



Agritech Today, Building for Tomorrow

Findings and Actions to
Strengthen the Sector in the
Metro Vancouver region

April 2022

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With healthy support for the agritech sector, particularly at the early-stages, the next big challenge for the region is to create an environment where the many agritech start-ups can scale-up successfully.

About Us

Invest Vancouver is the Metro Vancouver region's economic development leadership service, created to advance broadly shared prosperity for all residents of the region. This report has been prepared by Invest Vancouver, which offers independent, objective research, analysis, and economic development and policy recommendations crafted to position the region for success in a rapidly evolving global economy, where capital is highly mobile and where firms have many choices about where to locate. The aim of the report is to provide actionable intelligence that will better inform and guide the strategic work of Invest Vancouver itself, as well as the work of key decision makers.

Many factors contribute to the quality of life in the Metro Vancouver region (See Figure 1). Invest Vancouver's mandate is to focus on prosperity through catalytic investment attraction and strengthening the region's value proposition and overall competitiveness in key industries. Invest Vancouver recognizes the interconnectedness of components such as: health and social determinants; and the environment in contributing to the Metro Vancouver region's unique quality of life that we all enjoy and is in itself a key differentiator when compared to other economic regions.

Invest Vancouver is a service of the Metro Vancouver Regional District, operating on behalf of the Metro Vancouver regional economy and the 2.7 million residents who depend on it.

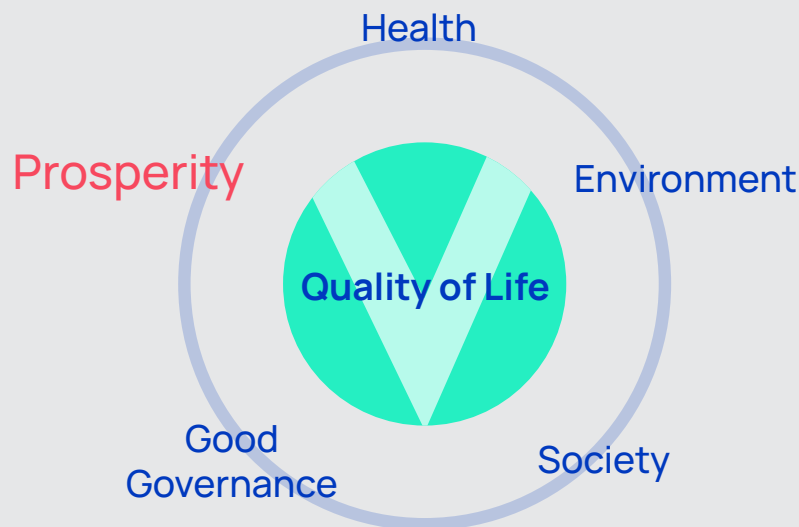


Figure 1 Quality of Life Components (Adapted from Measuring What Matters: Toward a Quality of Life Strategy for Canada, 2021)

Agritech Sector at a Glance

The world urgently needs more resilient, efficient, and environmentally friendly food systems and there is broad scope for innovation in the production, processing and distribution of food. While the Metro Vancouver region has opportunities in both

agritech (i.e., technological solutions focused on the farm sector) and foodtech (i.e., innovation in food processing and food products), this report focuses exclusively on agritech.

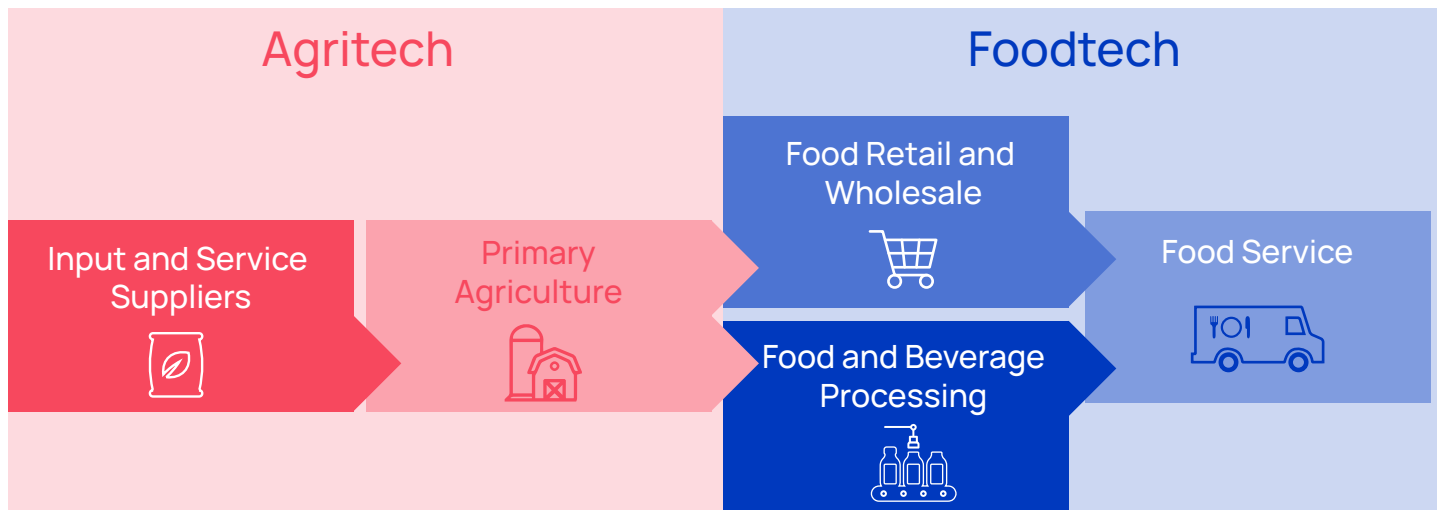


Figure 2: Technology and the Canadian Food System¹

¹ Adapted from: "Overview of the Canadian agriculture and agri-food sector 2018," 2020, Government of Canada.

What is agritech? Technology and technological innovation in the farm sector with the aim of improving production, profitability, and sustainability.²

The Metro Vancouver region has four distinct areas of focus in agritech: animal ag, ag biotech, precision ag, and indoor farming.

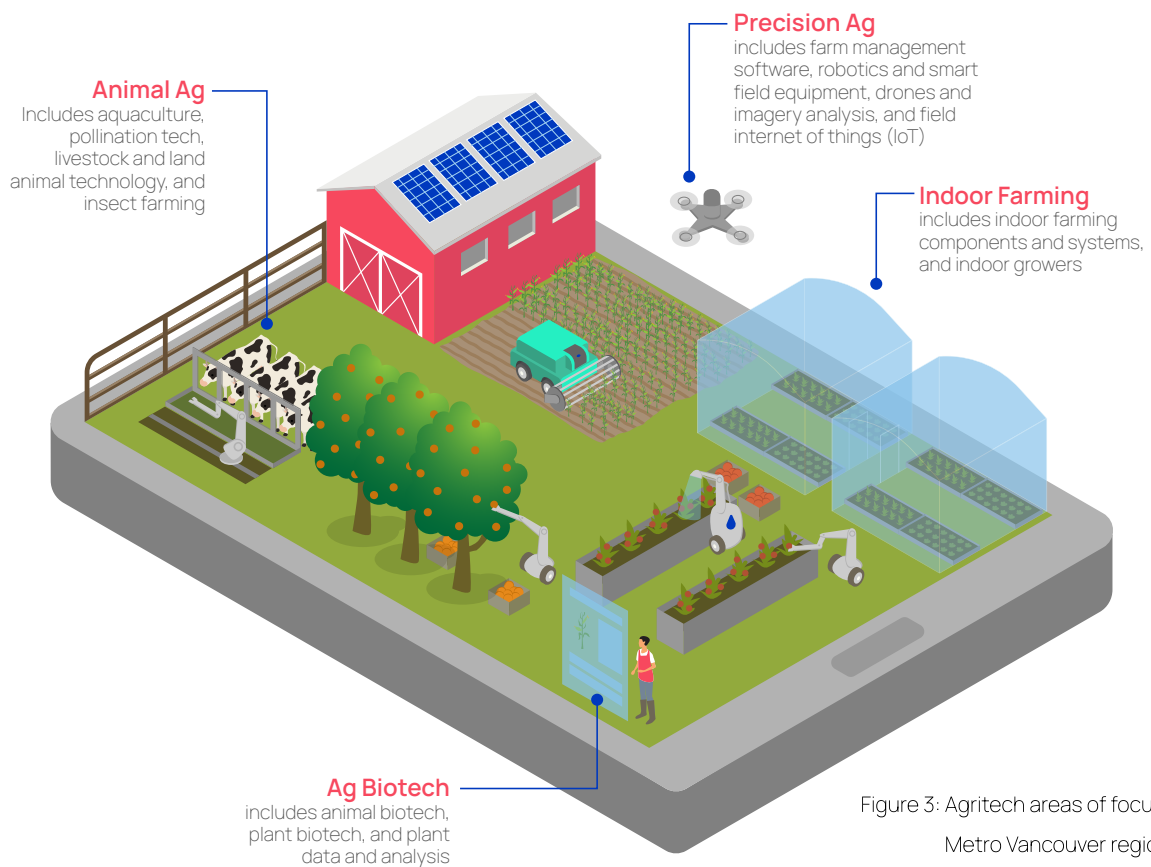


Figure 3: Agritech areas of focus in the Metro Vancouver region

Firms in the agritech sector in the Metro Vancouver region are:

- **Young**, with approximately one-third of the firms under five years old, and **growing**.
- Directly drawing upon, and emerging from, the region's robust **innovation ecosystem**.
- Benefitting from **readily available sources of early-stage funding** and **generous tax credits for investors**.
- Taking advantage of **small-scale demonstration opportunities** that are available thanks to the diverse range of agriculture in British Columbia (BC).
- Looking to the US and elsewhere overseas for **export opportunities**.

² Adapted from the Government of BC's agritech definition (see: Trade and Invest BC Agri Technology)



Recommendations Summary

Invest Vancouver conducted primary and secondary research to understand the strengths of the agritech sector in the Metro Vancouver region and to learn about the challenges faced by the sector's entrepreneurs and firms. The following recommendations aim to address identified gaps, to strengthen competitive advantages, and to bolster the value proposition of the agritech sector in the region.

Theme	Identified Challenge	Recommendation
Ecosystem Building	The BC ecosystem of agritech players is disconnected, without an industry-wide support system or networking organization, leaving limited opportunity for firms to connect with one another, with farmers, with investors, with new markets and with potential customers.	Establish the necessary relational infrastructure, such as an agritech industry association or support mechanism focused on strengthening the sector, possibly as part of the Agritech Centre of Excellence.
Technology Adoption	Farmers often lack the capital to invest in new technologies, which slows the technological adoption rate and negatively impacts demand for BC agritech solutions.	Fund an easy-to-access government grant program that enables farmers to adopt made-in-BC agritech products and services.
Manufacturing and Prototyping Support	A manufacturing gap exists between the early-stage development of proof-of-concept designs and the design-for-manufacturing-stage, where production ramps up by several orders of magnitude; this gap lengthens product development times and acts as a barrier to firms scaling up.	Create fast-prototyping and small-scale manufacturing capacity, including shared facilities, for use by entrepreneurs, inventors, and start-up-, early- and development-stage firms looking to scale up in the region.
Start-up and Scale-up Technical Assistance	Information on starting a business is difficult to find and existing information is not targeted to the needs of agritech start-ups.	Improve the content and accessibility of information on starting and scaling tech-based businesses by consulting with start-ups to ensure available information addresses their needs.
Export Assistance and Readiness	Navigating exports and other cross-border issues is challenging (and/or expensive), especially for early-stage agritech firms that do not qualify for existing programs but depend on the US and other markets for export opportunities and their customer bases.	Develop a "how-to export" guide for small early-stage firms.
New Market Access	Connecting with larger (potential) customers is vital for firms looking to scale-up, but opportunities for early- and development-stage firms to find these customers can be difficult, time-consuming, and costly.	Introduce an initiative to provide business-to-business matchmaking services for BC-based agritech firms. Lead BC agritech business missions to key markets and showcase BC agritech solutions providers at international trade events.
Talent Pipeline and Occupational Analysis	The transferability of in-demand skills between several high-growth sectors in the region's economy means that agritech firms are competing for and losing talent to "technology giants" and expanding life sciences firms in the region.	Investigate the future talent and skill requirements for the BC agritech sector, in conjunction with the requirements of other high-opportunity, high-growth sectors.



Report Overview

Introduction

The world urgently needs a more resilient and secure global food system to contend with myriad challenges arising from a changing climate, supply chain disruptions and labour shortages. There is broad scope for innovation that improves efficiency and sustainability in the production, processing, and distribution of food along the entire value chain that connects farms to consumers. The Metro Vancouver region is poised to benefit from and contribute to the emergence of these improved food systems.

For example, indoor farms in the Metro Vancouver region could reduce greenhouse gas (GHG) emissions stemming from long-distance food transportation by substituting locally grown leafy greens for those from California. More compact supply chains with shorter cycle times are often less vulnerable to disruptions,

such as those created by pandemics, and climate-controlled crop production may be more resilient in the face of increasingly frequent extreme weather events caused by climate change. Plant-based pest control can reduce the need for chemical pesticides. Innovative fertilizers can reduce the harmful runoff while shrinking a farm's carbon footprint. A combination of sensors and data science can be used to monitor crops, and with digitally controlled technology, increase efficiency by directing water and nutrients only where and when they are needed. Robots will expand the century-long trend of automation and other capital-labour substitution in agriculture, for example, by greatly reducing the need for hand-based harvesting of delicate fruits and vegetables. Such technological innovations, variously described as "agritech" and "agtech", are the subject of this report.

The first half of the report (including the rest of this section) lays out the key research questions and the methodology to address them; describes the sectoral and geographical boundaries for the investigation; characterizes the collection of firms comprising the sector in the Metro Vancouver region; surveys the innovation ecosystem underpinning the sector's emergence; highlights capital investment and formation; and identifies important investors, sources of funds, and programs. The second half of the report summarizes the research findings and suggests recommendations to address pressing gaps in the sector.

Image: LucentBioSciences

Questions to be Addressed

Invest Vancouver seeks to answer two fundamental questions related to the developing agritech sector in the Metro Vancouver region:

1. What competitive advantages (if any) do firms in the industry enjoy by locating here?
2. What challenges or barriers (if any) keep the region from being a more attractive place for agritech firms?

Answering these questions is critical for economic development, public policy, industry and labour associations, and education and workforce development decision-makers. A purely statistical approach, such as an industry contribution analysis, only provides an estimate of economic, job, and fiscal impacts of firms in the sector at a particular point in time. However, industry contribution analyses do not address competitive advantages or barriers. Indeed, there is no quantitative approach that will zero in on the answers to the two questions listed above. Qualitative research methods such as interviews, on the other hand, allow for a more nuanced understanding of regional competitive advantages and shortcomings based on the insights and experiences of key players in the sector.

Methodology

Invest Vancouver conducted in-depth interviews with chief executives (CEOs), founders, and senior executives from almost half of the region's agritech firms. Prospective interview targets were drawn from Invest Vancouver's preliminary mapping exercise, which was conducted to understand the scope, scale, areas of focus, and regional distribution of key industries in the region. Specific firms were identified for inclusion by examining and classifying job data aggregated by Emsi Analyst and by querying the PitchBook database of firms. The list was supplemented using industry resources and relevant

news articles, suggestions from members of the Invest Vancouver Advisory Committee, and referrals from other interviewees.

Further valuable information was collected in interviews and discussions with government representatives, academic intuitions, accelerators, capital providers, and others providing support to the agritech sector.³ These included: the BC Ministry of Jobs, Economic Recovery, and Innovation; the BC Ministry of Agriculture; the National Research Council of Canada; 4D Labs at Simon Fraser University (SFU); entrepreneurship@UBC; in-region research universities and academic institutions; and agritech angel investors, general partners (GPs) managing agritech-focused investment funds, and agritech industry consultants.

Each of these semi-structured interviews lasted an hour or more, and consisted of a number of pre-determined areas and questions to be explored, including business climate, supporting infrastructure, physical spaces, capital access and formation, workforce and labour markets, network organizations, research and development (R&D) competencies, supplier connections and concentrations, and customer access and catchment. Interviews were allowed to unfold naturally in order to pursue an idea, line of inquiry, or response in more depth. This approach enabled the discovery or elaboration of information relevant to answering the research questions stated above, and also the uncovering of information that may not have been previously recognized as pertinent. Findings in the report were anonymized and, as such, were not attributed to specific individuals or firms to encourage candid responses and forthright discussion.

The final phase of the study included the evaluation of the collected data, the formulation of findings, and development of recommendations. Recommended interventions and strategies aim to address identified issues, constraints, and opportunities for improvements.

³ The research is further informed by "The Future of B.C.'s Food System: Findings & Recommendations from the B.C. Food Security Task Force" (2020), "British Columbia Agricultural Technology & Innovation Sector Labour Market Study: Part 1: Applied Sciences" (January 2022), and "AgFunder 2021 AgriFoodTech Investment Report" (2021).



The Agritech Sector in the Metro Vancouver Region

Defining Agritech

This report covers agritech in the Metro Vancouver region. While there is not yet a clear, universally-accepted classification of (or name for) agritech, Invest Vancouver focuses on **technology and technological innovation in the farm sector that aims to improve production, profitability, and sustainability**. This definition excludes the fish sector and innovations in food processing and food products (often described as “foodtech”), for investor-centric and jurisdictional reasons.

Invest Vancouver’s mandate includes attracting investment to the region; therefore, an “investor-centric” lens is applied when analyzing the region’s key industries. This lens suggests differentiating agritech from foodtech, which encompasses, for example, bio-engineered food products, such as alternative meats, and technologies that reduce the resource-intensity of food processing. Investors often distinguish the two because foodtech, particularly consumer-facing foodtech, has different branding and distribution requirements. From an economic development standpoint, too, agritech and foodtech firms likely face different barriers, most notably in their respective land use needs. Thus, foodtech is worthy of a separate in-depth investigation to fully appreciate its unique opportunities and challenges and is not covered here.

Invest Vancouver’s role as the economic development leadership service for the Metro Vancouver region narrows the research focus to the firms located in the region. The fish sector, critically important in BC, is excluded, as most aquaculture activity in the province takes place outside the region. Similarly, the geographically-adjacent Fraser Valley, with its economic base firmly rooted in agriculture, is a natural fit for agritech, but firms based there, being outside of the Metro Vancouver region, were not solicited to take part in this research process. Nevertheless, while the report addresses barriers currently faced by agritech firms in the region, the recommendations will undoubtedly strengthen the sector province-wide.



Image: Terramera – Research Associate in the Lab

Characteristics of Metro Vancouver's Agritech Sector

The regional agritech sector has a concentration of small, early-stage firms; approximately one-third of the identified firms have been operating for fewer than five years. These early-stage firms are poised for growth and have benefitted immensely from the local innovation ecosystem, including research universities and accelerators, and readily available sources of early-stage, non-dilutive capital (i.e. sources of capital that do not require the firm to give up equity ownership).

Further along the maturity scale are the agritech sector's two better-known success stories, Terramera Inc. (Terramera), a developer and manufacturer of agriculture technology platforms and pesticide products, and SemiosBio Technologies Inc. (Semios), a developer of a real-time agricultural data analytics platform. Both companies are mid-sized (by employment), with over 100 (but fewer than 500) employees each; both have acquired other agritech firms, and both have generated enough international interest to put BC's agritech sector on the map. After a successful funding round of \$100 million in 2021, Semios became a unicorn (i.e. a privately held company with a valuation of over \$1 billion). Anandia Laboratories Inc. (Anandia Labs), a cannabis genomics company acquired by Aurora Cannabis Inc. in 2019 for approximately \$119 million, is another local success.

While a majority of the agritech firms in the region have direct or indirect ties to regionally-based academic institutions, there are currently no agritech-focused university programs in the region, although an undergraduate agritech program is under development at SFU. Nonetheless, the sector draws on the robust talent emerging from the region's high-tech, life sciences, and engineering university programs, and the resulting labour market and pools of talent. This also means that the region's agritech firms are most often applying technology to an agricultural problem, without necessarily having an agriculture or farming background; in the Metro Vancouver region, the emphasis is on the 'tech' in agritech.

Due to this tech focus, challenges around growing practices and permitted uses of agricultural land in BC were not raised as barriers to agritech firms in the region. While issues around allowable uses of farmland and the region's capacity to process food are critically important, agritech firms (as defined above) are focused on the development of technological solutions to be exported globally. Uses of Agricultural Land Reserve (ALR) land (protected farmland in the province) was not raised as a topic of concern for agritech firms in the region. Indeed, a recent provincial amendment to the ALR Use Regulation, clarifying that ALR land can be used for vertical farming, has sent positive signals to BC's agritech firms focused on indoor farming.





Image: Lucent BioSciences

With respect to the agritech labour market, thriving high-tech, including software and hardware providers, and life sciences sectors in the region and agritech firms overlap in terms of in-demand skills. The implication is that agritech firms are drawing from and thus competing for talent with larger players from other industry sectors in the region that can often offer far higher salaries than what an early- or development-stage agritech firm can afford.

Agricultural expertise notwithstanding, founders in the region reported being driven by personal values, including the importance of local, sustainable food and the need to find solutions to improve the resilience of food systems, particularly in the wake of BC's recent climate-related events.

At present, BC's market for agritech is small, diverse, and highly regulated. The market is small enough that some agritech firms have opted not to target the Canadian market at all, focusing instead on export opportunities. Firms also reported that federal regulations in areas such as pesticides make the Canadian market a challenging one to enter. Even so, the region, along with BC more broadly, offers a favourable growing climate for a wide variety of

agricultural products. This diversity in production, along with willing agricultural partners, allows for an ideal "test bed" for emerging technologies in a range of applications, from livestock to viticulture.

The region's agritech sector is increasingly attracting private capital and investors, both from within Canada and globally. With healthy support for this sector, particularly at the early-stages, the next big challenge for the region is to create an environment where the Metro Vancouver region's many agritech start-ups can scale-up successfully. Interest from financial institutions and social impact investors who want to invest in firms that score highly on ESG (environmental, social and governance) criteria means that BC-based agritech firms may have a competitive advantage over global counterparts due to their focus on environmental stewardship and sustainability, access to clean sources of energy, high-quality water, and opportunities to partner with First Nations and Indigenous communities.

Agritech Firms

Within the Metro Vancouver region, firms can be categorized into the following four areas:

Ag biotech | Animal ag | Indoor farming | Precision ag

Ag biotech includes animal biotech, plant biotech, and plant data and analysis, which reflects the region’s data science strengths. Additionally, the life sciences industry extends into this area through areas such as the application of human therapies to animal husbandry.

Animal ag encompasses aquaculture, pollination tech, livestock and land animal technology, and insect farming, though only the latter is represented in the region (so far).

Indoor farming includes indoor farming components and systems, and indoor growers. Vertical farming is a subset of indoor farming, and this entire category is well-represented in the region.

Precision ag is another strong category in the region, encompassing farm management software, robotics and smart field equipment, drones and imagery analysis, and field internet of things (IoT).

Invest Vancouver identified more than 30 export-oriented agritech firms (i.e. they either sell or potentially could sell their products or services outside of the region) across the region.⁴ As firms grow, their activity not only provides a significant economic contribution, with economic, job, wage, and fiscal impacts that flow back to the region, but their presence also contributes many community development impacts on the municipalities in which they are located, as these firms and their employees become part of the local social and community fabric.

The median employment among agritech firms headquartered in the region is 13 full-time employees. Figure 4 lists firms in each agritech category in the region.

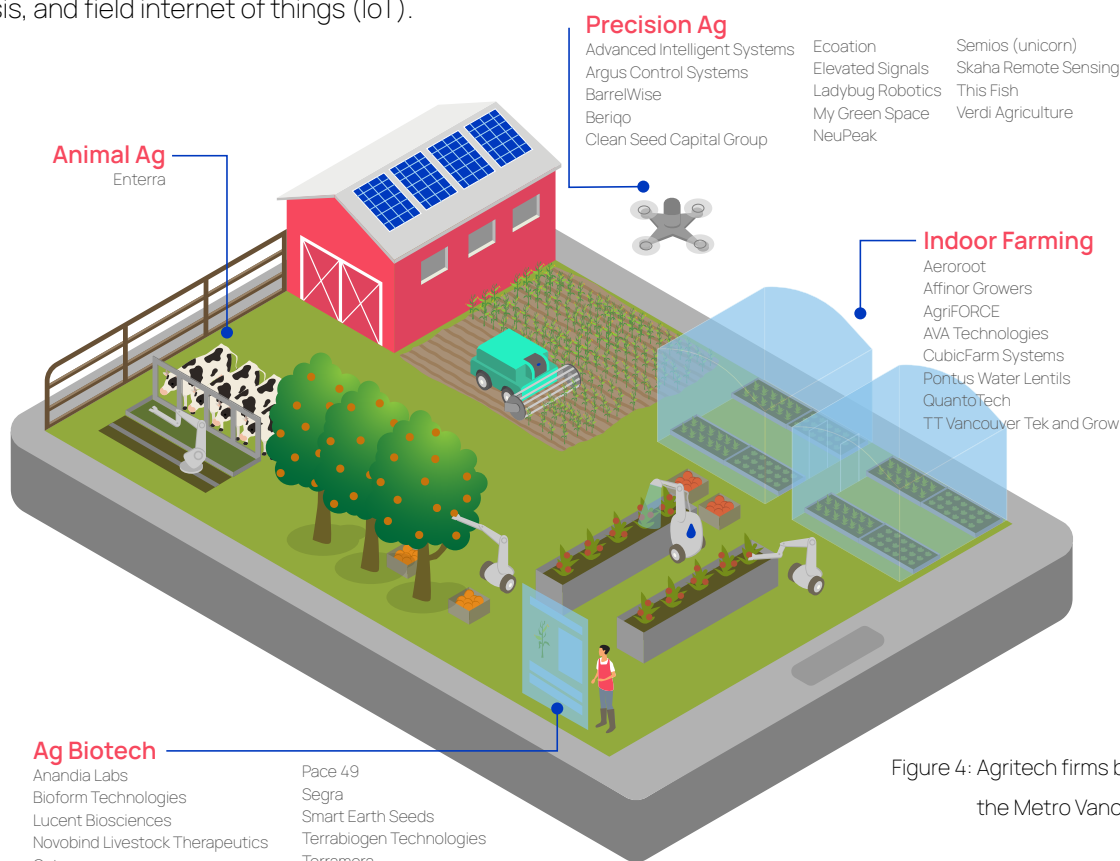


Figure 4: Agritech firms by category in the Metro Vancouver region

⁴ The BC Government, which, as described earlier in this report, uses a more expansive definition of agritech that includes the adjacent food processing and fish sectors, has identified approximately 150 agritech firms province-wide.



Factors Supporting Sector Development and Growth

Agritech Innovation Supporting Institutions

The region's agritech sector draws upon, and emerges from, the existing innovation ecosystem. Firms have strong ties to research universities and institutions, along with a mix of incubators, entrepreneurship programs, and accelerators. The precision ag category has considerable overlap with the region's existing technology sectors. Similarly, the region's life sciences sector underpins and propels the ag biotech sub-sector within the region's broader agritech sector. A majority of interviewed firms directly attribute their existence to one or more of the regional innovation supporting institutions shown in Figure 5.

Additional supporting institutions are under development and will come online soon. As previously mentioned, SFU is developing an undergraduate

program in agritech. As well, in February 2022, the Government of BC announced the creation of an Agritech Centre of Excellence to assist agritech firms to grow and scale-up. Activities are slated to include R&D, piloting, commercialization, incubation and mentorship, in addition to connecting with industry and providing partnership opportunities with First Nations and Indigenous communities.

Similarly, the recently announced SFU Agritech Innovation Sandbox (AGIS) seeks to empower and connect scale-ups and small- and medium-sized enterprises (SMEs) with agritech stakeholders to identify and address critical challenges. AGIS focus areas include: AgTech projects, skills development, and the formation of a BC AgTech Network.

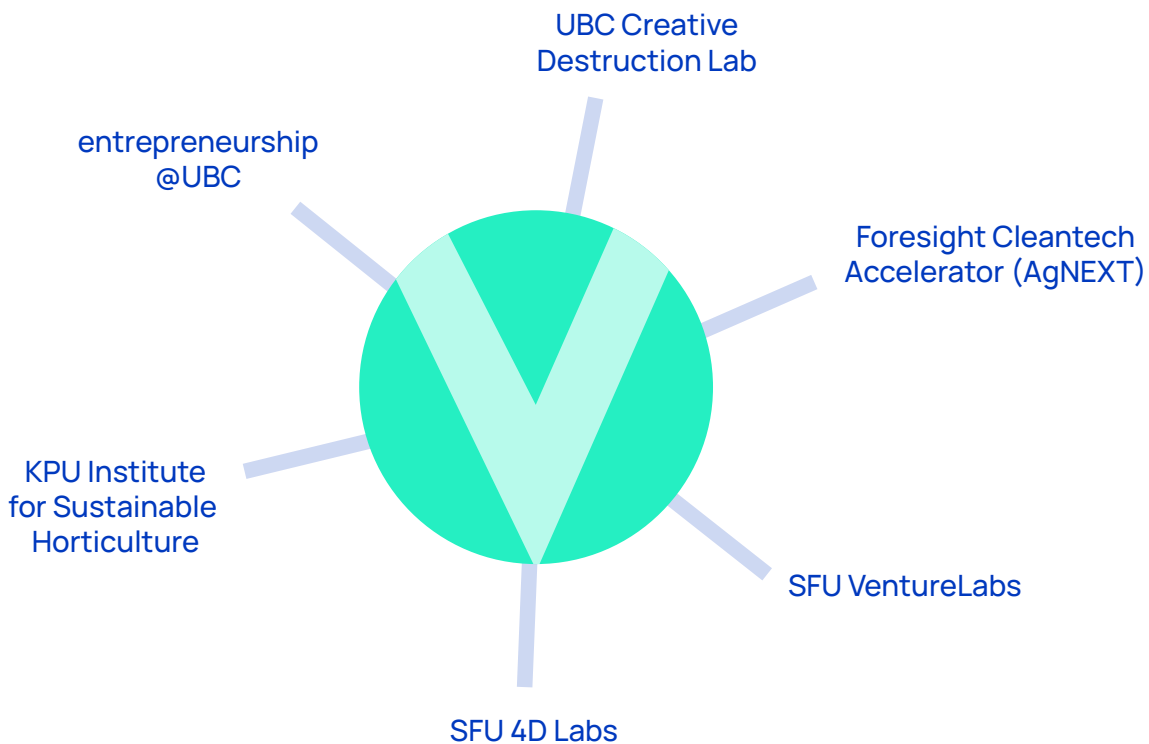


Figure 5: Agritech Innovation Supporting Institutions

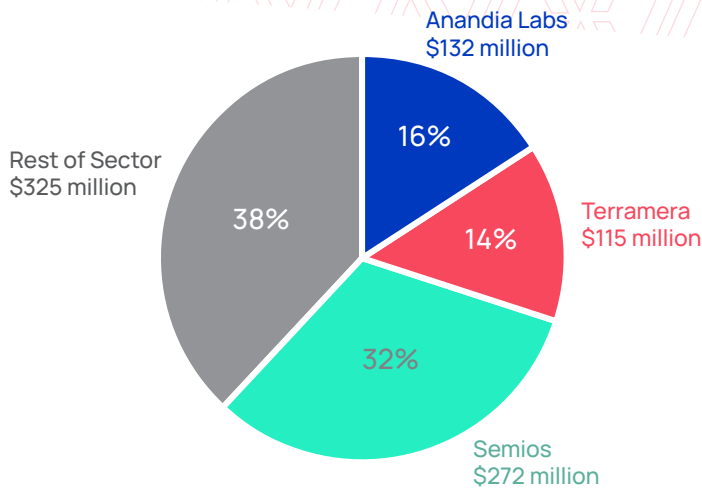


Figure 6: Capital Investments in Agritech 2017 to 2021
(Source: PitchBook 2022)

Agritech Capital Formation & Investment

With mounting stresses on food systems, global investors including corporate and sovereign wealth, hedge, private equity, and venture funds are recognizing that the agricultural sector is ripe for innovation and disruption. The Metro Vancouver region's agritech sector attracted over \$844 million of capital investment from 2017 to 2021.⁵

Figure 6 shows 62 percent (\$519 million) of the investment in the sector went to the three largest players: Anandia, Semios, and Terramera. Of the \$325 million directed to the rest of the sector, over 80 percent (\$260 million) was directed to just five firms, while the remainder (\$64 million), was split among 17 others.

Breaking down investment activity during the period by agritech category, ag biotech and precision ag each attracted 42 percent of the total, and the remaining 16 percent went to indoor farming. Figure 7 presents regional highlights from agritech deals in 2021.

2021 Deal Highlights

- \$100m** SemiosBio Technologies Inc.
- \$30m** Terramera Inc.
- \$27m** Ecoation Innovative Solutions, Inc.
- \$25m** Ostara Nutrient Recovery Technologies Inc.
- \$27m** CubicFarm Systems Corp.

Figure 7: 2021 agritech deal highlights
(Source: PitchBook 2022)

Direct and indirect government funding has helped advance the agritech sector. Interviewees reported benefitting from readily-available sources of non-dilutive capital from both the provincial and federal governments. **Almost one-third (29 percent) of the agritech firms in the Metro Vancouver region have received some form of grant funding in the past five years.**

Indirect support has come from BC's Venture Capital Tax Credit Program, which offers investment tax credits to both individuals and corporations residing in the province and was highly praised by investors interviewed by Invest Vancouver.

The next section provides additional information on the sources of non-dilutive capital, agriculture-specific venture capital funds, and other sources of agritech sector support.

⁵ All dollar values in this section are from PitchBook.

Notable Agriculture-Specific Capital Funds Active in Canada

Emmertech is a \$60 million venture capital fund focused on agtech and agribusiness innovation, managed and operated by Conexus Venture Capital Inc.

THRIVE by SVG Ventures invests, accelerates, and helps entrepreneurs scale globally to solve the biggest challenges facing the food and agriculture industries.

The51 Ventures Food and AgTech Fund invests in those who are at the forefront of innovation in Canada's agriculture sector yet are statistically underfunded: women-led and diverse founders.

Sources of Non-Dilutive Capital

AgriScience Program (federal) aims to accelerate the pace of innovation by providing funding and support for pre-commercial science activities and cutting-edge research that benefits the agriculture and agri-food sector and Canadians.

Agritech Grant Program (provincial) is a \$7.5 million program providing one-time funding to B.C.-based agritech or technology companies, agriculture producers or agrifood companies. The funding supports the increase of domestic food production and stimulates the development and testing of technologies.

BC Fast Pilot Program, delivered in partnership between Innovate BC and NRC IRAP, helps regional small- and medium-sized enterprises (SMEs) design, build and operate a pilot plant or small demonstration of their technology in real-world conditions.

Sustainable Development Technology Canada Clean Tech Fund provides funding for promising clean technology development and demonstration projects that are start-ups or scale-ups and includes an agriculture-specific stream.

Other Sector Support

Agritech Concierge Program (provincial) provides government support for agritech businesses to grow, diversify, access new markets and attract investment opportunities.

Agritech Ramp-up Pilot Program, delivered by the Investment Agriculture Foundation, supports the growth of BC's agritech sector through the provision of a cohort-based business support program.

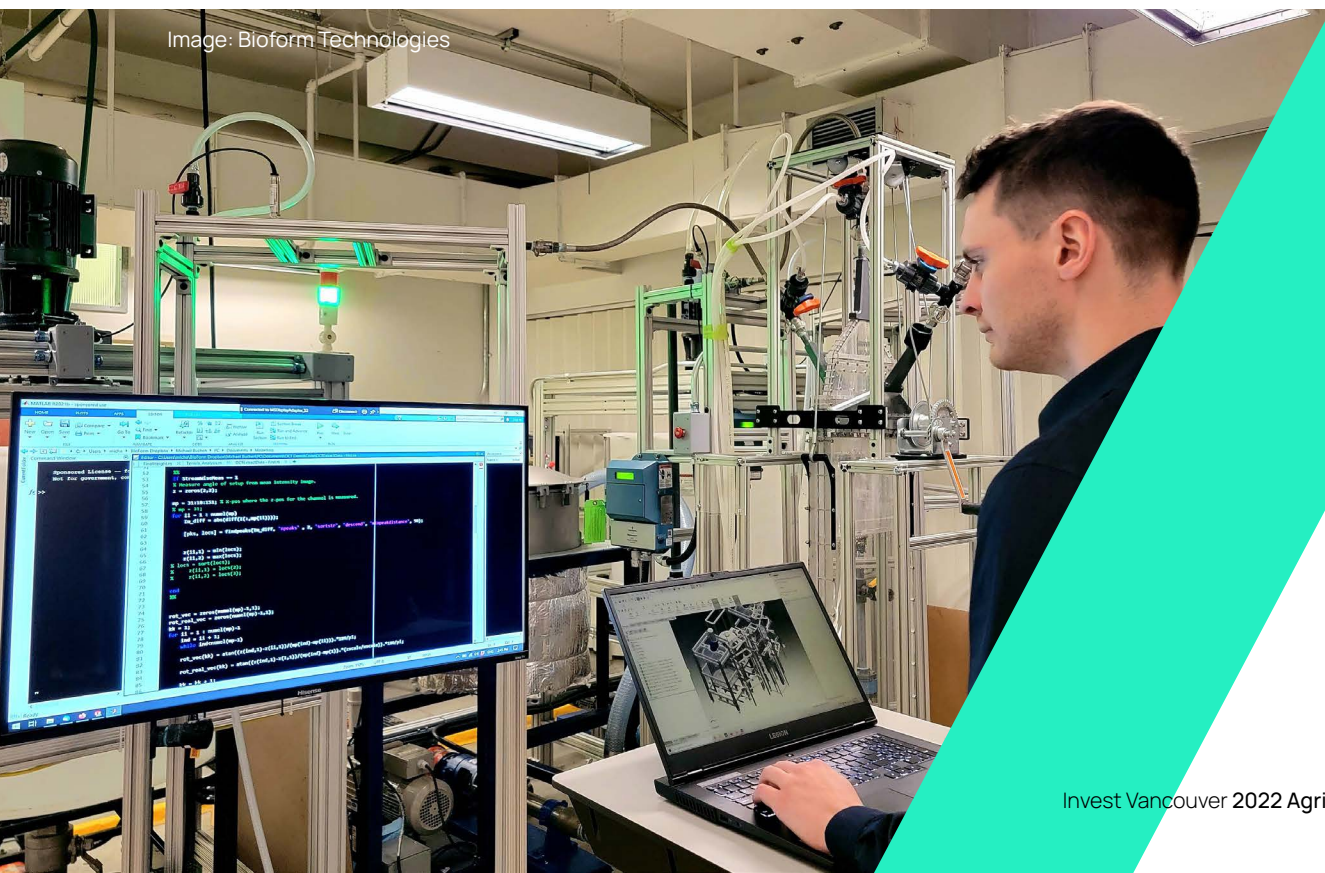
Investment Agriculture Foundation is an industry led, not for profit society that creates funding opportunities to support a thriving BC agriculture and agri-food sector through the effective delivery of programs.

Mitacs provides businesses with one-to-one support finding matching funding and talent to help solve organization's research challenges.

The National Research Council of Canada Industrial Research Assistance Program (NRC IRAP) is Canada's leading innovation assistance program for SMEs helping to build innovation capacity by providing financial assistance, advisory services and connections to the best business and R&D expertise in Canada. Participants do not need to qualify for funding in order to receive other services.

Scientific Research and Experimental Development (SR&ED) tax incentives are deployed to encourage Canadian businesses of all sizes and in all sectors to conduct R&D in BC and Canada.

Image: Bioform Technologies



Findings and Recommendations

Growth in agritech depends to an uncomfortable degree on happenstance and luck. Decision-makers should note that the presence in the region of many of these firms, particularly in agritech, has been frequently attributed to the founders being here, often for university. For example, interviewees reported creating firms out of projects in the engineering physics program at UBC, post-doctoral work at SFU, and similar endeavours. The good news is that the local ecosystem of research universities and accelerators is proving fertile ground for the creation of start-ups. The implication, however, is that many firms are here for personal rather than business reasons. Love for the Vancouver lifestyle is admittedly a powerful draw, but the high cost of living, particularly for housing, as well as real or perceived barriers to scale up their business due to an unfavourable business environment, could weaken the commitment to the region, particularly if there are compelling business reasons to locate elsewhere.

Luck seems to play a surprisingly prominent role in overcoming the hurdles of growing a business. Interviewees frequently described “feeling lucky” to have found lab space, to have met a particular advisor or to have received a particular grant. While good luck is always welcome, the recommendations that follow are intended to foster conditions where firms in the agritech sector need a little less luck to succeed.

Ecosystem Building

Findings:

To become a leading centre for agritech, the Metro Vancouver region needs to go beyond R&D, incubation, and commercialization to develop high-quality relational infrastructure to support the sector. Today, the local agritech ecosystem can be seen as a “grab bag” of specializations from other industries, connected only by a shared application to agriculture. There is not yet a clear industry champion, or even an industry-focused association.

Interviewed agritech investors, such as venture fund GPs, described the need for tighter integration within the sector, better information exchange and feedback loops between firms, investors, government, accelerators, and educators, and “a unifying glue” to bring the disparate pieces together. Interviewees, both firms and investors, also pointed to the need for a relationship map of the industry players, along with more opportunities to make new connections. Currently, agritech entrepreneurs and start-ups are, for the most part, only connected to the research universities from which they originated or to the accelerators (often multi-sector) in which they participate. For the sector to thrive, firm-to-firm and firm-to-support cluster connections are needed, too.

There are many potential benefits to enhanced and richer connections between agritech firms. Such connections encourage information sharing and may lead to transactions such as mergers, joint ventures, and partnerships, that provide the economies of scale and resource leveragability necessary to scale agritech firms. Connections between firms in the industry (or adjacent, complementary industries) can also foster the cross-pollination of ideas and create a reinforcing cycle where skilled workers are drawn to a region's concentrated network of firms and the related pooling of talent, and new firms are attracted to or created from the collected pool of talent. One interviewee lamented the lack of comradery between agritech firms, which is often exacerbated by the need to compete against one another for available talent.

A stronger ecosystem would also help make connections between agritech firms and the farmers and food processors that are their primary customers. Since agritech firms frequently emerge from projects in the high-tech, engineering, and life sciences fields, their founders do not necessarily have much (or, indeed, any) agricultural expertise. This means connections with farmers are essential for product development, testing, feedback, validation, and customization, along with collaboration, to ensure the resulting products and services solve real-world problems farmers would be willing to pay to address.

Recommendation:

Establish the necessary relational infrastructure, such as an agritech industry association or support mechanism focused on strengthening the sector, possibly as part of the Agritech Centre of Excellence

There needs to be a deliberate effort to intensify connections within the sector with relational infrastructure focused on strengthening the support and networking systems for firms at all stages in this space, keeping in mind that firms in different stages need different types of support. The immediate opportunity stems from the forthcoming provincial Agritech Centre of Excellence, which could undertake work in this area. Key initiatives might include:

- Providing networking opportunities for firms at all stages of development to connect and share ideas, intelligence, resources, and expertise
- Creating a network of post-secondary institutions to collaborate on agritech-related initiatives, such as talent development and applied research partnerships
- Hosting Metro Vancouver region-based investor conferences to establish BC as a place where agritech deals get done
- Connecting BC farmers with agritech firms to pilot new ideas and work towards developing exportable products or services that solve real-world issues
- Facilitating mentorship programs that connect early- and development-stage firms with firms that have successfully commercialized
- Partnering with First Nations and Indigenous communities to support new economic development opportunities in agritech such as vertical farming and commercial seaweed operations

An explicit, formal relationship between industry and the Agritech Centre of Excellence will make both stronger. While Invest Vancouver's scope covers firms within the region, building a strong ecosystem should extend beyond Metro Vancouver's regional borders and encompass connections and partnerships with agritech firms throughout the province.

Demand-Driven Agritech Solutions Supporting Technological Adoption

From afar, it is easy to assume that some combination of higher yields, greater efficiency, increased resilience to pests and extreme weather events, and automated alternatives to a fast-evolving labour market would spur rapid adoption of novel solutions developed by the agritech sector. Yet, farmers may be understandably reluctant to alter time-honoured practices, particularly when the alternative is new and commercially unproven.

Farmers in BC also face hurdles to adopting products and services being developed by the local agritech sector. Farms in the province are often small-scale, family-run operations and may have limited time and capital for experimenting with new technologies. The so-called “digital divide” also means that farmers in rural communities (including some that are not particularly remote) may lack the reliable high-speed internet access to integrate some of these technologies into their operations. As a result, agritech solutions face a slow rate of adoption.

The agriculture sector would benefit from more direct access to made-in-BC solutions, and agritech firms would benefit from additional opportunities to test their products in a real-world setting, to secure initial customers, and to incorporate product feedback from paying customers; thus improving commercial viability and market potential. The current process for connecting start-ups and potential users – primarily “cold-calling” – incorporates, in the words of one interviewee, “all the worst parts of telemarketing”. Instead of unsolicited calls from firms they’ve never heard of or with whom no prior relationship has been established, farmers and growers could opt-in to a government-supported program that could be mutually beneficial.

Recommendation:

Fund an easy-to-access government grant program that enables farmers to adopt made-in-BC agritech products and services

A grant program would de-risk the choice to try something new while spurring demand for BC agritech products and services. Farmers who elect to opt-in to the program could use the funds to purchase early-stage BC technologies that meet their needs. Allocating the funds through farmers has two important advantages. First, it shifts the burden of identifying winning solutions from a government looking to support the development of agritech to the actual end-users, increasing the likelihood of rewarding the most viable, market-driven solutions. Second, it prioritizes real-world needs in agriculture by allowing farmers to decide which of their problems are the most pressing.

The grants should be administered through the existing Agritech Concierge Program, which was praised by interviewees for its “painless” access to funding. Keeping the administrative burden on farmers low would increase participation and speed the uptake of agritech products and service in the province.



Image: Semios

Developing Small-scale Manufacturing and Prototyping Capacity

Findings:

Agritech, along with other goods-producing or production-based sectors in the region, would benefit from the creation of shared spaces where firms developing a physical product could engage in rapid prototyping and small-scale manufacturing. A gap exists between the early-stage development of proof-of-concept designs created primarily in university labs and accelerators, and the design-for-manufacturing-stage where production ramps up by several orders of magnitude. Invest Vancouver heard from interviewees that firms struggle both to produce enough units for test deployments and then to rapidly incorporate changes in their designs based on the test results.

There is limited local capacity for rapid prototyping and small-run manufacturing in the region, and indeed, in Canada, with local firms looking to the US and China for the provision of these services. Working with Chinese firms, in particular, can stretch out product development cycles due to the time required for ocean shipping. While this problem is notable in the agritech sector, where many of the firms are young, similar challenges have been identified in the clean transportation sector, and are likely present in other goods-producing sectors.

Agritech firms might be expected to develop their own capacity for prototyping and limited-volume manufacturing. Yet, much of the necessary capital equipment is prohibitively expensive, creating a significant obstacle for young firms as they move from proof-of-concept to commercial viability. The challenge created by the cost of equipment is compounded by the lengthy development times for physical products, where it can be years before firms are generating revenue, much less income.

Accelerators see the repercussions of the lack of prototyping and limited-run manufacturing capacity in the form of firms “hanging on a little too long”, thus filling valuable accelerator spots, since there really is nowhere else for them to move to. Interviewees described informal arrangements for sharing spaces and costly equipment, sometimes across industries. Firms (temporarily) lease unused lab and warehouse space to each other, which is an effective stop gap but can leave the lessees in the lurch when the lessor needs the space again. Sharing specialized equipment depends on finding similarly situated firms with similar needs. There is room for a larger, more formal arrangement.

Recommendation:

[Create fast prototyping and small-scale manufacturing capacity for use by start-ups and development-stage firms looking to scale up in the Metro Vancouver region](#)

Inspiration for a fast prototyping and small-scale manufacturing space can be drawn from SFU's 4D Labs, where firms that need help with materials science get access to clean rooms, expensive test equipment, researchers, and even training for their employees at reasonable prices. The region needs “the dirty equivalent” of 4D Labs, a space that could host large, industrial-scale (and quality) 3D printers for additive manufacturing, metal and wood shops, surface-mount technology and printed circuit board capabilities, and other equipment required for fast prototyping. Something as simple as stocking an assortment of common parts (such as batteries and actuators) would allow entrepreneurs and firms to concentrate on innovating.

There are many possible business models for such a space, such as membership dues or rental fees. The space itself can be fairly rough; firms interviewed by Invest Vancouver in relation to the agritech sector and





Image: AVA Technologies

in the clean transportation sector (Invest Vancouver's last applied research project), expressed concern about being priced out of "fancy" developments. From a financial standpoint, the fast-prototyping and manufacturing space(s) must be accessible (low-cost) but also self-sustaining. An initial capital investment by the provincial government in facilities would overcome the barriers to entry created by the high cost of industrial land in the Metro Vancouver region. Under this type of model, operating costs would be covered and a modest return on investment generated by the fees paid by the firms using the space. Such an approach would free the government from having to pick potential winners from among early-stage firms; provide a necessary resource for firms in agritech and other industries; and potentially help multiple generations of firms. The user profile and needs of such a facility would make it an excellent candidate to demonstrate multi-story development as a means of intensifying industrial land use.

Creating a shared fast-prototyping and small-scale manufacturing space should be an element of the BC Government's Industrial Manufacturing Strategy, which is currently under development. The strategy must acknowledge and respond to the difficulties created

by the acute shortage of industrial land in the Metro Vancouver region, where the industrial vacancy rate is under one percent and industrial land is forecasted to reach an average of \$7 million per acre in 2022.⁶ The underlying land cost makes this a relatively safe investment because the initial land acquisition costs could always be recovered through a sale at a future date.

There is a huge gulf between established manufacturing companies and those start-up or development-stage SMEs looking to expand in or enter the market. Just as the housing market looks vastly different depending on whether one owns a home, the prospects for manufacturing in the region look very different for a firm that purchased land and built facilities 20 or more years ago, and a new firm looking for space to scale up. Since many of the region's competitive advantages appear to be in areas such as agritech, with high concentrations of new firms, any economic development or industrial capacity building strategy looking to capitalize on the talent and ideas generated in the region needs to help make scaling up possible, which often entails land and/or physical space expansion, relocation, and/or acquisition. While proposed in this agritech sector analysis, the availability of such space would be beneficial to many other production-based sectors as well.

6 Source: CBRE's 2022 Canadian Market Outlook (March, 2022)

Start-up and Scale-up Technical Assistance

Findings:

The agritech sector in the Metro Vancouver region boasts many young, growing firms navigating the routine challenges of getting a business up and running and trying to overcome the additional hurdles of bringing an idea from concept to commercialization. They could use help with both challenges.

First, consider the mundane steps required to get started, including registering and incorporating a business, opening a business bank account, getting a business license, registering for appropriate taxes, amongst other more technical, administrative business-related issues. These steps are required of any new business, regardless of industry, and should be as easy as possible, particularly for people who may be starting their first business. Information on these topics is available, but we heard from interviewees that it can be difficult to find, and is not always relevant or helpful.

Next, consider the challenges specific to launching a tech-based start-up, for which there is even less targeted information. Unsurprisingly, these firms have different needs than a local population-serving business, such as a bakery. Intellectual property (IP) protection, for example, an issue notable for its complexity and expense, was repeatedly raised as an issue of concern, despite programs intended to provide IP support.⁷

Recommendation:

Improve the content and accessibility of information on starting and scaling tech-based businesses by consulting with start-ups to ensure available information addresses their needs

In addition to improving ease-of-access to information on routine start-up matters, there needs to be detailed “how-to” guides for specific topics such as capital formation and IP protection. The resources and information provided by Small Business BC and others are not meeting the needs of tech-dependent start-ups, including those from the agritech sector. Existing resources need to be re-evaluated and updated, or new resources need to be created and publicized, to specifically target the needs of tech-based start-ups.

The mode of delivery matters, too. Invest Vancouver found that some information is only accessible to start-ups if they are enrolled in a program, pay for advisory services, or connect with government staff. This may not be an obvious obstacle, but for a start-up facing extensive costs and operating with limited funds, it presents a hindrance. To effectively support these firms, the relevant information should be available “at the touch of a button”, without additional constrictive steps required.

⁷ Firms were quick to point to the cost of patent protection, which averages between \$10,000 and \$20,000 in Canada alone, with further expenses for international markets. There is also the more general issue of IP strategy, an area where the National Research Council of Canada’s Industrial Research Assistance Program, for example, offers expert advice. The complex issue of protecting intangible assets is not unique to agritech, and efforts to develop an IP strategy for BC are underway through the Parliamentary Secretary for Technology and Innovation.



Image: Quanto Tech Solutions

Export Assistance and Readiness

Findings:

For many agritech firms in the Metro Vancouver region, their current or projected markets are elsewhere, whether on the Canadian prairies or in orchards in the state of Washington or strawberry fields in Southern California. The larger opportunities, and a more welcoming regulatory environment offered in the US, particularly in areas such as pesticides, mean that the focus of many local agritech firms will be on the markets south of the border. For many early-stage and small-scale firms, however, navigating cross-border challenges can be daunting.

Interviewees reported difficulties in easily finding the correct forms, for example, to take products into the US for field testing and commercial demonstrations. Firms described arriving at the border not knowing whether they had the correct paperwork and lacked the resources to pay customs brokers to complete the process on their behalf. CanExport, which provides SMEs with support gathering market intelligence, applying for IP protection, seeking expert legal advice, etc., seems like a logical place for these firms to turn. Yet, agritech firms moving from proof-of-concept to field tests with a potential client do not clear the threshold for CanExport help, which requires at least \$100,000 in declared revenue over past twelve months.

Recommendation:

Develop a “how-to export” guide for small early-stage firms

Agritech firms in the Metro Vancouver region could use a single, definitive source of practical information on doing business in the US from this side of the border, written from the perspective of an early-stage firm. Moving to the US may already be an attractive option for a Metro Vancouver-based agritech firm due to the pull of larger markets and the prospect of higher valuations during funding rounds. The region must keep “frustration with cross-border operations” from joining the list of possible inducements to leave. There is an opportunity for the BC Ministry of Jobs, Economic Recovery and Innovation and/or a local trade service organization, such as the World Trade Centre Vancouver, to build on the work already being undertaken through the Trade Accelerator Program. Importantly, the focus of this guide should be on small, early-stage firms who would not qualify for support through existing programs. Helping young agritech firms deal with border issues is likely an inexpensive, yet effective, support which would benefit start-ups in other industries as well.



New Market Access

Findings:

As firms emerge from early-stage development and look to scale-up, they need to connect with big customers. As one interviewee put it, “you can go sideways with the wrong first customer; you need to get your best customer first”. But for agritech firms in particular, connecting with that first customer can be a barrier given the slow rate of agritech adoption in BC and with so many of the largest potential customers being based in the US. Helping make those critical first connections, especially when the ideal customer may be located far away, would help the local agritech sector grow.

Recommendation:

[Introduce an initiative to provide business-to-business matchmaking services for BC-based agritech firms](#)

BC agritech firms need to get their solutions in front of a lot of potential buyers if they are going to find an ideal customer. As the sector grows, the Agritech Centre of Excellence should introduce initiatives to enable firms to access new markets. Initiative could provide business-to-business matchmaking services for BC-based agritech firms looking to do business in Canada and abroad.

[Lead BC agritech business missions to key markets and showcase BC agritech solutions providers at international trade events](#)

Supporting agritech firms by facilitating access to customers in key markets should be a priority of both the federal and provincial government. In addition to hosting the more mature firms at these business missions and trade events, Global Affairs Canada and Trade and Invest BC should consider including less mature firms in order to facilitate those critical first connections.

Agritech-specific trade shows, such as Agritechnica in Germany and evokeAG in Australia, are great opportunities to connect with the international agritech scene. However, more traditional farming conferences should not be overlooked as an opportunity to connect with new customers. Farming conferences, that may lack the glossy production value of a tech convention, would allow a well-executed booth with multiple firms to really stand out.

Talent Pipeline and Occupational Analysis

Findings:

There are several interrelated labour challenges in the agritech sector, some more obvious than others.

Interviewees reported that it can be difficult finding senior executives and managers with direct agriculture, food industry, or agritech work experience. This is perhaps unsurprising given the emerging nature of agritech in the region, and it should improve as the industry develops. More broadly, some firms described challenges finding mid-level and senior-level professionals with appropriate business skills (as opposed to engineering or other technical skills). Recruiting from outside the region to fill these posts is difficult because of the high cost of living, and the high cost of housing in particular.⁸ Interviewees also reported that there is increased competition for employees and that poaching of staff is a problem, though the poaching is often from firms in adjacent industries.

Talent is the driving force behind many of the regional areas of focus in agritech, and is an area of overlap with other key industries. For example, the mechanical engineers working on sensors used in greenhouses and robots used in strawberry fields could be working in clean transportation; research scientists working on animal therapeutics could be working in the life sciences; software engineers and data scientists could be working in multiple other industries. This transferability of skills, which effectively creates a larger pool of potential employees in certain sought-after occupations than there would be if fewer of these industries were thriving here, is potentially one of the key strengths of the regional economy.

Skills transferability also means that demand and competition for workers spills across industries. For local agritech firms, success in adjacent industries (a rapidly growing biotechnology sector, for example, or the local expansion of another global software giant) contributes to the competition for workers. Invest Vancouver heard from agritech firm-interviewees that they have had success attracting recent graduates, particularly mission-driven individuals drawn by challenges such as addressing climate change. However, once the workers get more experienced, it can be difficult for a local agritech SME to compete with the lure of a global giant, particularly one that can offer significantly higher wages.

⁸ Metro Vancouver is a desirable place to be, yet the high cost of housing was frequently cited as an obstacle to recruiting experienced scientists and other workers from outside the region. While beyond the scope of this report, the efforts to address this complex problem warrant increased attention by all orders of government.



Thus, the demand for workers with appropriate skillsets for a growing agritech sector is dependent on more than just the growth of the agritech industry. Since agritech is a small, emerging sector, it will be more of a market-taker than market-setter for labour, at least in the near-term. Policy makers and educational institutes can help, and a few notable efforts are already underway.

The creation of the Agritech Centre of Excellence will help generate interest in agritech. Technical (engineering and computer science, for example) and business programs could introduce and/or promote agritech as a place for tech graduates to deploy skills. The undergraduate program in agritech under development at SFU, as part of the engineering stream, will strengthen the supply of local talent. Additionally, the network of non-research universities, such as Kwantlen Polytechnic University, which are engaged with the agritech industry in field tests and other work, could expand such collaboration with the sector and also help ramp-up the talent pipeline through upskilling and reskilling via professional development offerings.

Nonetheless, more could be done to strengthen long-run access to its most important competitive advantage, labour.

Recommendation:

[Investigate the future talent and skill requirements for the BC agritech sector, in conjunction with the requirements of other high-opportunity, high-growth sectors](#)

Connecting these educational efforts with industry needs will require a more thorough understanding of the industry-spanning skills underpinning the competitive advantage of multiple sectors of the regional economy beyond agritech. An analysis of talent and skill requirements in agritech and other sectors will better position the province to plan for and deploy the most needed solutions to ensure a robust talent pipeline into the future. Given the strong connection between agritech and the post-secondary education system and the challenges in attracting outside talent, BC must lead the way in ensuring the talent pipeline can support these high opportunity sectors in which the region has specialization.

Conclusion

The region's advanced innovation ecosystem, access to early-stage sources of non-dilutive capital, and ample demonstration opportunities in BC's widely varied agriculture sector mean that the Metro Vancouver region's young and emerging agritech sector presents many distinct productive and/or strategic advantages to the world. Focus on the sector is increasing due to challenges such as climate change and food security. BC's favourable climate conditions and orientation toward sustainable, clean growth is providing an appealing framework for the sector to flourish. Investors' interest is increasing, further supported by available tax credits. **Growth in the agritech sector is within reach and BC and the Metro Vancouver region need to take action now to realize it.**

With a couple of local successes demonstrating what is possible, the next challenge is to support and accelerate more early- and development-stage firms to scale up. To do so, urgent action needs to focus on creating a more cohesive agritech ecosystem, enabling BC farmers to adopt local agritech solutions, providing fast prototyping and small-scale manufacturing capacity in the region, and improving start-up assistance to allow young companies to get off the ground and access foreign markets. Going forward, an investigation into the talent and skills requirements for the BC agritech sector should be undertaken to ensure the talent pipeline can support the sector in addition to high-growth opportunities in tech and life sciences.

Invest Vancouver would like to thank all interviewees for their time and for sharing their insights.

Prepared by Invest Vancouver

The work of Invest Vancouver is built around three integrated functional areas: Data, Research and Policy, Collaboration and Strategic Investment.

The Data, Research and Policy team supports investment and job creation in key export oriented industries, conducting research, discerning the factors driving their growth, identifying gaps along the product-service value chains, and articulating the underlying competitive advantages of the Metro Vancouver region. Through the identification of opportunities and challenges faced by firms in these industries, the team develops recommendations to inform policy and to influence decision-makers in strengthening the regional value proposition across key industries in order to increase the region's global competitiveness.

The work of Data, Research and Policy informs the Collaboration function, which then influences the Strategic Investment program. Additionally, the Investment needs guide work done in Data, Research and Policy and Collaboration.

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