



Cultivate and Consume

October 22, 2020

reimagine NS: Cultivate and Consume

Co-Chairs: Dr. David Gray, Dalhousie Faculty of Agriculture
Jolene MacEachern, Dalhousie Industry Liaison & Innovation

Contributing Authors (in order of contributed recommendations in section IV. Future):

Jason Grant, Dalhousie Faculty of Agriculture
Dr. Travis Esau, Dalhousie Faculty of Agriculture
Dr. Sylvain Charlebois, Dalhousie Faculties of Management & Agriculture
Dr. Iraj Fooladi, Dalhousie Faculty of Management
Dr. Karen Foster, Dalhousie Faculty of Arts & Social Sciences
Dr. Kathleen Kevany, Dalhousie Faculty of Agriculture
Dr. Sara Kirk, Dalhousie Faculty of Health
Dr. Chris Cutler, Dalhousie Faculty of Agriculture
Valerie Lalande, Université Sainte-Anne
Miriam Zitner, Halifax Innovation District
Carolyn Van Den Heuvel, Nova Scotia Federation of Agriculture

And special acknowledgment to those from the community who shared their thoughts and experiences.

Introduction

The broad theme for this report is *Cultivate and Consume*; however, given its significance, we focused our lens on food security in Nova Scotia. We asked: what did a global pandemic do to our ability to secure food that is not only abundant, but also accessible, safe, nutritious, reliable and culturally fulfilling?

COVID-19 has had a drastic effect on life as we knew it in Nova Scotia. Crucial to that life is the role food plays—not only as sustenance, but as a comfort, a routine and a catalyst for connection.

Food has never been perfect in Nova Scotia; in fact, we are one of the most food-insecure provinces in Canada. Yet we have a robust food industry with rich fertile soils, an abundance of nutritional ocean resources, and we play host to a handful of food processors that sell in global markets.

Amid these resources, cracks in the system are showing. They have been expanding in recent years, which we investigate in this report, but COVID-19 has exposed some of our true weaknesses, weaknesses that threaten the foundational needs of our society. It is time to act to ensure our food systems are hardened against future possible disruptions like these.

I. Context

New ways of thinking are required to ensure Nova Scotians have a food system they can trust. Not only does a food production system need to be able to feed us, it also needs to be understood, connected with and relied upon to provide nutrition in a way that supports well-being and prevents chronic disease. All the while, we must ensure production practices sustain the earth's resources for generations to come.

This is no small order. There are many partners in the value chain of global food production that must work like a well-oiled machine to deliver the basket of goods consumers desire. The impacts of the pandemic were felt throughout food chains globally and left many Canadians and Nova Scotians wondering how we can be more food-secure, to ensure that incidents like these do not make us so vulnerable.

A first step to solving problems and creating viable solutions is to understand the problem from the user's perspective. There are multiple users in the food value chain requiring us to engage broadly. No one government department, organization, community or business can speak to the complexity of issues on a topic like food security. The media frenzy around food during the pandemic created assumptions about the issues. This makes it imperative that we pause and ask for input from those who are experiencing the complexities first-hand.

We engaged with representatives of stakeholder groups and thought-leaders working on these issues to get their perspectives. The feedback was comprehensive, and respondents expressed appreciation for the effort we made to understand before rushing to solutions.

To facilitate the engagement process, a list of assumptions was shared as a means of providing "food for thought." Respondents provided feedback on the assumptions by either agreeing with or amending them and by including additional issues they felt were not expressed. The following list summarizes Nova Scotia's COVID-19 food security experience based on the feedback we received:

1. **Consumers are weary.** In a crisis, they hoard, they go back to basics, they grow gardens and fill their freezers with meat. They may now recognize the importance of local production. They miss the social aspect of food and food becomes a comfort in isolation. Not only do we ask if we will have enough, but we also ask whether we will have what we *want* as global supply chains struggle.

Some people are generous, donating to food banks and local charities. Others scrimp and save and are anxious about the future. Some understand the issues with food production and are patient with shortages and the stories of food waste. Others are not understanding; they are angry with an imperfect system and have no sympathy for backlogs, food waste or fluctuations in price or supply.

2. **Farmers and fishers are frustrated.** While producers struggle to sell last year's crops, they are faced with market uncertainty for the future and don't know how much to grow. Fishers head out onto waters not knowing if they can market their catch. They are at the bottom of the food chain—crucial as suppliers of raw product, yet they carry the weight of the risk as price takers. They win when demand is high but lose when products must be dumped.

3. **Shortages in farm and food processing labour have been exacerbated.** Producers and processors that depend on migrant workers faced significant delays or reduced numbers, resulting in a reduction in planting and challenges in harvesting. The effect of emergency payments (e.g. CERB) on farm and food labour is unknown. However, some speculate that these payments have made it challenging to get eligible workers back to the fields when they could stay home, ostensibly safe from the virus, and possibly caring for children, while still receiving sufficient income. In this context, automation is key, but huge capital costs make these investments risky, and weak profits mean fewer dollars for the research and development (R&D) required for further growth.
4. **The food value-add sector in Nova Scotia is challenged.** The importance of local processors, restaurants and retail has intensified during the pandemic. When a global crisis threatens trade, we realize that we must be self-sufficient in food production. When the value-add sector is challenged, food produced across the province is wasted because it cannot make it to consumers.

The scale of food processing globally is a challenge. Retail representatives stated that many of our difficulties with product availability were due to a lack of packaging instead of an actual shortage of raw product. Food processors had to shift production lines as restaurant and institutional food demand decreased, and products used in home meal preparation increased. Flour is one example. Many consumers returned to their kitchens as they spent more time at home, and cooking and baking supplies flew (and stayed) off the shelves. While this was a good problem for food processors who were losing significant sales due to restaurant closures, it meant immediate increased demand in product lines for which they were not prepared. Experts cite the popular *just-in-time* inventory management system as one culprit, meaning processors had to wait for the supplies needed, like flour bags, to adapt to the changing demand.

5. **The food industry is vulnerable to market disruption.** Nova Scotia is a small marketplace, and therefore producers are encouraged to expand into the global market and focus on export. In peaceful times, this brings wealth to Nova Scotia, but in times of crisis, it puts our food production system at risk. Many producers were hit hard during the first wave of the pandemic because of this focus on export, especially those in our fisheries and aquaculture industries. Some were able to pivot quickly and turn to local customers and innovative distribution channels, but those who could not might never recover.
6. **The value of institutional food is overlooked.** Some of our largest food purchasers are those in institutions and food service. When this market opportunity is hindered, that has a significant impact on the economic model. Buyers disappear and, as a result, processors must repackage goods to serve a different customer.

The role of institutional food as a nutrition source is often also overlooked. With high levels of food insecurity in the province, many families depend on school breakfast and lunch programs to help feed their children. These programs came to a standstill when institutions and schools closed, leaving many of our province's children hungry.

7. **Health restrictions hinder community support.** It has been more difficult to assess the needs of neighbours and offer support when adhering to COVID-19 health protocols. Community gardens and kitchens closed and community events were cancelled. The act of community food can be a major source of nutrition. For those who cannot prepare food for themselves, the loss of community food and restaurant facilities has been a challenge. We also must pay attention to the results of reduced community health supports that provide resources for encouraging healthy diets, meal planning, and breast-feeding support for new mothers.

8. **NGOs and support organizations are essential.** Food banks are struggling to keep up with demand and to provide support in ways helpful to those in need. Old ways of providing food are difficult to organize with health protocols, reductions in public transit and the stigma that surrounds the need for support—especially for those who have not been in this situation before.

“I think community members are shaken and food insecurity became a stark reality for many during the first COVID crisis; access, cost, income, [and] supply were all called into question. Food dollars were diverted for cleaning supplies, programs supplying food were shut down and already food insecure people became more insecure and people close to the line crossed over. For those people unconnected to supports prior to COVID, accessing supports during the crisis was extra challenging to navigate and access with the capacity of many service providers reduced.” United Way, Halifax

9. **Rural communities lack support.** There are fewer avenues for providing food to those in need in rural communities. The shelves of urban centres are stocked first. Food banks do not exist in some communities and are not always accessible without public transportation. Ironically, but not unprecedentedly, the communities that produce much of the province’s food supply were the least food-secure.

10. **There are inequalities at play.** The COVID-19 lockdown experience was not the same for everyone. While some workers were able to shift to a home office and continue to receive full pay, others lost their jobs completely, struggled with childcare issues and/or supported extended family members in times of need. This pandemic is a socio-economic crisis that left marginalized groups in distress. Race, gender and age are all factors contributing to decreased safety and food security, which are magnified in times of crisis.

11. **We lack the data required for planning.** To develop pandemic recovery plans and prepare for future outbreaks, data is required. But in terms of food and agriculture, we lack the reliable and comprehensive data needed for complex planning and policy development. With many data collection options available in today’s technological environment, the challenge lies in the accumulation and management of that data for its optimal application.

II. Prior Challenges

COVID-19 has illuminated many issues in our food system, but there were cracks showing long before the virus hit. This section investigates those weaknesses and examines their role in augmenting the impact of the virus and impacts to our food system from potential future disruptions.

1. **There is a divide between food security and food sovereignty.** Most stakeholders see *food security* as a socio-economic issue, rather than an agricultural one. It is seen as linked to income equality more than food production. The ability to produce enough food as a province is considered *food sovereignty* by our stakeholders. This involves ensuring we produce foods that will be successful in our region and with economic models that will return a profit for those in the food chain. These systems are run by different groups of people with different lobbying groups, policy agendas and community representatives. This provides a challenging environment for collaboration.
2. **We need innovation in the food system.** We have become complacent about our food. We expect it to be there, when and where we need it. Consumers say they support local, but without a crisis, they feel secure in their ability to source food from anywhere around the world through dependable supply chains and competitive prices.

Farmers have been innovating for years, learning from R&D that happens across the globe. Some of those technologies and processes do not work or are too costly for the scale of Nova Scotia agriculture. Do we put our farms at risk by asking them to compete on a global scale in a region that has challenges scaling up? There is a concern that we will struggle in the future to have a competitive agriculture industry at this scale. Without a strategy, and with extra pressures from the current and possible future pandemics, this becomes even more problematic.

3. **Ecosystem functionality is challenged.** The ecosystem for innovation in Nova Scotia should be strong, with many R&D support institutions and organizations to draw upon. Yet, the agriculture, food and fish sectors are challenged to invest in innovation. These sectors could benefit from a strategic approach to innovation by coming together to work on common issues and priorities and by pooling scarce resources to leverage funding programs. How do we increase engagement in R&D? What are the appropriate roles for industry, government and academia when it comes to this sector?
4. **The food processing industry in Nova Scotia is “anemic.”** Producers are worried about the lack of food processing facilities in the province but feel powerless as they have watched this critical piece of infrastructure erode over the past few decades. A significant industry stakeholder is quoted as saying “... we gave a lot away over the years with sales of businesses to outside organizations, that in turn rationalized their production outside of the region.”

Now that the tide has turned in the direction of out-of-province value-adding, there are great obstacles to reversing that trend. These challenges include distribution networks, procurement policies, supply chain logistics and regulatory burdens that hinder smaller-scale value-adding.

5. **Rural infrastructure needs investment.** Almost all of our food production and processing happens in rural communities in Nova Scotia. This increases cost and risk as food and agricultural businesses struggle to compete with deteriorating roads, aging workforces and intermittent cell and internet service. The advancement in the use of technologies to solve labour issues is hindered by poor broadband coverage.
6. **Social services need investment.** While acknowledging that a living wage is best, until we reach that goal, we must work to ensure our social services have what they need to provide adequate nutrition. We can do better than our current food security rates in the province, and we look to both federal and provincial jurisdictions for support. Innovation in this space is crucial as we expect that the economic impact of COVID-19 will move more of our citizens into the food-insecure category. Immediate response is required.
7. **The average consumer does not feel the need to engage in the food supply system.** In general, Canadians have not had to worry about their ability to source food. The current generations have not lived through a war or a time of scarcity. Therefore, our country has developed a blind reliance on a system it trusts but does not necessarily understand. This makes it more difficult to promote the importance of a local food production system that may not always provide exotic choices or the cheapest prices, but ensures we have the ability to feed ourselves if major events disrupt global supply chains. Food is a major political topic, but if the average consumer is not compelled to pay attention, it does not receive the awareness it deserves.

III. Evident Transformations

COVID-19 changed our lives in a very short time. Companies that wanted to survive in the new system were forced to innovate and adapt to the ever-changing situation. The Agriculture and Food industry was no exception—and it arguably faced more pressure as an essential service.

Despite adversity, there have been positive transformations, which might seed the development of new ways forward. Some are innovations that predate the pandemic, forced upon the agriculture and food sector due to the crisis. Others are novel reactions exhibited in the marketplace and public policy that we think will have a positive impact in the sector going forward. Not all were intentional, but going forward there can be intention to secure their place in future food systems.

First, we examine the intentional innovations due to COVID-19. These were decisions made by businesses to ensure the ability to earn revenue during isolation and lockdown periods while protecting customers and employees. Many of these innovations are seen at the micro-business level. It is nothing new to witness small-scale producers and processors pivot more easily than large-scale operations when facing adversity due to lower levels of investment, technology and employee numbers.

Many innovations were seen in the marketplace. Store-front businesses changed to online ordering and allowed for curbside pickup or switched to delivery. Micro-breweries and distilleries were quick to invest in delivery trucks to secure sales in lockdown.

Another group forced to pivot were farmers' markets. Online ordering had been in operation for some markets before COVID-19, but the pandemic forced the option as, without it, there would be no sales at all. A recent survey of farmers' market shoppers by Dalhousie faculty showed that nearly 75% of them would like to continue shopping at their preferred markets online, at least some of the time, after the pandemic. While grocery stores also had online options in place prior to the pandemic, the demand for this service skyrocketed when families were forced to stay home and preferred not to shop in-store to avoid the risk.

Specialized shopping hours were implemented by grocery stores to protect their most vulnerable customers. This is seen as a more inclusive, positive approach to commerce, especially as the demographics change in our region to an aging population. The basic idea predates the pandemic; most Sobeys stores offered "sensory friendly" shopping hours for neurodiverse shoppers.

The ability exhibited by small-scale producers to pivot in the marketplace was also seen in the processing line. While large-scale food processors struggled to respond to market demands, small producers and processors rose to the occasion, even switching to producing hand sanitizer when it was needed. While we witnessed larger companies also change product lines, it seemed an easier pivot for smaller companies.

The smaller food producers in the region not only gained market share if they were able to respond to change quickly, they also enjoyed a new popularity and made valuable connections with consumers who were now leery of relying on global supply chains. We hope these connections build longer-lasting relationships with consumers who would otherwise not have had the time or interest to source food locally.

COVID-19 not only shone a light on the importance of local food processing to the nation's food security, but also revealed the investment required to support and sustain this important infrastructure. A positive result has been the federal and provincial funding announced as part of the COVID-19 response to support this sector. It is imperative that support for food processing continues and includes a long-term plan for its viability—especially in Nova Scotia where we have seen such need.

As previously mentioned, the role of institutional food as a nutrition source cannot be ignored in the food security discussion, and we have seen innovations in our province as part of the COVID-19 response. Many school districts were able to respond quickly to families in need, providing some relief as a replacement for meals their children would have been given in school. Schools were able to divert their funding for breakfast and lunch programs in the community. Some administrators took it upon themselves to shop and deliver to those families they knew were in need. There were other programs, run by parent-teacher groups, that included providing gift cards for food, donations to food banks and other creative means to offer support.

One notable solution was a program in which school food funding was used to order meals from local restaurants and have them delivered to families in need. This solution supports both the families and the local businesses that were forced to shut their doors during the lockdown. It is hoped that

institutional food can find its permanent place in the agriculture and food space as there would be significant, stable increases in revenues for local farmers, processors and food businesses if these food funds continued to be spent on local products where feasible.

Although the pandemic has shown us more challenges than opportunities, it is important to discuss the positive transformations we have seen and what we would like to see as permanent solutions for our food insecurity. The most positive transformation might have been the opportunity for innovators to come to the surface. The pandemic has created impossible obstacles in some regards and innovation is the only way forward. It is hoped that this crisis brings disparate groups and initiatives together to provide solutions that work for our province and our communities, making us stronger as a result.

IV. Future

We talk of “getting back to normal,” but many believe that there will be no “going back,” only going forward. We have been asked to *reimagine* Nova Scotia—to see the opportunities and the innovations we can further develop and welcome into our new normal.

The following recommendations have been provided by thought-leaders in areas pertaining to the issues brought forth by the community. These are presented as discussion starters to catalyze thinking around where Nova Scotia should focus in the coming months and years.

1. How might we better use the resources of the university as a playground for new ideas in food and agriculture?

Given the frenetic pace and mounting pressure that our livelihoods seem to demand, individuals and businesses are increasingly siloed. Farmers do not have the resources to mine available information for solutions to their individual needs in normal times, let alone during a global pandemic.

Universities need to knock down barriers to agricultural innovation and provide accessible solutions for existing and future farmers so that they can not just survive but thrive within the varied constraints of our diverse farm landscape.

The Dalhousie Agricultural Campus, as an example, can develop experimental farms that embody learning, collaboration, transparency, affordability and results, including implementation across the diverse cultural, geographical, topographical and climatological factors constraining our agricultural landscape.

Providing agile, low-cost and iterative experimentation at all levels of the farm will reduce barriers and enable small-scale farming to grow. New farmers will see opportunity in the methodologies provided to them as road maps towards successful start-ups, and existing farmers will be able to add valuable insight to experimental needs, accelerate the customizability required to meet challenges within specific microcosms, and see their farms gain efficiencies based on the findings of those experiments.

The opportunity to involve industry, students, research, teaching and the media in low-cost visual and experimental farm models that address the needs of Nova Scotia farmers and the possibility of self-sustaining food security is extraordinary.

2. How might we develop and adopt affordable agricultural technology for the greatest uptake at the farm level?

COVID-19 has brought to light the issues of Nova Scotia's reliance on migrant labour. While this system works well when managed appropriately, it can also leave the province's food security and agricultural industry at risk.¹

Automation is thought to be an obvious answer, but it is not as simple as going to the local dealer to purchase equipment. There are many challenges for Nova Scotia producers in finding equipment that is adaptable to the diverse cropping needs, scale and topography challenges at a cost that will provide a reasonable return for our typically smaller-scaled agriculture.

There is much work being done on automation and technology development, but issues still exist in the safe use of these technologies. It is no help to our smaller-scaled farms to purchase expensive technologies and then have them fail or seriously harm a farm worker. Investments in training will have to accompany technology investments to ensure worker comfort and safety.

Until there is development of smaller-scale technologies that are more adaptable and affordable for Nova Scotia farmers, it is recommended that large investments should be cost-shared among a small group of producers. This spreads the investment across multiple farms and equipment use can be easily managed using mobile applications. There are existing producer groups in Nova Scotia that have had tremendous success with this approach, and their models should be further explored.

To deal with the safety and employee training issues of technology adoption, we recommend that semi-automation should be the starting point. Can we break down existing technologies so they can be purchased and incorporated in stages rather than an all-at-once approach? This would help with the cost of such investments.

It would be beneficial to have a provincial review of the state of technology for agricultural production and to determine if there are possible efficiencies to be found by a concerted effort in development, testing and planned purchasing, rather than having each individual farm acting alone. In other words, we can think of agricultural technology as part of the supply chain, and work to localize it too.

3. How might we strengthen the food processing sector in the region?

First, many of the processing plants in our country need to be retrofitted. Since the beginning of the pandemic, all plants in Canada under 10 years old have avoided COVID-19 outbreaks. That is a sign. The virus could eventually spread to these newer plants, but modern infrastructure can play a significant role in avoiding outbreaks. As an example, most European plants have avoided the virus so far due to their investments in automation, robotics and modern up-keep. Plants that have been in operation for decades and had years of patchworking and provisional solutions are the ones having problems with COVID.

¹ E.R. Guzueva et al., "The Impact of Automation of Agriculture on the Digital Economy" (2020) 421:2 IOP Conference Series; 2020; Vasso Marinoudi et al., "Robotics and Labour in Agriculture: A Context Consideration" (2019) 184 Biosystems Engineering 111.

The high-volume, low-margin nature of the agri-food sector puts tremendous pressure on the entire supply chain in North America. Price volatility also makes things more complicated. There is almost no room for capital investment. The Atlantic region needs more processing, either with newer facilities or with more players.

Improving the viability of the processing sector in Nova Scotia will need a few key components:

- a. **Predictable, accessible, high-quality inputs.** Ideally, food processing companies in Nova Scotia should position themselves to possess supply chain resources that have a low propensity for competition and around which they can build market entry barriers. To that end, commodities in the province that offer a competitive advantage should be identified. The agri-food sector relies heavily on raw materials; therefore, controlling the source of raw materials is essential to secure the supply to large chains and networks. Farmers would need to be incentivized by the model so inputs can be easily secured throughout the year.
- b. **Capital, potable water and cheap/clean energy.** Funding is needed to support a wide range of enterprises in the agribusiness and agri-food sector, including agri-tech, manufacturing, packaging and distribution. Funds should help companies in times of need through innovative solutions such as convertible debt investments and other flexible financing solutions. Access to clean water and affordable, clean energy would also be key to supporting the sector. Given the direction of global markets, Nova Scotia will need to offer better conditions to support the sector and attract investors from outside the region.
- c. **Well-trained labour.** More R&D in the region would allow the province to train more qualified professionals and provide expertise to support the food processing sector. But training does not stop when people leave the classroom. Awareness programs create a valuable opportunity to reinforce how the agri-food sector contributes to the economy.
- d. **Market access.** Understanding the economics of food distribution is key for Nova Scotia's agri-food sector. It is critical to adopt a "demand chain management" paradigm to better appreciate how market demand is changing. But the sector cannot limit itself to feeding Nova Scotians alone; the market is much too limited. As we build a strategy to support our processing sector and focus on its competitiveness, market access will be key. For Nova Scotia, given recent trade agreements, key markets are the United States and Europe.

4. How might we consider more sustainable economic models?

The pandemic has been an exogenous shock to our healthcare system and to our economy. But the impact would have been far less severe if we had learned from other crises and were prepared. For that to have happened, we would have needed a more sustainable economic system.

A sustainable economic model is one that includes **long-term planning** so that a country is not fully dependent on another for strategic products such as certain foods and medications. This requires coordination among markets, governments and education sectors. If we only rely on one of these dimensions, such as a market solution (as many countries do), a sustainable economic system would not be possible in the long run.

Many decisions that are made in business and political environments are **short-term** in nature and involve **significant negative externalities**. Likewise, several financial and economic theoretical models,

taught in our business and economics disciplines, are myopic and only serve to justify short-term business strategies that are not sustainable and do not create value for society. They are built on assumptions that are not valid in the long term. As the impact of COVID-19 unfolds, it becomes obvious that strategies like “comparative advantage” or “just-in-time” inventory management are invalid and unhelpful, particularly in a time of crisis.

An example of unsustainable economic activity is the extent of outsourcing, which has continued to increase over the years. This has made Canada (and many other countries) dependent on one or two countries for much manufacturing and some strategic products such as medicine and important food items.

To be less impacted by the next crisis, we must invest in an infrastructure that enables us to respond quickly. This level of readiness requires relative self-sufficiency in some products, including medical equipment, PPE, medicine and essential foods. For that to happen, we also need smart regulations and incentives to encourage businesses to produce certain products at home. In our interconnected world, no country can live in isolation. However, crucial products should not be left to a so-called “laissez-faire” economy because market solutions focus on the short-term bottom line.

5. How might we work towards increased productivity in rural food-producing businesses?

One of the biggest barriers to developing a more robust local food system is a shortage of agricultural and fisheries labour. Nova Scotia farms currently have difficulty filling job vacancies across a range of occupations and it is predicted that by 2025 one out of every three jobs in the sector will go unfilled. Farms rely on seasonal agricultural workers from other countries for about 15% of their workforce. Many of these workers return each year to jobs they enjoy, but the pandemic has brought into sharp relief the risk inherent in such a significant reliance on temporary migrant workers.²

The fisheries have been impacted by astonishing declines in global demand for seafood exports during the pandemic, in addition to difficulties with labour supply. In the Southwest Nova Scotia fishery, the labour force aged 15–34 in both fishing and processing declined more than 25% from 1990–2001.³ To ensure that food-producing businesses in Nova Scotia can meet local demand and benefit from strong export demand, these key sectoral labour shortages require the most attention.

Farm and fishery labour shortages stem from several interrelated factors in Nova Scotia:

- a. The rural parts of the province have a declining and aging population;
- b. Farming and fishing jobs entail long hours, manual labour and intensive on-the-job training, but they are seasonal and not well remunerated considering their difficulty;

² Canadian Agricultural Human Resource Council, *Nova Scotia: Agricultural Labour Market Forecast to 2025* (2014), online: <https://cahrc-ccrha.ca/sites/default/files/files/Labour-Employment/NS_reportE.pdf> [<https://perma.cc/TV6B-CMDV>].

³ See Canadian Council of Professional Fish Harvesters, “Setting a new course” (May 2005), online: <<https://docplayer.net/15503144-Setting-a-new-course-phase-ii-human-resources-sector-study-for-the-fish-harvesting-industry-in-canada.html>> [<https://perma.cc/QPJ4-5Y6A>].

- c. Attraction and retention of workers in rural communities is improved by the presence of amenities and infrastructure that make rural living attractive and convenient. Rural areas in Nova Scotia have been fighting to get or hold on to improved transit service, broadband internet, community schools and commercial amenities.

The following outlines several recommendations for tackling this complex issue—especially in our food-producing rural communities:

- a. Act on decades of recommendations from rural community advocates and organizations to “invest in the foundations” of rural life.⁴ Doing so will attract people to rural areas and make it possible for them to build complete, rewarding lives outside cities, and thus take on the jobs and business opportunities a rural food system needs. These include rural broadband, community schools and healthcare, public transit and a housing strategy.
- b. Develop a “comprehensive human resources strategy” for both fisheries and agriculture, with coordinated input from the numerous federal and provincial departments and stakeholders with jurisdiction over matters of labour, education and training and rural development.
- c. The strategy should contemplate wage subsidies and training plans that not only address skill-based labour but also promote high-skill careers in agriculture, fisheries and food.⁵

6. How might we facilitate greater food security and sufficiency and optimize relevant government, industry, academia and community resources?

In Canada, it is estimated that the number of people affected by food insecurity may double from 4.4 to 8.8 million by the end of 2020.⁶ COVID-19 has illuminated issues of inequality, where food insecurity is disproportionately experienced by women, racialized communities and those with unstable incomes.⁷ Prior to COVID-19, Canadians were already experiencing sub-optimal health, with high levels of non-communicable diseases and high costs associated with the burden of disease.⁸ To this, the pandemic added a fear of communicable diseases and other increased pressures. Many face loss of income from this economic downturn, and food producers are feeling more strain. More attention needs to be paid to mental and physical health.⁹

⁴ Federation of Canadian Municipalities, *Rural Challenges, National Opportunity: Shaping the Future of Rural Canada* (2018), online: <<http://crrf.ca/wp-content/uploads/2018/10/FCM-Rural-Canada-2018-EN.pdf>> [<https://perma.cc/LLW5-NRCQ>].

⁵ See Canadian Council of Professional Fish Harvesters, “Setting a new course” (May 2005), online: <<https://docplayer.net/15503144-Setting-a-new-course-phase-ii-human-resources-sector-study-for-the-fish-harvesting-industry-in-canada.html>> [<https://perma.cc/QPJ4-5Y6A>] for a list of potential participants.

⁶ Food Secure Canada, “Growing Resilience and Equity” (2020), online: <<https://foodsecurecanada.org/2020-growing-resilience-equity>> [<https://perma.cc/DS7A-R4FE>].

⁷ *Ibid.*

⁸ David A. Dodge & Richard Dion, “Chronic Health Care Spending Disease: A Macro Diagnosis and Prognosis” (2011) CD Howe Institute 327.

⁹ Government of Canada, “Canada’s COVID-19 Economic Response Plan” (2020), online: <<https://www.canada.ca/en/department-finance/economic-response-plan.html>> [<https://perma.cc/5V5F-6G5L>]; Kathleen Kevany & Andria Jones-Bitton, *Rural mental health during COVID-19* (2020) in Canadian Rural Revitalization Foundation, *Rural Insight series: COVID-19*, online: <<http://crrf.ca/ri-mentalhealth/>> [<https://perma.cc/9JKZ-Q6B7>].

Signs of a lack of food sovereignty include inadequate local and regional food supplies and being unable to effectively feed the population for more than one month. Sufficiency in food requires supports, infrastructure and input from citizen-consumers and producers. Components of food sovereignty include sustainable methods of food production, increased localization of food production and consumption, attention to equity and justice, appreciation of traditional knowledge and farming “know how” and economic and political institutions that support self-determination and self-reliance.¹⁰ This means all sectors attending to food safety, security, sovereignty and sustainability.

For the optimal functioning of Nova Scotia’s food system, we must pay attention to both food security and food sovereignty. This will take a collaborative effort of many stakeholders across the food and fish value chains. Below are recommendations whereby all levels of government, industry, academia and community are expected to engage where appropriate:

- a. Local governments should provide supports to help community gardens, kitchens and farmers’ markets. Supports for infrastructure are valuable investments;¹¹
- b. Support programs that use waste heat and vacant lots or unused space for urban agriculture and food security initiatives like *Grow-a-Row* and *Vacant lot to active plot*;
- c. Ease restrictions through by-laws that support citizens developing gardens, rearing animals and otherwise engaging in creative approaches to sustainable food production;
- d. Value and reimburse farmers for the benefits of ecological services such as protecting habitat and pollinators, sequestering carbon and protecting water, as this will increase their capacity and confidence for food production;
- e. Expand provincial and federal tax credits for farmers to donate produce to local food banks;¹²
- f. Increase wage subsidies to incentivize Canadians who live locally to be farm workers to increase local food production and food sovereignty;
- g. A basic income, not expanded food charity, is critical as the pandemic forces more Canadians into deprivation;¹³
- h. Incentivize local institutional buying, which would reduce imports and boost local sales;
- i. Plan for and support alternative strategies that complement existing, conventional production methods. This coexistence works to enhance the overall system by strengthening soil health and

¹⁰ Andrew D. Jones, Lily Fink Shapiro, & Mark L. Wilson, “Assessing the Potential and Limitations of Leveraging Food Sovereignty to Improve Human Health” 3 *Frontiers in Public Health* 263.

¹¹ Amy Trauger, “Toward a Political Geography of Food Sovereignty: Transforming Territory, Exchange and Power in the Liberal Sovereign State” (2014) 41 *Journal of Peasant Studies* 1131–1152.

¹² Canada Senate, Standing Senate Committee on Finance, Report on Tax Incentives for Charitable Giving in Canada, 41st Parl, 1st sess, Report 9 (2013) (Chair: James Rajotte), online: <<https://www.ourcommons.ca/DocumentViewer/en/41-1/FINA/report-15>> [<https://perma.cc/E9LM-DF2Q>]; Food Banks Canada, Fresh Food Tax Credit: An Agricultural Tax Credit for Fresh Food Donations (2016), online: <https://www.foodbankscanada.ca/getmedia/0720dae5-e0c4-4350-a6cc-a4563d00ae22/Fresh-Food-Tax-Credit_Food-Banks-Canada_Aug2016.pdf.aspx?ext=.pdf> [<https://perma.cc/883Y-8WYS>]

¹³ Valerie Tarasuk & Lynn McIntyre, “Food Banks Can’t Adequately Address COVID-19 Food Insecurity,” *Policy Options* (28 April 2020), online: <<https://policyoptions.irpp.org/magazines/april-2020/food-banks-cant-adequately-address-covid-19-food-insecurity/>> [<https://perma.cc/4LGG-NUSX>].

ecological sustainability and sequestering carbon. Examples include permaculture and bioenergy cropping;¹⁴

- j. Support those in academia to foster multi-sector dialogue and regional collaboration;
- k. Establish programs and extension services to support Indigenous, urban and rural communities with small-scale and urban farming resources for food security and sustainability;
- l. Form farm incubators for people of diverse ages to access training to develop their food production and processing skills and connect with retiring farmers;
- m. Citizens should support local, buy from farmer hubs or farmers' markets, or join a farm-share/Community Supported Agriculture; and
- n. Uproot community complacency through campaigns around food sovereignty and security.

7. How might we strengthen the role of institutional food for health and economic stability?

There is an urgent need to reform food systems to protect human and planetary health. Health is a human right, inseparable from other human rights like the right to food, housing, work and education.¹⁵

The cost of chronic disease in Canada is not just borne by the healthcare system, although at \$68 billion per year, this cost is significant—it represents 67% of the healthcare budget.¹⁶ Diet is a significant contributor to rising rates of chronic disease.¹⁷ Additionally, Nova Scotia has one of the highest rates of food insecurity in the country, at 13% of households.¹⁸

Institutional food procurement is an important economic driver and a means to develop sustainable food systems. Institutional food procurement can support local economies, employ thousands of food service professionals and support domestic agriculture.¹⁹

The following recommendations could strengthen the role of institutional food:

- a. Convene a group of stakeholders from government, academia, agriculture and industry to develop a clear and evidence-informed business case for institutional food procurement.
- b. Consider key public sector settings—healthcare, education and social care—and establish a shared understanding of the value proposition of institutional food.

¹⁴ Hilla Benzaken, "How Permaculture Can Give Food Security to Future Generations" *Goodnet* (24 October 2018), online: <<https://www.goodnet.org/articles/how-permaculture-give-food-security-to-future-generations>> [<https://perma.cc/3EDZ-B5W3>].

¹⁵ World Health Organization, "Human Rights and Health" (29 December 2017, accessed 17 March 2020), online: <<https://www.who.int/news-room/fact-sheets/detail/human-rights-and-health>> [<https://perma.cc/W29J-AUBC>].

¹⁶ Kimberly Elmslie, *Against the Growing Burden of Disease*, Report for Public Health Agency of Canada (2016), online: <<http://www.csih.org/sites/default/files/resources/2016/10/elmslie.pdf>> [<https://perma.cc/RT83-DXRA>].

¹⁷ International Panel of Experts on Sustainable Food Systems, *Unravelling the Food-Health Nexus: Addressing Practices, Political Economy, and Power Relations to Build Healthier Food Systems* (2017), online: <[http://www.ipes-food.org/_img/upload/files/Health_ExecSummary\(1\).pdf](http://www.ipes-food.org/_img/upload/files/Health_ExecSummary(1).pdf)> [<https://perma.cc/87HM-UFCX>].

¹⁸ Valerie Tarasuk & Andy Mitchell, *Household Food Insecurity in Canada, 2017-2018*, Report for Food Insecurity Policy Research (PROOF) (2020), online: <<https://proof.utoronto.ca/wp-content/uploads/2020/03/Household-Food-Insecurity-in-Canada-2017-2018-Full-Reportpdf.pdf>> [<https://perma.cc/CET4-TKGT>].

¹⁹ International Panel of Experts on Sustainable Food Systems, *Unravelling the Food-Health Nexus: Addressing Practices, Political Economy, and Power Relations to Build Healthier Food Systems* (2017), online: <[http://www.ipes-food.org/_img/upload/files/Health_ExecSummary\(1\).pdf](http://www.ipes-food.org/_img/upload/files/Health_ExecSummary(1).pdf)> [<https://perma.cc/87HM-UFCX>].

- c. Ensure food provision is in alignment with Canada’s Food Guide to support human and planetary health.
 - d. Identify leverage points for implementing an institutional food procurement program and outline steps for implementation and evaluation.
8. **How might we engage stakeholders in agricultural research to build a culture of R&D and solve problems more collaboratively?**

Research is systematic inquiry to describe, explain and predict observed phenomena. This is, in itself, crucial for the growth and development of any society, company or sector. But equally important is that research is an essential path towards innovation: discovery and creativity transformed into processes, outcomes and solutions. Innovation is the creation of something new. Without creating something new there is no progress. Without continual progress, the productivity, problem resolution, efficiency, well-being, accessibility, sustainability and economic competitiveness of an organization will suffer. R&D is therefore vital to “move the needle” of every private, public or government enterprise.

R&D does not just happen. As the Dalhousie Research and Innovation Strategic Plan points out, R&D needs to be cultured through creative thinking and a sustained urge to improve and advance. The core principles of building a culture of research and innovation are the same for agriculture as any other sector or company. However, the agricultural sector is one that is more important, complex and competitive than most: every human and animal on the planet needs food; the complexity of the web of players involved in producing, processing, distributing, selling, consuming and disposing of agricultural products is unmatched; and, globalization and an extraordinary rate of multinational innovation means Nova Scotian agricultural stakeholders risk falling behind irrevocably without a strategic plan to grow and secure the sector for its producers and consumers. Against the backdrop of the global pandemic that illuminated the strengths and vulnerabilities of Nova Scotia’s food system, a cohesive, cooperative and committed effort towards agricultural R&D is more important than ever.

To build a culture of agricultural R&D in Nova Scotia we need to:

- a. **Recognize the importance of R&D culture to agricultural gains.** Evidence demonstrating the link between a strong R&D culture and sector growth is unequivocal. There needs to be a profound understanding among all stakeholders that investment in R&D is critical if we truly want to make Nova Scotia Agriculture stronger and more resilient. Unless R&D culture management is viewed as a strategic imperative and a driver of decisions, there is little reason to expend effort on it.
- b. **Work together.** Without strategic, forward-thinking alignment of goals between academia, industry and government, agricultural progress in Nova Scotia will flounder. The network of stakeholders is too complex and the ramifications of not cooperating are too pressing to not unite. When we appreciate the innovative ideas of others, collaboration flourishes, giving partners insights to develop and commercialize technologies. Despite diversified interests and fragmentary initiatives, regular meetings and cohesive follow-through is imperative to maximize impact and bolster our culture of innovation. A lack of systematic cooperation among stakeholders is a principal barrier to agricultural R&D and progress in Nova Scotia.
Think big. A culture of R&D will best thrive with bold commitment to a few priority areas of focus. Work on lower-priority areas and small project initiatives should not be ignored, but the current approach to agriculture R&D is largely piecemeal and is bound to deliver small returns.

For academic institutions, industries and governments charged with innovating, focussed capacity-building in key areas needs to be sharpened. Big returns and grand progress are most likely to be achieved with stalwart, coordinated investment of people, time and funding towards strategic and audacious R&D initiatives.

- d. **Pare bureaucracy and hierarchy and increase trust.** Process and chain of command are important, but they can also stifle creativity, innovation, efficiency and progress. People need to be trusted to do their jobs and make decisions, and encouraged to take calculated risks. Trust helps forge an innovation culture. We need to give the innovators broad latitude to do their work in service of agricultural goals. When personnel feel ultimately accountable for delivering practical and profitable innovative solutions, they are less likely to waste time and money. This approach will also allow organizations to be nimble and able to pivot and strike on opportunities when they arise. Red tape and a fixation on budgets, deadlines, chain of command and politics of decision-making will often kill ideas before they get off the ground.
- e. **Invest to receive.** Financial investment is needed to drive innovation. When researchers see a lack of financial commitment to R&D, it invariably dejects innovation culture. Innovation culture cannot thrive without modern, inspiring facilities; without investment in top scientists and engineers—adroit and interdisciplinary visionaries who are given time to focus almost exclusively on R&D; and without reasonable access to funding programs that allow them to pursue non-conventional high-risk, high-reward research while training highly qualified personnel and collaborating with stakeholders.

9. **How might we reduce the risk to primary food and fish producers and harvesters during times of crisis?**

The food industry, especially in the fisheries and aquaculture sectors, has experienced a drastic impact on its commercial activities due to the pandemic because products couldn't be exported (nationally and internationally) or sold locally. This led to large volumes of product going to waste as short- and long-term storage was already at full capacity.

From what has been observed in the lobster industry, the most lucrative sector in Nova Scotia and an economic generator for many rural areas in the province, companies and associations were affected by the pandemic as early as January when exports to Asia, then Europe, were shut down. This led to a series of events impacting the entire supply chain. Lobster fishermen were unsure whether they should continue to haul lobsters, while pounds and storage facilities were at full capacity because live lobsters could not be exported. This also had a negative impact on processing facilities, as they weren't able to manage large volumes in a short period of time. Altogether, losses in product were enormous; there was a high mortality rate in the live market as animals were kept too long in storage and processed products had to be thrown away due to decreased market demand.

Some aquaculture companies contacted during the pandemic—mostly small and medium-sized enterprises in southwest Nova Scotia—faced similar issues when it came to exporting capacity. Company owners knew that they could not export any of their products but still had to invest in labour and equipment and in upkeep of their farm to avoid losing all their inventory. Selling locally was not an option either as their main market—the restaurant and hospitality industry—had to shut down, at least partially, because of the pandemic.

Based on what these industries experienced between January and March–April 2020, decisions had to be made rapidly to inform other fishing areas in the province that had not yet opened at that time of year.

Following the market uncertainty that companies in the food industry faced, and are still facing with the pandemic, some fishing associations and seafood exporters have shared an interest in using tools such as blockchain to better understand the supply chain and efficiently manage the flow of product. The implementation of such data analytics in the agriculture, fisheries and aquaculture industries is timely as it would allow the tracking of products to avoid waste and, in live markets, to reduce mortality rates. Moreover, having access to such data, whether it's shared or not, could not only predict volumes of product, but also inform fishermen and farmers, processing facilities, and cold chain logistics companies.

In Nova Scotia, businesses in the food industry have similar issues (labour shortages, old infrastructure, economic drivers for rural communities, etc.), making this an opportunity to set up a data-driven system to improve the efficiency of the local supply chain. The implementation of blockchain technology would have to be led by industry groups from each sector, namely agriculture, fisheries and aquaculture, with representation from the major steps of a “traditional” supply chain: farmers/fishers, storage/transportation and vendors/exporters. These leaders would work closely with the provincial and federal governments as well as academia for supporting innovation, R&D and training.

10. What is needed to bolster agriculture and food innovation and commercialization in the region?

In 2014, the One Nova Scotia Coalition identified the need to meet our declining economic indicators with actions focused on 19 areas that, if progressed, would precipitate growth in the region. Two years later a team of community leaders and policy influencers became the first Canadians to participate in the MIT Regional Entrepreneurship Acceleration Program to explore ways to build an innovation ecosystem that would “create a funnel for innovators and entrepreneurs.”

Since then, we have capitalized on our ocean advantage (solidified the Ocean Supercluster, opened the Centre for Ocean Ventures and Entrepreneurship, developed the Ocean Startup Project and more) and launched the Halifax Innovation District, progressed rural innovation hubs and developed a backbone organization (ONSIDE: One Nova Scotia Innovation Driven Entrepreneurship organization) to create a prosperous Nova Scotia through inclusive, innovation-driven entrepreneurship.

While organizations and academic institutions are already supporting entrepreneurial endeavours focused on growing, selling and consuming food, a focused venture organization would add to that community of supports by collaborating with investors and partners to accelerate a small number of high-potential startups in the agriculture, food and health sectors in Atlantic Canada and beyond. This organization would aim to add to our existing innovation ecosystem, and bring together Nova Scotians who are already working in the areas of agriculture, food supply chains and technology in the same way our focus on this region's ocean advantage amplified its existing assets.

11. How might we work to establish a food strategy for Nova Scotia?

The lack of a food strategy for Nova Scotia hinders the industry's ability to effectively adapt and support food security and the economy of our province. A food strategy for Nova Scotia would ensure that the

entire food system works together towards a common goal of ensuring food security for all Nova Scotians.

At the beginning of the pandemic, the vulnerability of our food system was highlighted. It is essential that the development of a food strategy include all aspects of the food system. More than just the production of food, it should include access, distribution, waste etc. These components must all be built into the strategy to ensure sustainable long-term success. The strategy must also be relatable to all Nova Scotians and it is imperative to include those populations who are presently food-insecure.

The agriculture industry—those producing food—have an essential part to play in the development of the food strategy. From innovation to sustainability to processing to distribution, the industry must be supported in adapting to the needs of the province. Government and industry policies and programs must then be driven by the food strategy, which needs to be ever-evolving.

The long-term sustainability of the industry must be rooted in the strategy, which must consider land planning, soil health, labour gaps, agriculture as a viable career and public trust of our food system. Those closest to the issues are critical to informing the strategy as they provide concrete experiences and diverse perspectives. This must be a grassroots, community-led initiative, supported by government.