



# The Future of B.C.'s Food System

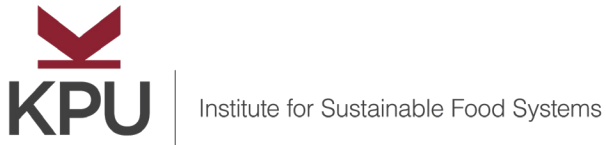
Response to Findings & Recommendations  
of the B.C. Food Security Task Force

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Institute for Sustainable Food Systems



The Institute for Sustainable Food Systems (ISFS) is an applied research and extension unit at Kwantlen Polytechnic University that investigates and supports sustainable agriculture and regional food systems as key elements of sustainable communities.

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## PREFACE

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Sustainability- living in ways that do not compromise future generations ability to do the same- is imperative and likely the greatest challenge humanity has ever faced. We must learn how to live on and with Mother Earth without destroying her, and in the process destroying the very foundation of our existence. The ability of our children, grandchildren and generations beyond, to live healthy, happy and fulfilling lives depends upon it. This is not hyperbole. As we stand at the crossroads, Mother Earth is warning us loudly and clearly to read the signs. Signs such as the rampant collapse of marine and terrestrial ecosystems (half of the Great Barrier Reef has died since 2016<sup>1</sup>), the erosion of biodiversity (we are undergoing the Earth's sixth major extinction event<sup>2</sup>) and climate change. All of these are threatening the wellbeing of humans and ecosystems at an unprecedented scale. As such, it is vital that citizenry and their governments everywhere critically examine the basis and outcomes of their economies. Is a continued and singular focus on economic growth, predicated on the liquidation of earth's resources, sensible? Does the path to human sustainability lie in doing more of the same or altering course?<sup>3</sup> We must engage in the hard, soul-searching work of answering these questions and taking appropriate action.

Undoubtedly, our food system is a foundation of our economy and a necessity for humanity's survival. Without a sustainable food system, there is no sustainable future. Therefore, we at the Institute for Sustainable Food Systems are grateful and encouraged that the government of British Columbia is focused on the challenge of bringing forth a sustainable food system in our province. We know, by virtue of our work, that a great many in the province share this concern and are working diligently and dedicatedly to address it.

The government of British Columbia appointed the B.C. Food Security Task Force to examine and provide recommendations for the development and use of technology to support food security and the economic growth of B.C.'s agricultural sector. It did so under the pretext that agritech solutions can effectively address the United Nations Sustainable Development Goals. The report emanating from this study, *The Future of B.C.'s Food System*, was released January, 2020. While it is commendable that the government of B.C. is concerned with and seeks to understand the challenge of advancing sustainable food systems, the suppositions and conclusions put forth in this report compels us to respond. Suffice it to say the report's myopic focus on technology as the means to achieve BC's sustainable food system future strikes us as insufficient, and in many ways antithetical. Therefore, the objective of this response is to present additional, substantiated information that was overlooked in the report, and must be brought into the calculus. We also present alternate perspectives that call into question the extent to which technology can or should be relied upon to contribute to our food system future. We conclude that the vision presented by the B.C. Food Security Task Force simplistically conjectures the ability of agritech to address the most complex food system challenges.

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1 National Geographic.(2018). Half of the Great Barrier Reef is Dead. <https://www.nationalgeographic.com/magazine/2018/08/explore-atlas-great-barrier-reef-coral-bleaching-map-climate-change/>

2 Ceballos, G., Ehrlich, P. R., & Dirzo, R. (2017). Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. *Proceedings of the National Academy of Sciences*, 114(30), E6089 LP-E6096. <https://doi.org/10.1073/pnas.1704949114>

3 Rees, W. E. (2019). Why Place-Based Food Systems? Food Security in a Chaotic World. *Journal of Agriculture, Food Systems, and Community Development*, 9(A), 5-13. <https://doi.org/10.5304/jafscd.2019.091.014>

Food system sustainability, given all of its dimensions, is the epitome of a complex problem that calls for extensive, critical examination so that the impact of any actions are comprehensively considered. Undoubtedly, an effective solution to food system and human sustainability challenges must consider many dimensions. There will be no single, easy answer. As a society, we have become enamored with technology, and by extension wealth creation, without examining the consequences such as who is benefiting and at what cost to others. This has become our default solution to many complex challenges. Such thinking can obscure and lead us away from the fundamental shifts that must be undertaken to achieve our sustainable future.

Our sustainable food system strategy should not be based on a singular line of thinking, especially, it seems, the one that has contributed so greatly to this conundrum in the first place. While technology will surely play a role in our sustainable food system future, it must be acknowledged that technology has often proven to have significantly adverse consequences. Many adopted agricultural technologies that now form the basis of our dominant food production paradigm have exacted their price. For example, extensive use of tillage equipment and synthetic nitrogenous fertilizers are highly detrimental to soil conservation and health. Similarly, the widespread use of synthetic broad-spectrum insecticides has exacerbated the pest problem, and the advent of genetically modified (Round-up Ready) crops has increased the use of the herbicide glyphosate (Round-up), a probable carcinogen<sup>4</sup> of which our dietary intake is increasing.<sup>56</sup> It is very important that the technologies we adopt to 'solve' one problem do not, as is so often the case, create more.

Thus, a singular focus and dependence on technological remedy cannot be thoughtfully advised. We urge the government of British Columbia to engage in a far more robust and comprehensive examination of the challenge of food system sustainability- economic, environment, social- and devise more thoughtful, comprehensive strategies than those presented in the Task Force's report. Herein, we provide additional information and perspective around the challenge of a sustainable food system future in British Columbia, and what might be more appropriate to reach that goal.

Lastly, we of the Institute for Sustainable Food Systems are ready and willing to support the people and government of British Columbia to fully understand our food system challenge, and to effectively advance a genuinely sustainable food system future. It is in this spirit and intent that we offer this response.

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## INTRODUCTION

In its report *The Future of B.C.'s Food System* (B.C. Food Security Task Force [BCFSTF], 2020), the B.C. Food Security Task Force (the Task Force) provides recommendations for supported development and use of technology and innovation to strengthen B.C.'s agriculture sector, grow the economy, and ostensibly address the UN's Sustainable Development Goals (SDGs). The recommendations center on the potential of the agritech sector to increase food security, improve climate change mitigation and adaptation, boost local food availability, and increase profitability for farmers. While technological advances certainly play a role in improving agricultural practices and adaptations, we caution that a strategy narrowly focused on the development of the agritech sector and an agritech focused food system has limited capacity to meaningfully, and likely appropriately, achieve these outcomes. We believe that substantially addressing food security, local food availability, climate change adaptation and mitigation, and food system productivity and profitability would benefit from a more comprehensive consideration of food system dynamics beyond the agritech sector, as well as a more thoughtful consideration of regionally-adapted technologies that address current needs within the agriculture and food systems. Additionally, we caution that a narrowly-focused agritech vision can overlook other critical avenues of support for ongoing initiatives, and policy development that, if pursued, could more meaningfully and genuinely advance these goals. In this response we;

- **PART 1:** Question the capacity of agritech to meaningfully increase food security, mitigate and adapt to climate change, boost local food availability, and increase profitability for farmers, as proposed by B.C.'s Food Security Task Force,
- **PART 2:** Suggest additional areas of needed policy attention to more directly increase food security, mitigate and adapt to climate change, boost local food availability, and increase productivity and farm profitability.

## PART 1

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*The capacity of an expanded agritech sector to achieve the outcomes outlined by the B.C. Food Security Task Force is uncertain, and potentially limited.*

In this section, we raise concerns that an agritech focused food system, as proposed by the B.C. Food Security Task Force in the *Future of B.C.'s Food System*, has limited capacity to meaningfully achieve the proposed food system outcomes, namely:

1. **Increase Food Security:** The scope of the B.C. Food Security Task Force report disregards the primary cause of food insecurity for most British Columbians - poverty and economic inequality.
2. **Improve Climate Change Mitigation and Adaptation:** Potential contributions of the agritech sector to climate change mitigation and adaptation over time are unexamined and unsubstantiated.
3. **Boost Availability of Locally-Produced Food for B.C. Residents:** The relationship between agritech, increased productivity for global markets, and the increased availability of local food for British Columbians is unclear and unsubstantiated.
4. **Increase Profitability for Farmers:** Increased productivity, through the adoption of capital-intensive technologies does not directly, or necessarily increase profitability and prosperity for farmers and other food system stakeholders.

1. **Increase Food Security:** The scope of the B.C. Food Security Task Force report disregards the primary cause of food insecurity for most British Columbians - poverty and economic inequality.

The mandate of the B.C. Food Security Task Force was to “*make recommendations that support food security and the economic growth of the agricultural sector in British Columbia*” (BCFSTF, 2020, p.9). However, the scope and recommendations of the Task Force’s report is notably focused on advancing the profitability and competitiveness of the agritech sector, conspicuously omitting the primary cause of both local and global food insecurity - poverty and economic inequality. While technological advances can improve agricultural practices and efficiencies, it is important to recognize the proven primary drivers of food (in)security and the limited capacity of agritech to address these. As the Task Force identified, food security exists when “*all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life*” (World Food Summit, 1996). Acknowledging this to be true, the report does not address issues that fracture food security. For example, in BC and Canada, poverty is overwhelmingly the cause of food insecurity (Food Insecurity Policy Research [PROOF], 2018). Long-term research investigating food insecurity in Canada estimates that approximately 10% of Canadians live with food insecurity because of financial constraints. In 2012, approximately 13% of households in B.C. experienced food insecurity due to economic barriers (Tarasuk, Mitchell & Dachner, 2014). This reality emphasizes the connection between improving household financial circumstances and improving food security (Dachner et

al., 2016), and, importantly, calls for food security strategies that address the root causes of poverty and economic inequality. These important considerations are omitted in assertions that “*Technology can enhance our domestic food security*” (BCFSTF, 2020, pg. 22). There may be an underlying assumption here that agritech will allow for the production of food to be so much cheaper that even those that live in poverty will have equal access to food. Regardless of the unclear potential for agritech to reduce food prices, it is important to note that currently, the cost of food in Canada is already amongst the lowest in the world (~10% of income) and yet food insecurity persists (Gray, 2016).

Presently, the global food system produces more than enough food to feed the global population (Alexandratos & Bruinsma, 2012; Holt-Giménez et al., 2012), yet more than one in 10 people around the world live with food insecurity (FAO, IFAD, UNICEF, WFP & WHO, 2019). In fact, *per capita* global food production has increased by 30% since 1961 (Mbow et al., 2019). Still food insecurity persists as a critical public health issue in both developed and developing countries, even rising in recent years (FAO, IFAD, UNICEF, WFP & WHO, 2019) despite increases in food production. These trends emphasize that increasing global food production alone is not an effective strategy to improve food security. Poverty and economic inequality, not scarcity, have been clearly identified as the drivers of chronic food insecurity, calling into question the capacity of agritech investment and associated aspirations for increased production to meaningfully address food insecurity, both within B.C. and beyond.

**Presently, the global food system produces more than enough food to feed the global population, yet more than one in 10 people around the world live with food insecurity.**

**SUMMARY:** We question the characterization of agritech investments as a meaningful strategy to address food security, which is overwhelmingly caused by poverty and economic inequality, both locally and globally. As such, we question the capacity of agritech innovations, and any associated aspirations to increase production, as an appropriate strategy to address the Sustainable Development Goal to end hunger and achieve food security (SDG2).

## 2. Improve Climate Change Mitigation and Adaptation: Potential contributions of the agri-tech sector to climate change mitigation and adaptation over time are unexamined and unsubstantiated.

The B.C. Food Security Task Force raises a need to develop the agritech and innovation sectors in B.C. to address new challenges facing agriculture in the province, such as climate change. This approach primarily focuses on the application of technology to lower GHG emissions from the sector adapting current agricultural practices to reflect new climate realities. Available lifecycle assessments consistently find that soil-based production systems have far superior environmental performance when compared to high-tech, soil-less production, in terms of land, water and energy use, as well as carbon and water footprints (Barbosa et al., 2015; Boulard et al., 2011; de Villers et al., 2011; Cellura et al., 2012; Page et al., 2012; Barbosa et al., 2015; Ntinis et al., 2020). For example, greenhouse gas emissions from fossil fuel heated hydroponic greenhouses have been found to be about six times higher than emissions from soil-based farming operations producing equivalent products (Clune et al., 2017). A 2009 survey of heated greenhouses in B.C. found that vegetable and floriculture operations consumed an average 1.9 and 1.3 GJ of energy per square meter, respectively, mostly (83%) in the form of natural gas for heating (MacNair & Thomas, 2011). As a result, B.C.'s greenhouse and nursery sector consumes about 70% of the natural gas used by B.C. farms (BC Agriculture Council, 2012).

In 2008, B.C. introduced the first carbon tax in North America. The greenhouse sector was hit particularly hard by this change in energy pricing, due to its high fossil fuel consumption and associated greenhouse gas emissions. The industry lobbied for exemption from the tax, and was granted a 100% rebate in 2012/13, valued at \$7.2 million. After 2013, heated greenhouses have been eligible for an 80% carbon tax rebate each year, with an estimated annual value now approaching \$12 million (BC Ministry of Agriculture [BC MoA], 2019). Recently-introduced federal carbon pricing schemes also allow an 80% rebate for heated greenhouses (Department of Finance Canada, 2019). The impact of the carbon tax on the greenhouse sector, and subsequent lobbying from the industry, highlight the energy intensive character of these operations, and how policy aimed at reducing emissions can be undermined.

Most emissions from B.C. greenhouses are associated with heating uninsulated structures in winter. A transition to vertical farming would introduce an additional energy cost, due to greater need for artificial lighting. B.C. is fortunate to have an electrical grid that is largely powered by hydro, so electrical lighting would be associated with lower emissions in this province than in other regions. Even so, the province's electrical power would be better used to transition the transportation and built infrastructure sectors off fossil fuels rather than attempting to replace sunlight for crop production.

**SUMMARY:** Assertions that indoor growing systems and related agritech innovations will reduce GHG emissions in B.C. disregards existing realities in the sector. Given the current trends of significant energy use associated with greenhouse production in B.C., we caution that expanding and relying upon similar indoor growing infrastructure (e.g. vertical farming) for food production has the potential to increase energy demand and dependence in the agricultural sector.



### 3. Boost Availability of Locally-Produced Food for B.C. Residents: The relationship between agritech, increased productivity for global competitiveness and increased availability of local food for British Columbians is unclear and unsubstantiated.

The vision presented by the B.C. Food Security Task Force focuses on strategic increases in production through investment in technology and agritech infrastructure. In the report, the Task Force suggests that *“growing more food in B.C. also means more food for British Columbians. Through new growing practices, farmers could increase their output and profits while producing high quality foods for local grocery stores, restaurants, and consumers. The new practices that could support farm-to-table or farm-to-supplier fresh supply in B.C. could take the form of container farms, vertical farms or urban space farms (BCFSTF, 2020, p. 34).”*

Such an assertion suggests that access to technologies and novel growing practices are limiting factors to the productive potential of B.C.’s agricultural sector, and the availability of local food for consumers. However, we believe it is important to note that there are several critical factors that more immediately and profoundly impact both the food provisioning capacity of B.C.’s agricultural sector, and the availability of locally-produced food.

### Addressing current failures related to land access policy is one area of critical importance for increasing agricultural production in the province.

**Productive Capacity:** Today, approximately 50% of B.C.’s agricultural land base is used for agriculture, including areas where soils are among the most fertile and access to markets is optimal (BC Ministry of Agriculture [BC MoA] n.d.). At present there are a number of barriers preventing B.C. from optimizing production on its fertile agricultural land base. For example, rising real estate prices have pushed some of the best quality agricultural land far beyond what is affordable for farming. In 2016, the median sale price of land in the Agricultural Land Reserve [ALR] land in Metro Vancouver was over \$200,000/acre (BC Assessment, 2016). Such elevated prices are not only attributed to intense land use competition in peri-urban areas, but also to an existing policy environment that can encourage farmland speculation and the use of farmland for non-agricultural purposes (Tatebe et al., 2018; Sussmann et al., 2016). Addressing current failures related to land access policy is one area of critical importance for increasing agricultural production in the province.

Only 5% of the B.C.’s land base is suitable for agriculture. The ALR was established to protect this limited, non-renewable resource and maintain the province’s agricultural capacity. The Task Force’s recommendation to establish an agri-industrial land use designation within the ALR, increasing allowances for development (e.g. concrete bottom greenhouses), undermines the primary purpose of farmland protection. Furthermore, this suggestion ignores the importance of such soils and lands to the overall ecological function and integrity of our agricultural landscapes (Rallings et al., 2019). We would like to caution that such a proposal reinforces the perception of the ALR as a land bank for future residential, industrial or infrastructure uses, rather than a mechanism for protecting irreplaceable agricultural soils and the ecological integrity of B.C.’s agricultural landscapes.

It is important to note that the indoor growing infrastructure promoted in the report does not require the use of the province’s limited arable soils. In fact, such development would degrade their viability for future soil-based agriculture. Despite varying degrees of agricultural suitability within the ALR, the reserve represents

the province's best quality agricultural land. We would like to caution that the future food production consequences of eroding the viability of the ALR for soil-based agriculture should be weighted heavily against any hypothesized benefits of expanded indoor growing. Furthermore, this proposal contradicts the recent recommendations brought forth by the Advisory Committee for the Revitalization of the ALR and the Agricultural Land Commission, appointed by the B.C. Minister of Agriculture. In 2018, the independent Advisory Committee recommended an ALR revitalization strategy focused around an "Agriculture First" agenda (Advisory Committee for Revitalizing the Agricultural Land Reserve and the Agricultural Land Commission, 2018a). Based on province-wide stakeholder engagements efforts (Advisory Committee for Revitalizing the Agricultural Land Reserve and the Agricultural Land Commission, 2018b), the Committee recommended a shift toward "a protected, productive ALR". Such a shift would eliminate activities that limit, damage and alienate farmland, or compromises the future agricultural use of limited agricultural soils.

The application of regionally-appropriate technologies to improve the efficiency and sustainability of soil-based agriculture represents an additional important opportunity to maintain and/or increase production in the face of climatic change- one that has been largely ignored in this report. For example, technologies such as rainwater harvesting, efficient soil-based irrigation, or soil carbon monitoring and reporting systems can contribute to maintaining productive agricultural systems while adapting to the impacts of a changing climate.

**Availability of Local Food for Local Consumers:** Even if highly technical agricultural interventions increase productivity in the sector, the accessibility of this food to local residents is not a direct outcome, especially if such production increases are primarily export-oriented. Gaps in local food supply chains, vertical integration within dominant global supply chains, and market power consolidation, are significant barriers that prevent local food from accessing local markets (Bloom & Hinrichs, 2010; Stahlbrand, 2017; Steinman, 2019).

An institutional procurement study completed in the Okanagan region of B.C. found that, while there was both significant agricultural activity in the region, and demand for local food from public institutions (universities, hospitals and correctional facilities), critical supply chain infrastructure was missing to effectively connect the two (Institute for Sustainable Food Systems [ISFS], 2017). Similarly, the absence of appropriately-scaled and located livestock slaughter and processing facilities in B.C. remains a significant barrier to the expansion of local, small and mid-scale livestock operations, especially for those located in remote areas (Small-Scale Meat Producers Association, 2018). While the Task Force's report articulates support for value-added processing, a focus on "*processes such as extraction, modification, and thermal processing to introduce novel products to market*" (BCFSTF, 2020, pg. 19) does not acknowledge or fulsomely address the absence of infrastructure for minimal food processing (slaughter facilities, freezing, canning etc.) across the province that severely limits the development of robust regional food systems.

The oligopolistic hegemony of nationally and globally-scaled agri-food companies can substantively exclude local producers from establishing themselves in the local supply chain. For example, extensive market

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consolidation within the grocery retailer sector presents barriers for many suppliers looking to reach local consumers. In 2016, the top five grocery retailers in Canada received more than 80% of consumers' grocery dollars (Steinman, 2019). With the majority of grocery retailers owned by few companies, a handful of enterprises maintain disproportionate influence over the type and variety of products available to local consumers. Practices such as long-term contracts with suppliers, appointing large manufacturers to manage shelving of competing brands through category management, and fees for carrying products ("slotting fees") are frequently prohibitive to suppliers without considerable access to capital, including many smaller, local entrepreneurs looking to establish themselves (Federal Trade Commission [FTC], 2005; Stanton & Kenneth, 2006; Steinman, 2019).

**SUMMARY:** We question the characterization of agritechnology, as referenced by the Task Force, as a fundamental barrier to increasing the production capacity of B.C.'s agricultural sector. Furthermore, we question the assumption that significant development in the agritech sector will increase the availability of locally-produced food to local consumers. Establishing a direct relationship between increasing local productivity and improving access to local food overlooks existing barriers in the local food supply chain that prevent locally-produced food from reaching local consumers.

#### 4. **Increase Profitability for Farmers:** Increased productivity, through the adoption of capital-intensive technologies does not directly, or necessarily, increase profitability and prosperity for farmers and other food system stakeholders.

Increasing farm profits is an obvious objective for agricultural producers, however there is a need to consider the existing variable impacts of technological adaptations on agricultural systems and farm profitability. Since net farm returns are the balance of cost and revenue, potential increased returns referenced in the report must be compared to increased expenses from capital-intensive, and tech-dependent production methods.

**Profitability:** Between 2012 and 2017 global agritech investments increased by 80% annually (Kukutai & Maughan, 2018), with total investment in agritech reaching over \$16 billion in 2019 (Food Technology Magazine, 2019). This significant influx in funding has resulted in emergence of a number of agritech startups, many of which are being rapidly acquired by trans-national agri-food corporations (i.e.

**Decreases in realized net farm income have occurred despite the fact that farmers are producing more food. In fact, 2018 saw the lowest realized net farm income for Canadian farmers in 12 years, with a 40% decrease from the previous year.**

John Deere, Case IH, Bayer [merged with Monsanto], Walmart, and **Nestlé** (AgFunder News, 2018). While technological advances in the agrifood sector have improved the operations and lives of some farmers, industrialization and corporatization of the modern food system often means that the economic benefits are primarily accrued by large transnational corporations, and not by primary producers (Bronson & Knezevic, 2016b). Current trends suggest that the rapid expansion of capital intensive agritech companies has primarily led to the growth and profitability of agri-food corporations, and much less so to the growth and development of local and regional food systems or the economic wellbeing of family farmers.

Since the mid-20th century **gross farm receipts** have generally increased as productivity (yield per acre) has increased (Qualman, 2017; Statistics Canada, n.d.; National Farmers Union [NFU], 2012). During this same timeframe, **realized net farm income** in Canada, which subtracts operational expenses and depreciation from gross farm receipts, have generally remained constant, or decreased (Qualman, 2017; NFU, 2012). While Canadian farms have managed to produce more food, and generate more (gross) revenue, this has not resulted in increased profitability for farmers. In fact, 2018 saw the lowest realized net farm income for Canadian farmers in 12 years, with a 40% decrease from the previous year (Statistics Canada, 2019). Such trends suggest that, while the introduction of new technologies in agriculture has contributed to the ability to grow more food and increase gross farm receipts, these benefits (read: profitability) are not being passed on to farmers. For example, in the period between 1985 and 2016, transnational agri-businesses were the primary beneficiaries of farm revenue in Canada capturing 98% of total farm revenues (Qualman, 2017). As mentioned above, these same companies are rapidly cornering the agritech market through the acquisition of new technology start-ups around the world suggesting that this trend of wealth capture and concentration may continue (Clapp & Isakson, 2018), raising the need to thoughtfully approach agritech expansion to ensure benefits can be captured locally, and by primary producers.

In their report, the B.C. Food Security Task Force highlights the history of technology and innovation in the agricultural sector since the industrial revolution, suggesting that as a result “*food largely became an affordable and accessible commodity in developed countries*” (BCFSTF, 2020, p.26). Their assessment ignores the social, ecological and economic consequences of rapid technological advancements in agriculture, especially when these technologies are developed and controlled by corporate interests. The 20<sup>th</sup> century has been characterized by the continual adoption of new technologies, primarily aimed at increasing production, resulting in what has come to be known as the “technology treadmill”. The treadmill describes the typical outcome whereby the benefit of new yield-enhancing, capital intensive, technologies are limited to the early adopters. Once widely adopted, new technologies result in overproduction, which in turn puts a downward pressure on both commodity prices and farmers’ profits. (Ikerd, 2002; Holt-Giménez, 2019). Farmers are then forced to adopt the new, capital intensive technologies in order to boost production and compensate for lower commodity prices (i.e. to stay in the game). Ultimately, the initial profits enjoyed by early adopters are negated, and those who did not adopt, or were late to do so, are pushed out (Ikerd, 2002). This phenomenon documents how, ultimately new yield enhancing technologies become yet another ever-escalating fixed cost of production required just to stay afloat, without improving the economic viability of the farming business. As noted above, the long-term economic benefits of the “technology treadmill” are often captured by the transnational companies that develop and control these technologies, and less consistently by farmers.

**Employment:** Additionally, the B.C. Food Security Task Force suggests that investment and development of an agritech sector will increase job opportunities for workers in B.C. As global investment in agritech and the digitization of agriculture increases, an emerging body of research is suggesting that the associated social consequences require more attention. While innovations in agritech have helped to advance export-oriented



agriculture, such technological shifts have the potential to perpetuate social, economic and racial inequities in the food system (Rotz et al., 2019; Bronson & Knezevic, 2016a, 2016b). Research also suggests that skill-based technological change may contribute to further wage inequality, and marginalization of low wage workers. For example, the increase in demand for high-skilled, tech-related workers can lead to stagnation in wages for less skilled workers (Kristal & Cohn, 2017). In the food system this may negatively impact already economically marginalized groups including migrant labourers, new immigrants, youth and rural workers, and new entrant farmers (Rotz et al., 2019). While there is significant investment in the development of the agritech sector, emerging research suggests that many of the social, political and ethical consequences merit thoughtful consideration as these have not been adequately explored or understood.

**SUMMARY:** We question the proposal of a direct relationship between increased production from technological adoption and increased farm profitability or prosperity for farmers. The trends cited suggest that widespread adoption of agricultural technologies have increased total production costs and gross farm revenue, but not farm profitability. Additionally, it has been documented that much of the profits of the food supply chain are accrued primarily by technological providers and agri-business, but not to farmers. Furthermore, we call for deeper consideration of evidence suggesting that agritech could exacerbate already existing inequality and marginalization in the food system.



## PART 2

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*Additional areas of needed policy attention to more directly increase food security, mitigate and adapt to climate change, boost local food availability, and increase productivity and farm profitability.*

We recognize that the mandate of the B.C. Food Security Task Force was focused on identifying strategies to grow the agritech sector. However, as identified above, we caution against the capacity of such an approach to address the goals identified by the Task Force, which include increasing food security, mitigating and adapting to climate change, boosting local food availability, and increasing profitability for farmers. We acknowledge that technology and innovation will be a factor in the development of B.C.'s sustainable food system, but caution against claims that the narrow agritech-centered approach will yield the broad food system societal and economic benefits results described in the report.

Additionally, we would like to highlight alternative pathways to pursue the important food system goals articulated by the B.C. Food Security Task Force. As such, below we highlight some key priority areas that may be overlooked in such an agritech-centered approach. These priority areas may have significant potential to impact the challenges highlighted by the Task Force including, 1) increase food security, 2) mitigate and adapt to climate change, 3) boost local food availability, and 3) increase profitability for farmers.

### **Protecting farmland, ensuring its use for soil-based agriculture, and maintaining B.C.'s food production capacity**

Only about 50% of B.C.'s protected farmland, known as the Agricultural Land Reserve, is currently used for agriculture. This should not be interpreted as agriculture's limited capacity, but rather an indication of the potential for soil-based agriculture to increase B.C.'s food production capacity, provided barriers to its utilization are adequately addressed.

For example, rising real estate prices across the province have pushed cost for some of the best quality agricultural land far beyond what is affordable for farmers. In 2018, average farmland prices in key agricultural regions, such as the South Coast, Vancouver Island, and Okanagan Valley were the highest in Canada, 3-6 times greater than those in Southwestern Ontario, the next leading region for farmland prices (Farm Credit Canada, 2019). Elevated prices are not only attributed to intense land use competition in peri-urban areas, but also an existing policy environment that encourages farmland speculation and the use of farmland for non-agricultural purposes (Tatebe et al., 2018), including rural estate development. For example, recommendations from the Advisory Committee for ALR Revitalization found that 80% of local government were struggling to regulate the development of estate style homes in the ALR, and call for strict regulations on home plate size (Advisory Committee for Revitalizing the Agricultural Land Reserve and the Agricultural Land Commission, 2018a). In this same report, local governments in the Lower Mainland reported regularly receiving development permit applications for homes in the ALR ranging between 5,000 and 40,000 square feet (Advisory Committee for Revitalizing the Agricultural Land Reserve and the Agricultural Land Commission, 2018a). Addressing current barriers in the land access policy environment is an area of critical importance to increasing production from soil-based agriculture.

**Possible Actions:**

- Improve access to credit and capital for new entrant farmers (Wilson & Martorel, 2017)
- Farm property tax relief reform (Metro Vancouver, 2016)
- Restrict farmland ownership for non-Canadians, non-residents and/or entities such as pension plans, hedge funds, or private equity firms (Magnan & Desmarais, 2017)
- Improve data collection and transparency of beneficial and legal farmland ownership to better improve and inform ownership policies (Tatebe et al., 2018)
- Improve regulatory framework to limit residential land speculation in the ALR (Advisory Committee for Revitalizing the Agricultural Land Reserve and the Agricultural Land Commission, 2018a)

**Support farmers to engage in regenerative, ecologically based farming practices**

It is well documented that farming practices on industrial commodity farms contribute to soil and water degradation, the loss of habitat and biodiversity, and climate change (Kimbrell, 2002; IPES-Food, 2016). On the other hand, regenerative farming practices that prioritize soil health and minimize dependence on external synthetic inputs are being adopted to restore ecosystem health, and build or maintain soil productivity and fertility over time (Paustain et al., 2016; Rodale Institute, 2014; FFCF, 2019; Loboguerrero et al., 2019). For example, increasing the amount of soil carbon stored in agricultural soils globally has been identified as an important climate change mitigation avenue with multiple benefits (Masciandaro, 2018; Milne et al., 2015, IFOAM, 2012). While the carbon sequestration capacities of soil vary geographically and over time (Baveye et al., 2018; White et al., 2018), the potential for GHG mitigation is recognized in policy initiatives such as the '4 per mille Soils for Food Security and Climate'. The '4 per Mille' initiative advocates for a 0.4% increase in soil carbon annually to help mitigate anthropogenic greenhouse gas emissions (Minasny, 2017). Furthermore, the Rodale Institute has found, through 30 years of farming system trials, that organic, regenerative farming systems produce yields competitive with conventional production systems (Rodale Institute, 2011).

These efforts suggest that regenerative agriculture can be practiced as both an effective climate change mitigation and adaptation strategy. This is achieved by building resilient systems that are better adapted to changing water availability, more fertile, and less dependent on synthetic external inputs. Additionally, increased prevalence of carbon markets and recognition for the value of ecosystem services have developed new revenue streams for farmers practicing regenerative, ecologically-based agriculture.

Regionally-adapted technology and innovation could support the advancement and adoption of regenerative agriculture practice. Investing in the development of a province-wide research and extension service would provide critical support for farmers, and support appropriate, productive use of the provinces ALR land. While adaptation of current agricultural practices through such things as the development of new cultivars, and pest management strategies is important, it must be paired with aggressive mitigation plans if we hope to meet climate commitments, and ensure our capacity for provincial food self-reliance.

**Possible Actions:**

- Support extension programming linking applied academic researchers, private sector partners, and new and experienced farmers, all focused on regionally-adapted regenerative agriculture

- Support development and application of technologies that facilitate adaptations in soil-based agriculture, such as improved water management (e.g. rainwater harvesting systems), reduced energy use, efficient soil carbon sequestration, monitoring and reporting, improved tools for reduced and no-till production systems etc.
- Develop and implement renewable energy technologies in agriculture to reduce energy dependency
- Support applied research to advance regenerative, ecologically-based, resilient farming and food systems

### Training the next generation of farmers

Securing B.C.'s food production capacity into the future requires investing in training new farmers. Today, the average age of Canadian farm operators is 55 years old and farm operators represent just 2% of Canada's population (Statistics Canada, 2017a; Statistics Canada, 2011). In the 2016 Census of Agriculture only 8.4% of farmers reported having a written succession plan (Statistics Canada, 2017a). This trend suggests that without investment in the education and training of new farmers, the capacity for long-term food production in B.C., and across Canada is at risk.

Increasingly, those interested in starting farming careers in Canada are coming to the sector from a diversity of backgrounds and experiences. They include youth, second careerists, Indigenous Peoples, and new Canadians, all of whom may or may not have agrarian backgrounds (Food Secure Canada [FSC], 2016). Given this reality, and the need to advance regenerative agriculture practices, it is increasingly important to provide appropriate and accessible training opportunities for new farmers coming to the profession from a variety of backgrounds.

#### Possible Actions:

- Support for new farmer training in the form of curriculum development, and institutional capacity building
- Support the further development and expansion of recognized non-traditional agricultural technical training programs, and ongoing professional development for farmers in B.C.

### Reduce poverty to improve food security for British Columbians

Poverty and economic inequality, not scarcity, are overwhelmingly the key determinants of food security, both locally in B.C. and globally (Food Insecurity Policy Research [PROOF], 2018; FAO, IFAD, UNICEF, WFP and WHO, 2019). While it is true that producing more food in British Columbia could help decrease B.C.'s reliance on food imports and help buffer against uncertainties in global supply chains (provided regional food supply chains are strengthened), related food security impacts are neither substantiated nor assured. Improving food security locally, and eliminating hunger globally, require strategies to alleviate poverty and improve financial circumstances among the most vulnerable populations (PROOF, 2018; Rothman, 2007).

#### Possible Actions:

- Make strategic investments to incorporate short and long term food security considerations into planning and design of subsidized housing developments (Vancouver Coastal Health, 2008)
- Strengthen social assistance programs such as effective child benefits, accessible early learning and childcare support, living wages etc (Brown & Tarasuk, 2019)
- Improve access to education and training such as student financial assistance programs



## Strengthen regional supply chain networks to improve access of British Columbians to locally produced products

We commend the B.C. Food Security Task Force for highlighting the importance of strengthening regional food systems by connecting regional producers and consumers. We believe that doing so can substantially improve economic, environmental and societal wellbeing (Mullinix et. al., 2016). However, given the export-oriented nature of the dominant food system, barriers to getting locally-produced food to local consumers exist throughout the supply chain. These include, but are not limited to, an absence of appropriately-scaled processing infrastructure, market consolidation across the supply chain, and prohibitive conditions to enter in the retail sector (Grube-Cavers et al., 2018; Stahlbrand, 2017; Steinman, 2019). As such, increasing agricultural production, through agritech innovations or otherwise, will likely be an insufficient intervention to increase availability of locally-produced food. Pursuing this outcome requires addressing barriers across the food supply chain to strengthen regional food systems.

### Possible Actions:

- Support the development of appropriately-scaled processing facilities (slaughter/cut and wrap, canning, freezing, etc.) through funding, policy development, and regulatory reform
- Review policy to ensure an appropriate balance between safety, traceability, and ability of local producers to access the local market.
- Develop policy to facilitate public institutional procurement of local food
- Support the development of cooperatively owned infrastructure and businesses, including grocery retail

## Support provincial and regional research and food system data collection to improve understanding of current trends and needs of the sector and inform policy development

Increasingly, the food system is being recognized as a complex network of processes that impact our communities and environments in multiple ways. As such, food system policy and planning approaches must be integrated across a breadth of previously siloed domains, including, agriculture, trade, local economic development, community health, poverty reduction, ecological integrity, and beyond. Support for interdisciplinary food system research and data collection, particularly at the local-regional level, can help inform policy by improving our understanding of current trends and linkages between food system domains and outcomes. As an example, the Winnipeg Food Atlas has been developed as an open access database integrating neighbourhood-level information on food retail environments, household income, demographics, and health indicators. The database reveals relationships between food access, health, nutrition, income and demographics for a more comprehensive understanding of the food environment and more informed policy development (Winnipeg Food Atlas, 2020). As another example, the City of New York expands their food metrics reporting each year as a critical tool for understanding the implementation of city-level food initiatives (Freudenberg, Willingham, & Cohen, 2018). By expanding the capacity for consistent, local level data collection, the city has been able to measure the impact of new initiatives, and develop policies, and strategies that respond to changing dynamics of their food system.

### Possible Actions:

- Develop province-wide, multidisciplinary food system indicators and monitoring programs
- Support local governments in efforts to collect and report on local level food systems data

## CONCLUSION

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The Future of B.C.'s Food System report, released by the B.C. Food Security Task Force puts forward that a substantial and singular focus on an expanded agritech sector can 1) increase food security, 2) improve mitigate and adapt to climate change, 3) boost the availability of local food, and 4) increase the profitability for B.C. farmers. While the thoughtful application of appropriate technology can play a role in improving agricultural practices and food system outcomes, this response notes that the capacity of technology-intensive approaches, such as vertical farming, cellular agriculture, or robotic farming, has a limited capacity to meaningfully advance these goals. We have prepared this response to caution against advancing an agritech vision for our food system as the primary mechanism for sustainability, prosperity and productivity in the food system. Additionally, we suggest that a narrowly-focused agritech vision can overlook critical avenues of support needed for ongoing initiatives, and policy development across the food system that, if pursued, could more meaningfully and genuinely advance these important goals.

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