R&D is required to realize the commercial potential of innovative products, processes or services. R&D programming also provides businesses with improved access to technical expertise and facilities required to support their R&D activities.



## Food Access: Marketing and Distribution

### Evaluating the Relationship Between Producer and Consumer to Identify Buying Barriers and Opportunities for Food Sustainability within the Province of Newfoundland and Labrador

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Local food has been growing in interest amongst consumers leading to a growth in research on the matter throughout the world. Understanding consumer buying behavior, motivations and barrier to purchase specific to Newfoundland and Labrador enables the development for a stronger local food system in the province.

The purpose of this study was to investigate consumer perspectives on the local food system and Newfoundland and Labrador agricultural products. By understanding the perspectives of Newfoundland and Labrador residents pertaining to local agricultural products, industry and other stakeholders would be able to move forward to create strong food sustainability in the province. A survey was conducted and distributed through social media to address the research questions. The data was used to quantify residents' perspectives on local agricultural products, comparison between local and imported produce, level of engagement with current food system and perceived barriers.

The findings indicate that, from the perspective of Newfoundland and Labrador consumers, that while the definition of local varies, the evidence shows that respondents find Newfoundland and Labrador agricultural products high on intrinsic attributes. However, extrinsic attributes such as price, access and identification of local exist has a significant impact on consumers' willingness to purchase.

### The Western Environmental Centre

Katie Temple

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Western Environmental Centre,

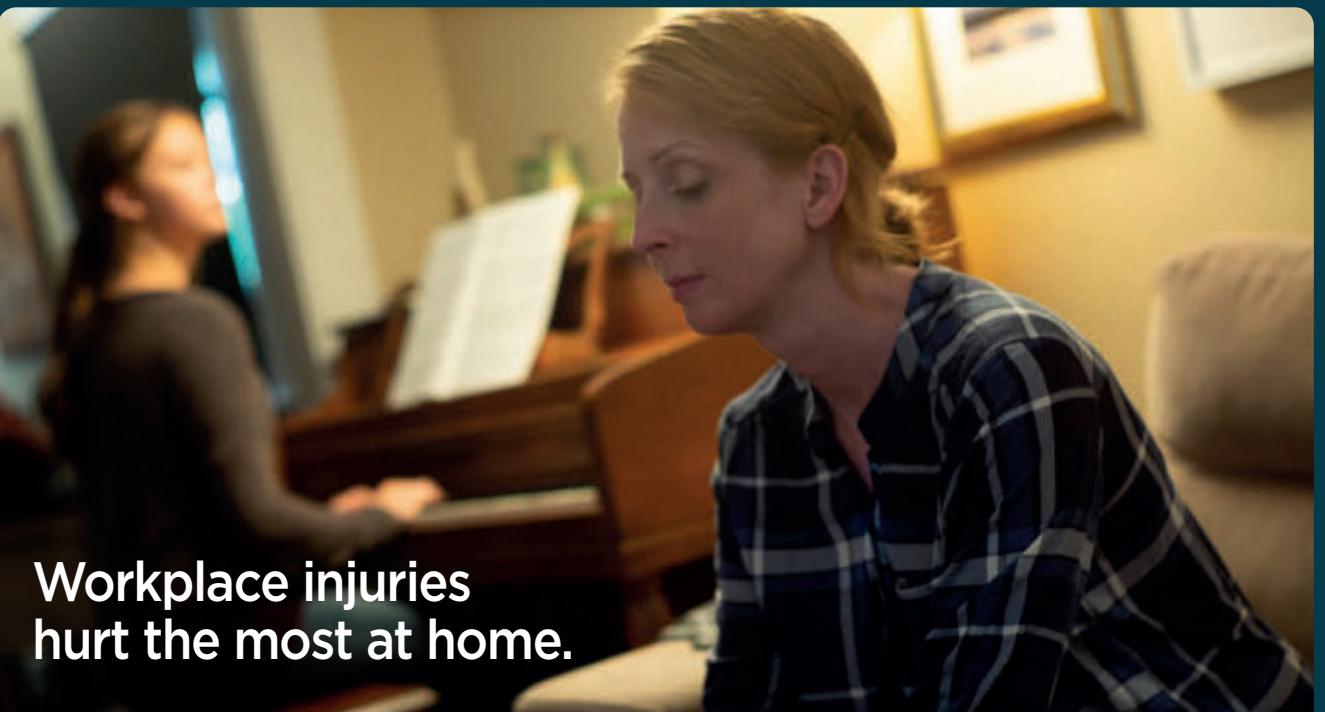
Corner Brook, NL

The Western Environment Centre has initiated and currently runs a diversity of community food projects in western Newfoundland. Over the past 10 years, our organization has begun to focus our work on food system sustainability and citizen engagement with the food system. In the past decade, we have started and are still successfully running two community gardens, a food skills workshop series, a partnership with a local school greenhouse, a fruit rescue program, and a community composting program. We are also involved in the local community market, the Wonderful Fine Market, and we are currently the only consistent vendor of fresh, local produce. Other projects that we have initiated but are no longer running include a community greenhouse and an outdoor farmers' market.

The overall aim of our entire suite of community food projects is to engage our community and citizens more closely in action to improve the sustainability of our food system. Although we are a very small, volunteer-driven organization, our impact is large. In 2017, we held over 15 food skills workshops with more than 150 participants, we diverted over 1000lb of organic waste through the involvement of over 30 new households in our community composting program, we saved close to 100kg of local fruit that would otherwise have gone to waste, we provided garden plots for over 70 community gardeners, sold over \$1000 worth of local organic produce at the market, and held over 100 food education sessions with local elementary school students.



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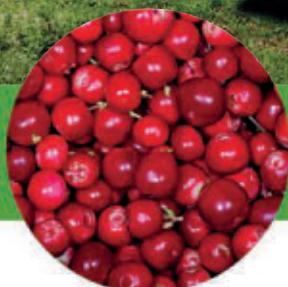


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