



Mapping Food Sustainability in Canada

Addressing Food Insecurity and Skills Pathing to the Agriculture Sector



Partners



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Executive Summary



Context

Food production and sustainability in Canada are closely tied to the country's prosperity, food security and social well-being. The agriculture and agri-food sector employed over 2.3 million people in 2023 and is essential for domestic food and global food supply as a net exporter. While Canada is a major agricultural producer, food insecurity continues to affect millions of Canadians, revealing significant gaps between agricultural output, sector participation and equitable access to food.

Sustainable agriculture requires resilience in the face of multiple challenges. Environmental and political pressures are reshaping production capacity and threatening food system stability, particularly for small and medium-sized agribusiness enterprises, as well as equity-deserving group sector participants. Canada's reliance on exports underscores the vulnerability of Canadian agriculture to external shocks, even as demand for sustainable and community-based food systems grows at home. These market shocks culminate in disproportionate access to food for Indigenous Peoples and equity-deserving groups. For Canadian agriculture

to maintain market competitiveness and improve the integration of resilient, forward-thinking agricultural technologies by small and medium-sized farms, diverse agricultural entrepreneurs and workforce participants will need continued support and skills pathing.

Food insecurity is a national emergency and disproportionately affects urban residents, Indigenous Peoples and other equity-deserving groups. In Ontario, the large cities of Toronto, Mississauga, Kingston and Orillia have declared acute food insecurity emergencies since 2024. These cities also tend to be the most diverse, where racial and community identities intersect to heighten food insecurity. Across Canada, over 46% of Indigenous Peoples experience food insecurity, with rates in Northern communities particularly acute due to high costs, infrastructure gaps and shortened growing seasons. Black households have almost double the odds of being food insecure as white households, and urban food insecurity has surged, with nearly seven to nine million Canadians using food systems, nearly four times pre-pandemic levels. Rising grocery prices and living costs force households to spend less on food and rely on lower-quality, culturally inappropriate food options.



Community-based food production through gardens, allotments and local greenhouses has gained traction to address food insecurity and present a pathway to social, cultural and environmental benefits.

Community-based food production through gardens, allotments and local greenhouses has gained traction to address food insecurity and present a pathway to social, cultural and environmental benefits. Across Canada, communities are regaining their agency in food production of healthy, local and culturally appropriate foods. While addressing local food insecurities, exposure to gardening and food production is not just about access to food. These programs and community initiatives are an essential pathway to build skills and visibility for the agriculture and agri-food sector, which is important as food insecurity is not just a food availability issue but interrelated to Canada's agricultural sector performance. These programs can ensure food security for all Canadians and address sector barriers to participation and technology adoption among Indigenous Peoples and equity-deserving groups which span rural, urban and remote environments.

There is an urgent need for communities to expand sustainable food initiatives, embed equity considerations and develop the skills required to maintain and grow local food production capacity.

Methods

To map the current ecosystem of food sustainability initiatives, we conducted a scan of 228 programs across Canada. We identified initiatives using targeted Internet searches and snowball sampling, then classified them according to geographic distribution, organizational type and types of skills training.

To conduct program analysis, we coded training into three categories: foundational, analytical and technical skills, with wraparound supports such as mentorship, networking and financial aid also noted. We define foundational training as teaching participants how to garden, usually from seed to harvest, involving general farm practice and crop maintenance. Analytical training includes primarily operational skills, including management skills, soil science, farm machinery operation, pest management, and agriculture and agri-food sector essential skills training including time management, management and logistics. Technical training is defined herein as education to use agricultural technologies (or agtech), which includes but is not limited to vertical farming, sensors and more data-enabled farm management. While we considered all food sustainability program offerings, we noted those with targeted interventions designed for Indigenous Peoples, women,



newcomers, 2SLGBTQ+ participants, persons with disabilities and other equity-deserving groups. We further classified organizations by ecosystem type, ranging from community-serving organizations and post-secondary institutions to incubators, accelerators, corporations and government bodies.

Findings

The mapping exercise revealed a diverse but uneven landscape of food sustainability programs, and fragmented offerings for skills pathing for participants. For example, geographically, Ontario hosts the largest share of initiatives, accounting for nearly 30% of programs, while Quebec and Alberta are under-represented, despite their relative contribution to the sector. In contrast, New Brunswick and the territories host a higher-than-expected number of programs relative to their workforce size, reflecting both community need and regional policy priorities. While some locations may have a program surplus relative to agriculture sector participation, growing food insecurity demands all regions continue investment in food sustainability programs and their attendant training opportunities.

Different organizations play unique roles in the ecosystem. Community-serving organizations dominate the ecosystem, delivering nearly half of all identified programs, often through community gardens, food banks and local hubs. Post-secondary institutions play a role in offering structured training pathways and technical programs, though private sector involvement remains limited. Wraparound supports vary widely, with universities

frequently providing mentorship and networking opportunities, but not a lot of financial support. Meanwhile, incubators and investor networks are more likely to provide funding and entrepreneurial assistance.

The focus of initiatives is weighted toward foundational skills programs. Nearly 78% of initiatives with training components offer basic gardening and cultivation skills, making these programs important entry points to the agriculture sector for participants. Analytical training is present in about two-thirds of programs, while less than one-half provide technical training in advanced agricultural technologies. Regional differences are pronounced, with provinces such as Prince Edward Island and Nova Scotia emphasizing technical upskilling. Newfoundland and Labrador and New Brunswick focus on foundational training. Technical training opportunities are strongest where community greenhouses and modular farms are in use, such as in Northern and urban contexts, but remain limited in regions with otherwise high agricultural activity that use traditional garden or community plot programs.

While food sustainability programs address acute local food insecurity, understanding the types of training offered is important to understand how these initiatives build career pathways for participants. Equity-deserving groups are those who are most likely to use food banks and gardening initiatives, and these initiatives are overlooked in the skills training ecosystem. It is essential to understand what skills are being offered

to whom, including the level of technical expertise and the applicability to sector trends which rely on agriculture technology adoption and proficiency in digital skills.

Targeted programming for equity-deserving groups shows important but uneven patterns. Indigenous Peoples benefit from significant programming in the territories, where food sovereignty and culturally relevant production are priorities, but urban Indigenous Peoples have fewer supports. Women are less supported; only a small fraction of mapped initiatives had explicit programming for them, despite their strong role in emerging agtech and urban farming. Newcomers are similarly underserved, with few programs tailored to their needs even in provinces with large immigrant populations such as Ontario, British Columbia, and Alberta. Very few initiatives explicitly target 2SLGBTQ+ communities or persons with disabilities, despite research identifying adverse barriers to participation in food production. However, general wraparound support may indirectly benefit equity-deserving groups to participate.

Barriers to participation and upskilling are widespread. Many programs stop at foundational gardening skills and do not provide clear pathways to more advanced training, reinforcing stereotypes that agriculture is low-skilled and dominated by men. For women, a lack of targeted interventions, coupled with persistent gender stereotypes, limits access to opportunities in both traditional agriculture and emerging agtech. Newcomers often encounter financial

barriers, limited social networks, and perceptions of agriculture as low-paying—a legacy of sector participation through the temporary foreign worker program—which reduces both participation and long-term sector retention. Indigenous communities face challenges tied to colonial histories and the imposition of Western food systems, and programs often fail to incorporate culturally appropriate food sources or Indigenous knowledge. Programs that do attempt to integrate such approaches, such as greenhouse projects in Northern communities, demonstrate the value of culturally grounded interventions, but remain limited.

Regional and structural barriers also impede progress. Quebec and Alberta, despite having large agricultural workforces, have deficits in training programs relative to their sector size. Meanwhile, access to agtech remains uneven, with Northern and urban programs more likely to adopt controlled-environment farming and vertical agriculture, while rural and traditional community gardens often lack the resources to integrate technology. Partnerships with agtech producers are underdeveloped, leaving smaller community initiatives disconnected from technological advances that could support growth and resilience. Wraparound supports such as mentorship and funding are inconsistent across the ecosystem, creating additional obstacles for equity-deserving groups who may require support to enter the sector.

Conclusions and recommendations

Food banks and food sustainability programs are often overlooked in the skills training ecosystem. These programs build skills and visibility to the sector to equity-deserving participants who are both under-represented in the sector and disproportionately more food insecure and provide much needed reprieve to food insecurity. We have identified several opportunities to improve skills training in food sustainability programs.

Address cultural preferences and stereotypes

- > Visibility of highly skilled professionals in biotechnology, food science, engineering, and data analytics is important to address perceptions of Canadians who still view agriculture as a traditional farming opportunity.
- > While women lead in agtech adoption in greenhouse environments, they require skills training support in non-greenhouse environments to improve agtech adoption and technical skills acquisition and thus address gendered stereotypes that men farm and women garden.
- > Immigrants also view agriculture as low-tech and labour intensive; visibility and use of agtech, digital tools and technical specializations can help encourage their transition into skilled sector opportunities.

Mobilize knowledge from agtech producers to small farms

- > Agtech produced by universities and small-scale innovators should be better leveraged to support food sustainability programs. Small agtech producers are making scalable technologies applicable to diverse agricultural business and small food sustainability programs, and technology producers and growers need to be better connected to enable agtech adoption.

Leverage educational expertise from post-secondary institutions

- > Partnerships with post-secondary institutions are needed to provide opportunities to improve technical and analytical skills training for program participants, improving the diversity and effectiveness of skills training educational offerings.

Address regional priorities in skills pathing

- > It is essential to address regional deficits in skills training program offerings to ensure participants can meet agriculture sector participation rates and promote operation continuity. For instance, training opportunities in Quebec and Alberta should be prioritized considering deficits which have the potential to address elevated food insecurity in these regions.

Address culturally applicable training needs

- > Different groups require different interventions to participate in the sector, and barriers are context specific. Programs in Indigenous and immigrant communities need to consider opportunities for skills development beyond learning how to cultivate plants from seed to harvest, considering culturally appropriate foods, to promote sector entry among diverse participants.

Expanding upskilling opportunities

- > We found most analytical and technical skills training is delivered through community agriculture projects in urban environments and in the North, and these technologies are not applied to traditional community gardening projects. Existing programs offering foundational skills training should be expanded to upskill participants, particularly to use agtech, to build pathways to skilled careers in the sector.

Regional priorities for engaging women

- > Programs for women are few and far between, despite women representing about 50% of the population. Regional focuses are needed given the unique contexts to participate in the sector. In the Prairie provinces, programs are needed to support integrating agtech used in oilseed and grain commodity operations, while in Ontario, more support is needed for supporting analytical skills acquisition, which can be transferred to meet operation management and succession planning needs.



Regional priorities for engaging newcomers

> Regional opportunities for growth in the sector exist for newcomers, who are not targeted by programs in provinces where they represent a large portion of the population. In Alberta, improved technical and analytical skills training is needed to bolster newcomers' participation, and in Ontario and British Columbia, more targeted support for sector entry and should target improving visibility of agtech, digital skills, and technical careers.

Regional priorities for engaging Indigenous Peoples

> Indigenous Peoples in the North and in communities and on reserve are predominantly targeted, but urban Indigenous Peoples are often not supported. In urban areas, more skills training is needed to meet Indigenous Peoples where they are, promoting food sovereignty and local food production while providing opportunities for further skills training.

Competency frameworks for food sustainability programs

> Food sustainability programs offer a variety of skills. A unifying competency framework is needed to understand how foundational skills can be upskilled into analytical and technical skills that are applicable to the sector and agtech adoption.

Additional digital tools and artificial intelligence training

> Participation in an agtech transition will also require additional competencies in artificial intelligence, data management and digital skills to ensure foundational literacy and tools to engage with agtech.



Introduction

Food security and sustainability

Since 2024, several large municipalities including Kingston, Mississauga, Orillia and Toronto—representing about 17.5% of Ontario’s population—have declared food insecurity an emergency.^{1,2,3} Food insecurity, which is the lack of availability and accessibility of food, is growing in Canada, and deeply multifaceted and socioeconomically linked.⁴ In 2024, Food Banks Canada recorded its highest use of food banks, increasing by 90% since 2019.⁵ In Toronto, food bank visits are about four times more frequent than pre-pandemic (in 2019),⁶ outpacing population gains of 10.8% across the same period of 2019–2024.⁷ Food banks are also disproportionately used by equity-deserving groups. In Toronto, individuals with disabilities (about 25% of visits) and racialized minority groups (about 80% of visits) comprise most of the visits.⁸

Food insecurity has undoubtedly grown following strains to local production and cost of living.^{9,10} Costs and accessibility of food are linked to the costs of food production, affordable housing, income and access to

decent work and skills training opportunities, as well as local food production capacity.¹¹ In response, several provinces with high food insecurity, including Newfoundland (23.0% of families) and New Brunswick (22.0%), have joined a national push to invest in community programs and faith or ethno-civic organizations, as well as local governments, to run local food banks, food growing programs and hunger relief agencies.^{12,13} These programs are intended to support local food production for communities, but are also an overlooked skills pathways for agriculture sector visibility and skills development among food-insecure equity-deserving groups.

Several federal programs run through local governments are prioritizing food insecurity. Federal mechanisms include funding programs for skills training and sector participation across equity-deserving groups. The AGRI Diversity Program, for example, provides funding to organizations offering skills training for equity-deserving groups within the agricultural sector to ensure continued growth in sector participation.¹⁴ Moreover, the Agricultural Wine Sector Support Program provided direct support to 454 projects between 2022 and 2023, 37.0%

of which were women-owned, 6.0% owned by racialized people and 2.0% Indigenous-owned, and built capacity among programs to improve their mandates to support women (13.0% of programs), 2SLGBTQ+ persons (7.0%), visible minorities and racialized persons (7.0%) and persons with disabilities (7.0%).¹⁶

Provincially, changes to land use policies have been used to provide physical footprints for agriculture initiatives and pilot projects in alleyways, pedestrian-oriented streets,¹⁷ rooftops and hydroelectric infrastructure corridors.¹⁸ For instance, funding through the federal Sustainable Canadian Agricultural Partnership to Newfoundland Eats has allowed a network of provincial farmers to provide opportunities for food-insecure youth to work in community farming and alongside mature farmers, while also leveraging their technical expertise and training to develop agricultural technologies (or agtech) applicable to small agricultural enterprises.

At the municipal level, cities like Toronto are enacting policies like the GrowTO Action Plan, and revisions to existing legislation (incl. the Green Roof Bylaw) to support local production on rooftop farms.¹⁹ There are concerted efforts to increase diversity in agriculture not only by engaging diverse communities in urban areas into community projects but also by focusing attention on Indigenous agriculture, women in agriculture and attracting newcomers to agriculture.^{20, 21}

Despite the growing range of innovative approaches to addressing food security and sustainability, many communities remain under-supported and food insecurity continues to increase. Concomitant with food insecurity, the Canadian agriculture sector requires an injection of skilled and diverse labour to meet labour shortages in rural operations,²² to support the adoption of agricultural technologies,²³ and to ensure overall sustainability to maintain Canadian market competitiveness. Significant skills gaps persist in technical and analytical skills on agricultural operations, and digital and AI literacy that are necessary for supporting the adoption of agricultural innovations. The purpose of this report is to map the existing food sustainability programs, understanding their skills offerings to participants, with an eye to identifying opportunities to address skills gaps and diversify Canada's agricultural sector with skilled, technologically adept workers.

Canadian agriculture

Food production and availability affect the daily lives of all people living in Canada. Sustainable food systems—spanning from production, to processing, distribution, consumption and disposal—directly affect Canadians. Canada may be a major agricultural producer and exporter,²⁴ but many Canadians are struggling with food security. Not only do Canadians lack fundamental access to food, but disparities are also greater for healthy or culturally appropriate options.²⁵

Agriculture and Agri-food Stats in 2023



Canada's agriculture and agri-food sector employed
2.3 million individuals



Providing **1 in 9 jobs** nationwide



Contributing about **7%** to the country's **gross domestic product** (\$143.8 billion)

Prosperity in the Canadian agriculture and agri-food sector directly affects food security, as opportunities in domestic and global markets are essential to ensure business growth and local food system resilience to meet domestic food requirements. In 2023, Canada's agriculture and agri-food sector employed 2.3 million individuals, providing one in nine jobs nationwide and contributing about 7% to the country's gross domestic product at \$143.8 billion.²⁶ Canadian farms are realizing growth through improving cost efficiencies,²⁷ as they adopt technological innovations (agtech).²⁸ However, improved production yields and cost savings have not been enough to offset rising Canadian costs of living and attendant food insecurity.²⁹

While multilevel supports for food sustainability exist, bottom-up resilient food systems require skilled participants who know how to adopt agtech, improve yields and production, and sustain local production. This ensures system resilience despite fluctuations in international relationships and their impact on the cost of food which embattles many Canadians' accesses to food.

Sustainable agriculture in Canada

Providing sustainable food requires resilient environmental systems, and food production mechanisms that can maintain output throughout planetary climate changes driving severe environmental issues. Climate and environmental stressors combine to affect crop yield and operational suitability, and agtech adoption is important to improve cultivation resilience.³⁰

Additionally, global trade and geopolitics are affecting the Canadian agriculture and agri-food market, and thus food security. Current uncertainty around U.S. tariffs and changes to food prices emphasize the importance of exploring new ways to augment traditional food supply chains with more community-based programs.³¹ Unlike many countries, Canada's agriculture industry is predominantly export-driven, with upwards of 70% of staple crops like soybeans, wheat, canola and pulses destined for international markets.³²

The rising costs of food production directly affect Canadian agribusiness, consumers, and food security. For instance, rising import costs of fertilizers from Russia and Ukraine are directly affecting Canadian agribusiness, who historically have depended on Russian nitrogen-based fertilizers. Canada is a large importer of Ukraine rapeseed (47% of production), wheat (13%) and barley (7%) for food processing and Canada's agri-food industry.³³ Tariff discussions with the United States also threaten Canadian agribusiness and production costs, with the greatest impacts on smaller and diverse farmers.³⁴

Food insecurity in Canada

Food insecurity in Canada disproportionately affects equity-deserving groups as intersectional barriers further limit access to food. Food insecurity is not just defined by the availability and accessibility of food, but includes adequacy and safety for consumption, acceptability toward cultural context and agency in the ability of individuals to work toward alleviating their own food insecurity.³⁵

Food insecurity is exacerbated for Indigenous Peoples and equity-deserving groups. Over 46% of Indigenous Peoples in Canada face food insecurity, with Northern food insecurity being particularly acute due to food availability limitations,^{36, 37, 38, 39} and Black households have almost double the odds of white households to be food insecure.⁴⁰ Statistics Canada estimates food insecurity has increased to 20.7% for those who belong to a racialized group in 2022, an increase of 3.9%



from 2021.⁴¹ Nearly one in four (about 26.0%) immigrant families, who immigrated between 2013 and 2022, reported food insecurity, above Canadian-born families (about 17.0%).⁴² These figures are still a conservative estimate: the lack of access to culturally appropriate foods likely contributes to greater insecurity among these communities.⁴³

Establishing local food production is important to address regional and disproportionate food insecurity for equity-deserving groups. In the North, food accessibility is limited by distance to markets and the lack of transportation infrastructure, while agency in production is limited by shortened growing seasons and the lack of skilled labour, which interact to increase the cost of food production and provision.⁴⁴ Building capacity for year-round, low-cost local food production in the North has been successful in generating interest in agriculture sector careers, addressing local food security and working toward Canada's net-zero goals.⁴⁵ Similarly, in urban environments, access to low-cost space for cultivation has been important for many communities to engage in local food production. Community agriculture addresses barriers to food security and supports traditional and cultural food pathways,⁴⁶ effecting knock-on environmental benefits (e.g., low food production and transport emissions),⁴⁷ facilitating community building and knowledge exchange⁴⁸ and supporting favourable participant mental and physical health outcomes.^{49, 50} With known benefits to local food production, there is increasing interest in competencies development and skills training for local food production, particularly targeted as interventions for equity-deserving groups by a variety of organizations from local to federal scopes, including schools,^{51, 52} food banks,⁵³ community gardening organizations⁵⁴ and cities.⁵⁵

Food banks and gardening programs—spanning traditional plot and garden agriculture to more advanced controlled environment agricultural (CEA) systems—are often overlooked in the skills training ecosystem to engage equity-deserving groups in the agriculture sector. Multiple levels of government see it as essential to improve sector participation^{56, 57} and maintain Canadian agriculture domestic and export production requirements. Food sustainability programs provide a deep-contextual, community-based educational opportunity while providing attendant access to food.^{58, 59} Continued investment is needed in supporting these programs, which have tremendous upskilling potential and already possess many of the necessary wraparound supports for diverse learners in the agriculture sector⁶⁰ that are not met by most traditional educational programs.^{61, 62}

Local sustainable food production

Canada has a strong tradition of local gardening and food production.^{63, 64} Canadians are increasingly separated from their means of food production;⁶⁵ is it unsurprising that many people now associate the sector with dated stereotypes of labour-intensive, low-paying and low-tech opportunities that are not conducive to immigrants, women, Indigenous Peoples or other equity-deserving groups.^{66, 67, 68}

Diverse communities continue to innovate to address local food insecurity but are subject to adverse barriers to exercise agency and participate in the adoption of

agtech to produce local food. The Ontario Farmer Association of Women reports that about 40.9% of women farmers in Ontario feel barriers exist when it comes to their place and advancement in the field of agriculture, including balancing career and family responsibilities, gender structure (“an old boys club”) in agriculture and the lack of role models.⁶⁹ This is in conjunction with less funding for food sustainability initiatives for women as compared to men.⁷⁰ Indigenous Peoples also must overcome barriers to participation linked to trauma from forced assimilation to Western conventions of a “healthy diet” that are not culturally acceptable, as well as a legacy of agriculture which historically has been used in land dispossession and assimilation.^{72, 73} Collaborating and co-developing agriculture systems to address local food sustainability with each community is essential to ensure needs are met and appropriate skills training is delivered. A variety of agriculture and agri-food innovations and technological tools can support communities to rectify food insecurity, providing opportunities for local and sustainable food production. Skills training is particularly effective as it can encourage food sovereignty and agency to grow the plants of value to communities while encouraging greater participation in the agriculture sector. Agtech solutions are often scalable and customizable to their context, such as vertical farming units which can be used in regions with limited arable land, urban environments and in converted land uses.^{74, 75} Additionally, opportunistic innovations in agriculture

allow the use of underutilized infrastructure corridors, as well as residential, institutional and commercial rooftops which can be converted into food production locations.⁷⁶ These innovations provide opportunities to meet communities where they are in both food production and skills training, offering much needed skills-training flexibility to equity-deserving participants. However, as the use of high-tech agriculture grows, there is a risk that systemic inequities in gender and racial sector exclusion will be replicated unless equity, diversity and inclusion principles are embedded into infrastructure and training from the outset.⁷⁷

Ensuring equity considerations are integrated into food sustainability programs requires explicit support for Indigenous Peoples and equity-deserving groups. Particularly, the sector needs to overcome the perception it holds as a low-skilled, low-income, male-dominated profession that discourages participation from diverse and skilled individuals. Agriculture offers long-term and meaningful career pathways with technology, digital skills and business expertise.^{78, 79} Several urban farming programs—from Montreal and Toronto to the North^{80, 81}—are effective examples where community engagement, local job creation and agricultural skills training to equity-deserving groups intersect to provide accessible local food and concomitant agency for food production. These cases should be emphasized and built upon within coupled future food sustainability and skills training initiatives.

Importance of skills training

Technical solutions to address food sustainability—such as modular vertical farms and data-driven controlled-environment agriculture—may streamline cultivation success but they require specific skills.⁸² Skills training is needed to ensure system use and longevity, and to overcome bias and discrimination from the agriculture and agri-food sector that deter diverse candidates from feeling reflected within the agriculture sector.⁸³ Evidence suggests that participation in smaller, localized and community-based agriculture is effective in addressing food insecurity for Indigenous Peoples and equity-deserving groups.^{84, 85} Expanding training and skill development program access is narrowing the skills gap and providing meaningful career opportunities, as well as shifting the perception that agriculture primarily offers low-skill jobs. Additionally, establishing a shared language around skills can assist in addressing workforce needs.

Food sustainability initiatives —Program mapping report

The Food Sustainability Initiatives Program Mapping project aims to provide an overview of the projects and associated skills training aimed at local and sustainable food production. It builds upon the Food Sustainability in the North project, led by the Diversity Institute and Green Iglu, which examined competencies and skills needed for Indigenous Peoples in the North to participate in community agricultural initiatives.⁸⁶ While a variety of community-based efforts exist

across Canada to train and equip Indigenous Peoples and diverse groups to participate in skills development—such as Scadding Court in Toronto providing hydroponics education through community gardening—there is little information about the current skills training ecosystem for sustainable food production through the use of agtech.

Details on the coverage and offering of food sustainability initiatives, their characteristics and their impacts on food security for equity-deserving groups are unclear. Additionally, it is unclear what skills training, if at all, is available to support these projects, and how this relates to the role of these initiatives in career pathing to skilled workforce participation in the agriculture and agri-food sector. Successful food production relies on skills training to build sector participation, and thus address food insecurity. The following section outlines the need for the mapping exercise of existing food sustainability initiatives, and the specific methods for how initiatives were selected and compiled. Additionally, it seeks to explore the different examples of food production sustainability initiatives, including those across greenhouses, indoor farming and community gardens.



Methods

This project provides a scan of projects focused on food sustainability in Canada and the associated training to support them. Using key words, we undertook an Internet search combined with snowball techniques to identify 228 food sustainability projects across Canada and analyze what training programs that they offered, if any.

We included organizations and groups that address food insecurity from points of accessibility, agency in production and applicability to culturally sensitive food sources. Among these programs, we examined the skills pathing, when available, for the agriculture and agri-food sector. We noted where targeted supports exist for equity-deserving groups. There is national focus on improving agriculture sector participation among Indigenous Peoples, women and newcomers,^{87, 88, 89} and among the food sustainability program ecosystem, we sought to identify which initiatives specially tailor inclusive methods for different groups. Specifically, we classified programs with targeted supports by their offerings to Indigenous Peoples and other equity-deserving groups, including racialized and Black people, newcomers, persons with disabilities, 2SLGBTQ+ persons, rural people and Francophones.

The types of organizations entered in the mapping exercise include, but are not limited to: public companies and institutions in the agriculture sector that support skills, training, financing and employment; private agriculture and agri-food sector companies that offer training, financing or employment opportunities for new workers in the sector; First Nations, Métis and Inuit communities offering skills training opportunities for community members related to food sustainability; not-for-profit companies offering skills and training opportunities related to the cultivation agriculture and agri-food sector; educational institutes that offer skills and training opportunities, including micro-credential, certificate and degree programs related to sustainable food production, agriculture and/or the agri-food sector; entrepreneurial support organizations that support enterprise development in the agriculture and agri-food sector; and incubators and accelerator programs that support skills and competency development for new enterprise owners in the agriculture and agri-food sector.

We collected information on the type of support provided by each organization, defining each skills support as foundational, analytical and technical. Foundational training consists of basics in cultivating and gardening crops, including setting up and using community garden plots, basics of plant life cycles, watering and fertigation management, plant maintenance and weed/pestilence control, harvesting and land management. Technical training pertains to the use of agtech, which includes, but is not limited to, vertical farming, hydroponics and aquaponics, use of alternative substrates, greenhouse technologies, automated irrigation and fertigation systems, optical and chemical sensors, data management infrastructures and climate controls for indoor environments. Innovative technologies such as electrochemical signal monitoring, drones, germplasm modification and climate-resilient crop engineering are also considered technical training. Analytical training consists of general crop and farm management, including management skills, soil science, farm machinery operation and pest management, and agriculture and agri-food sector essential skills training, including time management, management and logistics.

We also recorded whether specific wraparound program supports exist, such as financial support and networking, as well as mentoring and capacity building programs. Essential skills training programs that still support community food sustainability, such as those advancing policy advocacy and project management, were also included and classified as analytical skills that support more decision management. Additional organizations that provide wraparound support with specific mentions of supporting food sustainability were included, such as those providing mentoring and coaching, daycare and networking support.

Organizations were also classified by their sector and ecosystem type according to the classification system used by the Diversity Institute. This includes angel investors, investor networks and financial institutions, business support organizations, college and university organizations, community-serving organizations, corporations, employment or settlement service providers, ethnic-civic organizations, foundations, government (as federal, municipal or provincial), incubators and accelerators, K-12 educational organizations, other skills training providers, professional associations, research institutes and think tanks, skills training and workforce development organizations, small and medium-sized enterprises (less than 499 employees), and unions.

Findings

Provincial headquarters of support

The current distribution of programs mapped in the food sustainability training ecosystem is weighted heavily to Ontario (29.1%), and lagged by British Columbia (12.6%), Alberta (10.7%) and Saskatchewan (11.7%) (Figure 1). This is expected as Ontario is Canada's most populous province and has a proportionate representation of individuals in agriculture,

relative to Canada's total sector participation (at 29.3%). Higher numbers among Ontario, British Columbia, Alberta and Saskatchewan may also reflect programs delivered by organizations headquartered in Toronto and Ottawa, that serve external audiences.

However, regional discrepancies in the number of programs relative to the proportion of the workforce persist. Skills training program deficits, relative to provincial participation

Figure 1

Provincial and territorial distribution of food sustainability programs, by head offices

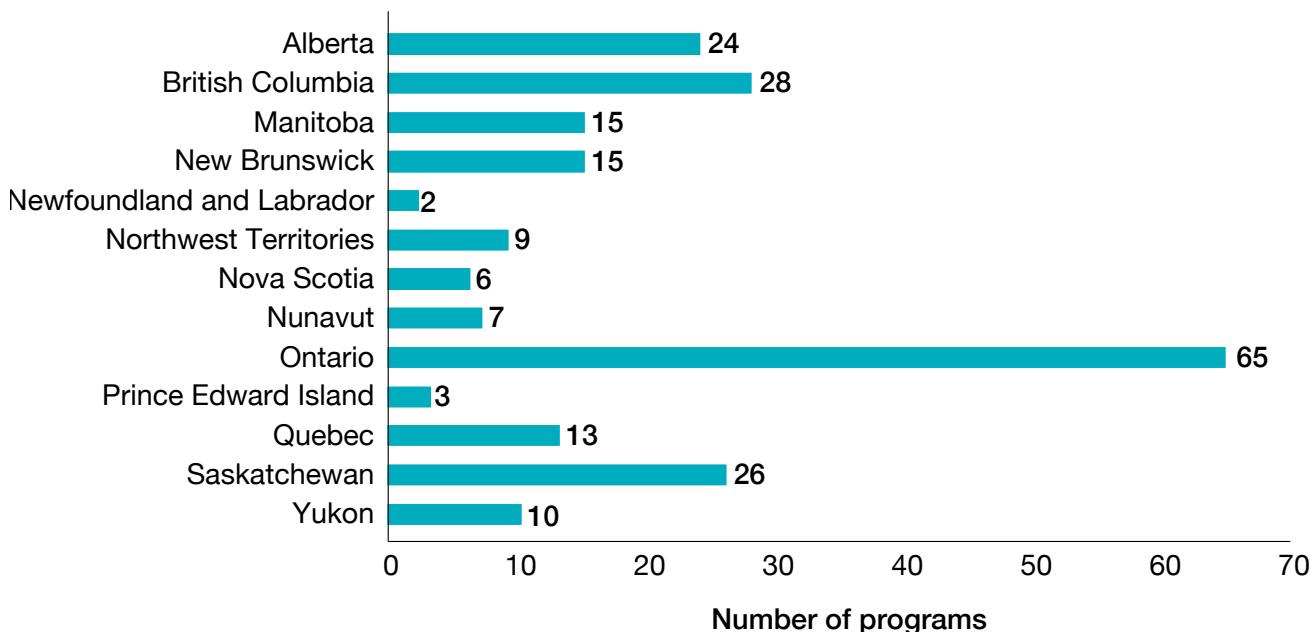


Table 1

Provincial and territorial distribution of Canadian population, agricultural sector participants and mapped skills-training programs

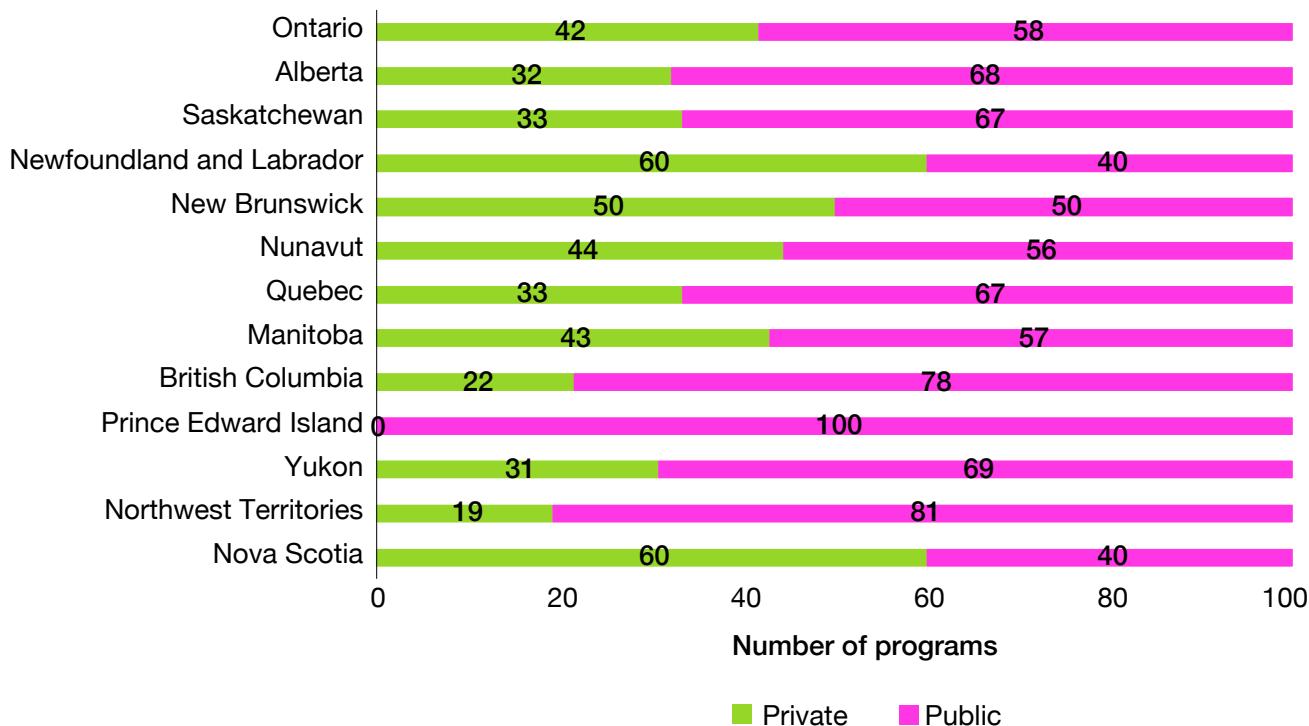
Province/Territory	Population By Province (% of National Population)	Agriculture Sector Participants (% of Total Participants)	% of Agriculture Programs Allocated by Region
Alberta	4,888,723 (11.8%)	38,070 (13.6%)	10.8%
British Columbia	5,698,430 (13.8%)	32,290 (11.5%)	12.6%
Manitoba	1,494,301 (3.6%)	17,297 (6.2%)	6.7%
New Brunswick	854,355 (2.1%)	5,786 (2.1%)	6.7%
Newfoundland and Labrador	545,247 (1.3%)	1,248 (0.4%)	0.9%
Northwest Territories	44,731 (0.1%)	-	4.0%
Nova Scotia	1,076,374 (2.6%)	6,161 (2.2%)	2.7%
Nunavut	41,159 (0.1%)	-	3.1%
Ontario	16,124,116 (39.1%)	82,348 (29.3%)	29.2%
Prince Edward Island	178,550 (0.4%)	4,390 (1.6%)	1.3%
Quebec	9,056,044 (21.9%)	69,065 (24.6%)	5.8%
Saskatchewan	1,239,865 (3.0%)	24,144 (8.6%)	11.7%
Yukon	46,704 (0.1%)	-	4.5%

in the sector, appear in Quebec (24.6% of agriculture sector, 5.8% of training programs), and marginally in Alberta (13.6% of sector, 10.8% of programs). A skills training program surplus, relative to sector participation, is present in New Brunswick, where 2.1% of agricultural sector participants have more than three times the proportion of Canadian

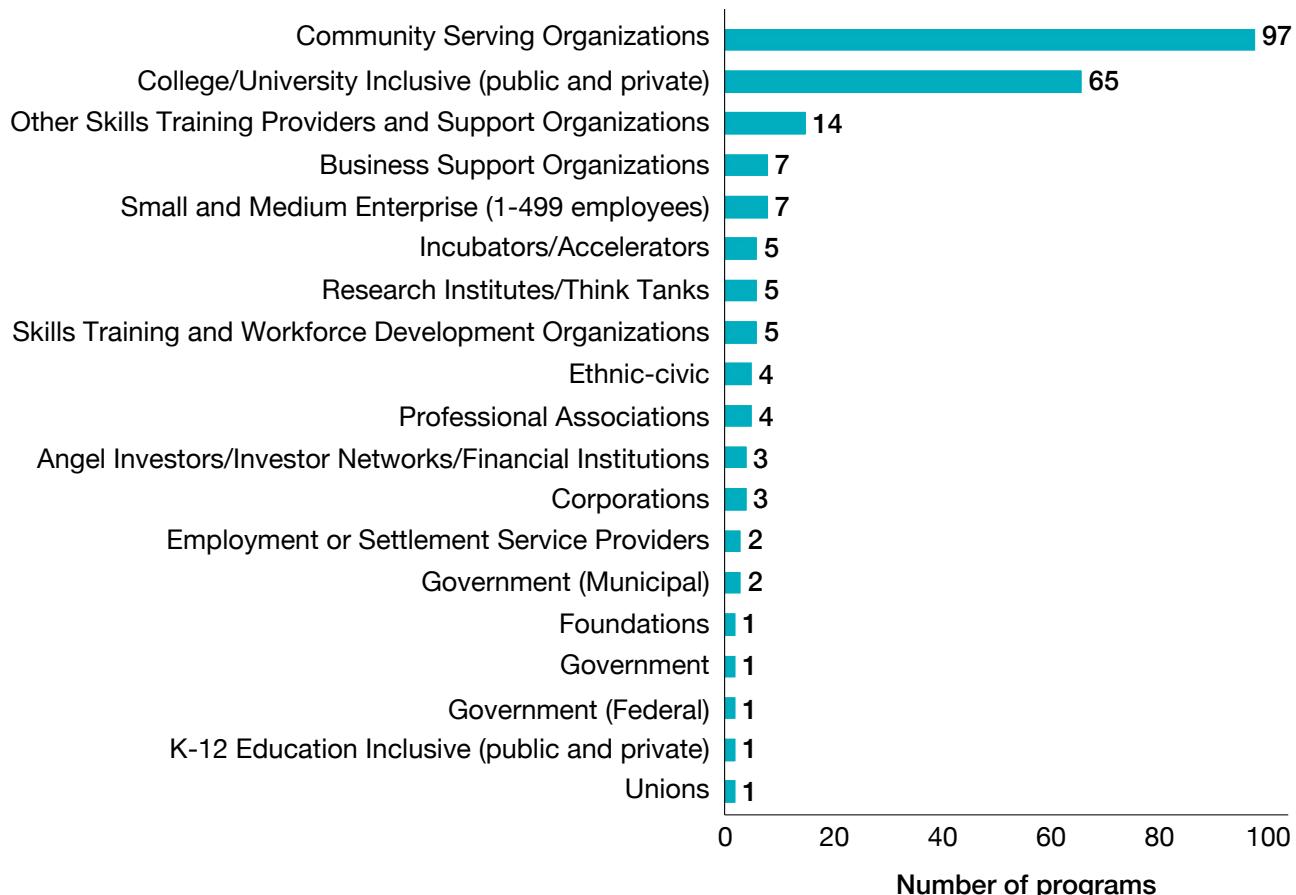
skills training initiatives (6.7%). However, this does not consider the number of individuals trained by individual programs, which can vary depending on the scope of a regional community farm (~10 individuals a year) as compared to a university or college program (+50 individuals a year).

Figure 2

Displaying ownership of food sustainability programs, by province and or territories



The types of organizations that are engaged in delivering food sustainability programs and attendant skills and training services include both private and public sources and vary regionally (Figure 2). Public institutions are largely responsible for post-secondary educational programs; however, some private educational institutions, offering micro-credentials, online courses, and skills academies, provide food sustainability programs attendant with their skills training objectives.

Figure 3**Ecosystem category of organizations offering food sustainability and training programs**

Ecosystem categories

Organizations that are engaged in food sustainability programs and skills training related to agriculture predominantly include community-serving organizations (97 programs, or 42.5%), such as community centres and groups, not-for-profit agencies and food banks (Figure 3). Community centres and hubs include Scadding Court in Toronto, Ontario, who offer community allotments and hydroponics, and couple training for equity-deserving groups on foundational and technical skills;⁹⁰ groups often include group-run community gardens, such as Off Bank Community Garden in Carleton, Ontario which offers allotment access and

some foundational training, such as training for cultivating specific plants in Ontario's climate. Formal educational institutions (65 programs, or 28.5%)—both private and public delivering targeted skills training initiatives from formal degree, certificates and/or micro-credentialing programs—also contribute to food sustainability initiatives. Other contributors include skills training and support organizations, outside of educational providers (14 programs, or 6.1%). Few programs are offered by employment or settlement service producers, which may be explained by the low number of targeted food sustainability initiatives for newcomers (eight programs, or 11.8% of targeted programs).



College certificate and technical programs offer many technical trainings for using new agriculture and agri-food innovations, including precision agriculture, precise irrigation and fertigation, and technologies such as GIS, IoT, drones, AI, robotics and autonomous machinery, as well as diagnosing, maintaining, and repairing field agricultural equipment. However, they are not the driver of education programs as are agriculture sector-specific initiatives, community farms and networks.

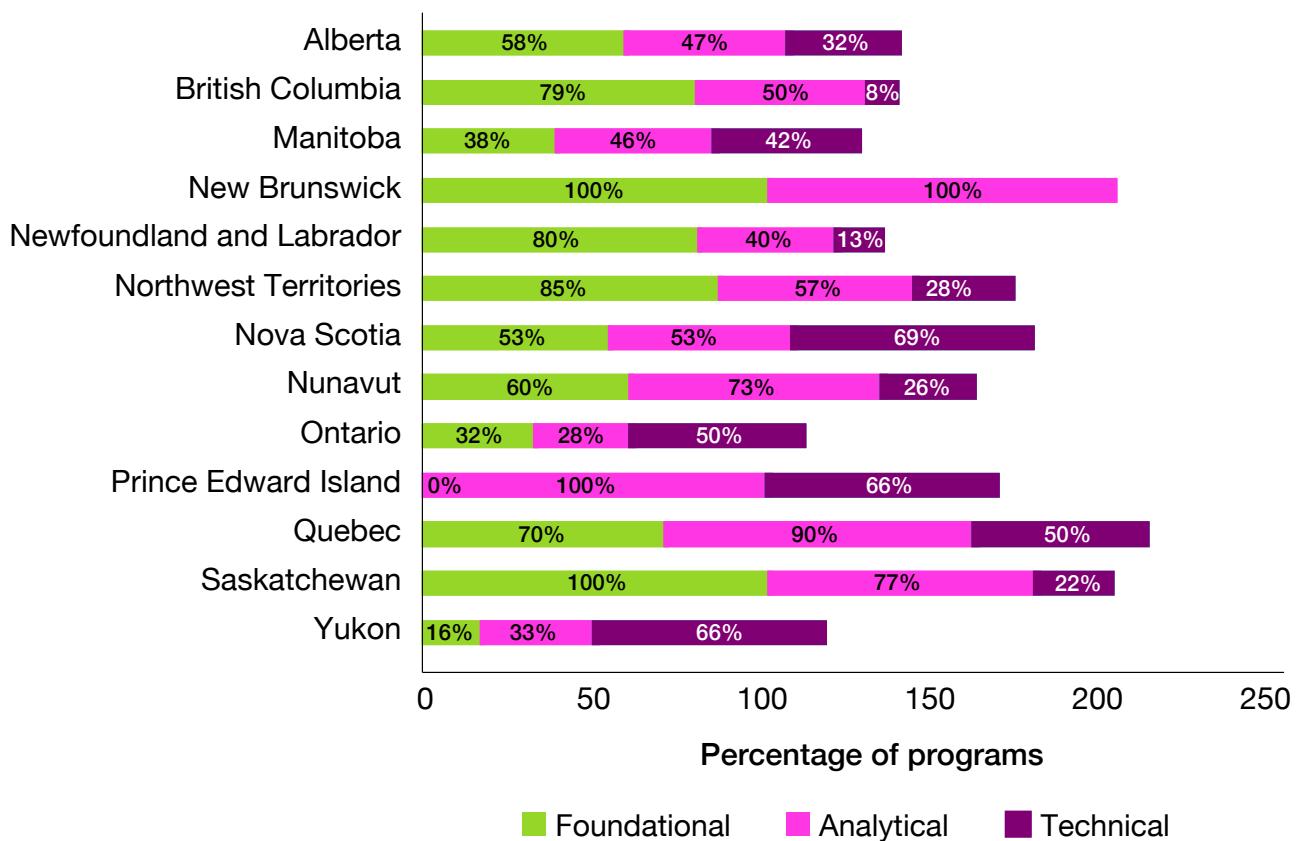
Skills training offered

The programs mapped differ in their offerings of skills training, including a variety of foundation, analytical and technical skills. Foundational training offerings consists of basics in cultivating and gardening, including setting up and using community garden plots, training on watering and fertigation for crop maintenance, and crop harvesting and packaging. For example, several community gardens exist across Canada, managed by community groups, religious organizations, and recreation centres who offer community garden access to individuals as well as opportunities for training on how to garden.⁹¹

Technical training pertains to the use of agtech, which includes but is not limited to vertical farming, hydroponics and aquaponics, and greenhouse technologies, as well as data management infrastructures and environmental climate controls for indoor and outdoor environments. These include food sustainability programs partnered with university technical training opportunities—

Figure 4

Percent of provincial and territorial food sustainability programs which offer skills training (as percent of programs), by skill level offered



such as Humber Polytechnic's community vertical farm and technical certificate program⁹²—as well as community food initiatives which utilize these technologies and thus need to provide training, including programs like the Yellowknives Dene First Nation Greenhouse which offers community members technical training as part of food production.⁹³

Analytical training consists of general crop and farm management, including management skills, soil science, farm machinery operation and pest management, and agriculture and agri-food sector essential skills training, including time management, management and logistics. For example, Jelly Academy offers digital marketing training for agriculture sector

participants, providing online training on how to use social media, SEO, Google Advertising, website analytics, PR + Influencer marketing and growth marketing for small and diverse agribusinesses.⁹⁴

Some programs include more than one type of training, which may support a pathway for upskilling (Figure 4). For instance, Scadding Court Community Centre offers foundational training in community allotments as well as more technical training in hydroponics.⁹⁵ Many food sustainability programs include foundational training opportunities (129 programs, about 77.7% of programs with training), which is important to facilitating new sector participation. There is large evidence of upskilling among food sustainability initiatives

through 114 programs with analytical training (about 68.7%) and 78 programs with technical training (about 46.9%).

The ecosystem mapping exercise identified 53 agriculture and agri-food food sustainability programs (about 25.6% of programs) which do not offer skills training components.

However, these programs may offer skills training informally, without explicit mention on public facing material. Community gardening is known for offering informal skills training opportunities as participants engage in community activities, knowledge sharing and hands-on learning environment,^{96, 97} where more experienced gardeners and farmers provide invaluable expertise to new participants, who often begin without knowing how to garden or grow plants.⁹⁸ However, among the programs we identified, initiatives with no skills training often do not include greenhouses or more technical cultivation environments, often aligned with community gardens and plot initiatives.

Regional differences may reflect training priorities among provinces and territories, or potential skills discrepancies among the provinces and territories. For instance, Prince Edward Island agriculture food sustainability programs do not offer foundational training and instead include post-secondary education offerings as well as targeted upskilling training in using agricultural technologies. All food sustainability programs that offer skills training identified in Newfoundland and Labrador as well as the Northwest Territories provide fundamental skills training. Interprovincial variation is high; provinces with a high



Regional differences and proximity to agtech resources should be considered to improve upskilling opportunities to food sustainability program participants.

allocation of sector participants relative to all of Canada's agriculture sector participants like Ontario (29.3% of Canada's agriculture workforce), Quebec (24.6%) and Alberta (13.6%) have high foundational training opportunities (58.0%, 54.0% and 79.0%, respectively).⁹⁹

Analytical skills training is low among Nova Scotia (33.0% of programs with skills training) and in British Columbia (29.0%), and high among Newfoundland and Labrador (100.0%), Prince Edward Island (100.0%), the Yukon (90.0%), the Northwest Territories (78.0%), and Manitoba (73.0%). Provinces with a low agricultural sector participation approach skills training differently; for example, Nova Scotia (2.19% of Canada's agriculture workforce) and Prince Edward Island (1.6%) offer low foundational skills training but above average technical skills training (67.0% of programs with skills training). Comparatively, New Brunswick (2.1%) and Newfoundland and Labrador (0.4%) have elevated foundational skills training at 80.00% and 100.0%, respectively, with low technical skills training opportunities (13.0% and 0.0%, respectively).



Regional differences and proximity to agtech resources should be considered to improve upskilling opportunities to food sustainability program participants.

Wraparound program support in mentorship, networking and funding is important to supporting skills education, but highly variable depending on the type of organization. As expected, post-secondary Colleges and Universities offer extensive mentorship (87.7% of programs) and networking (92.3%) opportunities for participants. However, these post-secondary programs (15.4%) and community-serving organizations (29.9%) offer limited financial support for participants to engage in food sustainability initiatives. Community-serving organizations mapped generally show moderate support for mentorship programs (49.5%) and networking opportunities (45.4%).

Mentorship and financial support are common among programs seeking to build enterprise and entrepreneurs through food sustainability, including investor networks and institutions (100.0% offer mentorship and 66.7% offer financial support), as well as incubators/accelerators (60.0% and 100.0%, respectively).

Table 2

Food sustainability program wraparound support offerings, by organization ecosystem category

Ecosystem category	Number of programs	Programs offering mentorship (% of programs)	Programs offering networking (% of programs)	Programs offering financial support (% of programs)
Angel Investors/Investor Networks/Institutions	3	3 (100.0%)	1 (33.3%)	2 (66.7%)
Business Support Organizations	7	5 (71.4%)	3 (42.9%)	2 (28.6%)
College/University Inclusive (Public And Private)	65	57 (87.7%)	60 (92.3%)	10 (15.4%)
Community-Serving Organizations	97	48 (49.5%)	44 (45.4%)	29 (29.9%)
Corporations (Private)	3	0 (0.0%)	0 (0.0%)	1 (33.3%)
Employment or Settlement Service Providers	2	0 (0.0%)	2 (100.0%)	0 (0.0%)
Ethnic-Civic Organizations	4	3 (75.0%)	3 (75.0%)	0 (0.0%)
Foundations	1	1 (100.0%)	1 (100.0%)	1 (100.0%)
Government (Multiple Jurisdictions)	1	0 (0.0%)	0 (0.0%)	0 (0.0%)
Government (Federal)	1	1 (100.0%)	1 (100.0%)	1 (100.0%)
Government (Municipal)	2	1 (50.0%)	1 (50.0%)	0 (0.0%)
Incubators or Accelerators	5	3 (60.0%)	4 (80.0%)	5 (100.0%)
K-12 Education Inclusive (Public And Private)	1	1 (100.0%)	0 (0.0%)	0 (0.0%)
Other Skills Training Providers and Support Organizations	14	5 (35.7%)	6 (42.9%)	1 (7.1%)
Professional Associations	4	0 (0.0%)	1 (25.0%)	1 (25.0%)
Research Institutes or Think Tanks	5	0 (0.0%)	2 (40.0%)	0 (0.0%)
Skills Training and Workforce Development Organizations	5	5 (100.0%)	5 (100.0%)	0 (0.0%)
Small and Medium-Sized Enterprise (1-499 Employees)	7	3 (42.9%)	0 (0.0%)	1 (14.3%)
Unions	1	0 (0.0%)	1 (100.0%)	0 (0.0%)

Demographics of food sustainability training

An important criterion for skills training initiatives mapped is the inclusion of provisions for specific groups, including Indigenous Peoples and equity-deserving groups, which are historically not engaged in the agricultural sector given the stereotypes of farming as a low-skilled profession for white men.

It is rare that programs provided specific supports for 2SLGBTQ+ persons (three programs) or specifically targeted one ethnocultural or racialized groups (i.e. Francophones).^{100, 101} We did not consider the fact that a program is only offered in French as a targeted initiative for Francophones but rather a product of the program's location. Programs offering support to 2SLGBTQ+ persons focused on providing a gathering space for the community, and prioritized analytical and management skills, such as communication, problem-solving, teamwork and self-care that are applicable to agribusiness but with a focus on transferring these to daily life activities of participants.^{102, 103} Selective programs supported persons with disabilities; however, this is rare and offers similar analytical skills in communication, problem-solving, teamwork, and self-care through unique one-on-one support in animal care and cultivation.¹⁰⁴



*Review of the organizations providing support to Indigenous Peoples and equity-deserving groups shows **unequal distribution among the number of specifically targeted programs**, relative to the proportion of group membership.*

Review of the organizations providing support to Indigenous Peoples and equity-deserving groups shows unequal distribution among the number of specifically targeted programs, relative to the proportion of group membership.

Women, comprising 50.9% of Canada's total population in 2021, and with minimal variability among provinces and territories (about 48.8% to 51.3%),¹⁰⁵ are less targeted by food sustainability programs. Women may be included in other food sustainability programs with coincident skills training through intersections with their other equity-deserving group traits, as one in four (about 25.8%) women are part of a racialized population, one in four (about 27.1%) are newcomers and about 4.5% identify as Indigenous Peoples.¹⁰⁶

Table 3

Provincial and territorial distribution of mapped targeted skills training programs in food sustainability, by Indigenous Peoples and equity-deserving groups, relative to the proportion of the population

Province / Territory	Programs With Targeted Initiatives (% of Programs)	% of Programs for Women	% of Programs for Indigenous Peoples	% of Regional Population as Indigenous Peoples	% of Programs for Immigrants/ Newcomers	% of Regional Populations as Immigrants/ Newcomers
Alberta	24 (13.00)	4.2%	4.2%	5.5%	4.2%	23.6%
British Columbia	28 (14.00)	0.0%	7.1%	5.2%	7.1%	30.0%
Manitoba	15 (20.0%)	0.0%	20.0%	13.5%	0.0%	20.2%
New Brunswick	15 (33.0%)	0.0%	6.7%	4.1%	0.0%	5.9%
Newfoundland and Labrador	2 (50.0%)	0.0%	0.0%	9.3%	50.0%	2.9%
Northwest Territories	9 (67.0%)	11.1%	44.4%	39.8%	0.0%	10.4%
Nova Scotia	6 (0.0%)	0.0%	0.0%	5.1%	0.0%	7.7%
Nunavut	7 (100.0%)	14.3%	85.7%	73.5%	0.0%	3.2%
Ontario	65 (26.0%)	6.2%	10.8%	2.6%	3.1%	30.8%
Prince Edward Island	3 (67.0%)	0.0%	0.0%	2.1%	0.0%	9.4%
Quebec	13 (62.0%)	0.0%	46.2%	2.2%	7.7%	14.9%
Saskatchewan	26 (27.0%)	11.5%	15.4%	11.9%	3.9%	12.7%
Yukon	10 (50.0%)	10.0%	50.0%	18.9%	0.0%	13.9%

Regional differences in programs targeting Indigenous Peoples exist, namely in the Northern territories, where the proportion of programs targeting Indigenous Peoples is either similar or greater than the percentage of the regional population. Programs with specific skills training interventions for Indigenous Peoples in Nunavut (85.7% of programs), the Yukon (50.0%) and the Northwest Territories (44.4%) is greater than the proportion of the Indigenous population among Canada's territories (respectively 73.5%, 39.8%, and 18.9% of the population). Most regions have a higher proportion of food sustainability programs with targeted interventions for Indigenous Peoples than the proportion of the population, apart from mapped programs in Eastern Canada among Prince Edward Island, Newfoundland and Labrador, and Nova Scotia.

Food sustainability programs targeted to newcomers were generally lower than the proportion of the regional population. In Prince Edward Island, Manitoba, New Brunswick and Nova Scotia—as well the territories of the Yukon, Nunavut and the Northwest Territories—no mapped food sustainability programs specifically targeted immigrant and newcomer populations.





Barriers to Canadian Food Sustainability Programs

Skills training is important to improve sector participation, addressing food insecurity and supporting Canadian market competitiveness. There are a variety of food sustainability programs in Canada delivered predominantly by civic organizations and post-secondary degree, certificate and micro-credential programs; however, regional variability exists in the types of training and groups supported. In the following section we identify several barriers to upskilling and expanding food sustainability programs.

Skills training barriers

Skills are a primary deterrent to realizing growth in Canada's agricultural and agri-food sector. First, agriculture sector innovation, improved agtech adoption and, thus, Canadian market competitiveness require further upskilling to technical and analytical skills. Most food sustainability programs offer foundational skills training (about 57.8% of programs) that start and end with gardening through harvest in community gardens, plots and allotments. These initiatives may build sector interest but do not address sector stereotypes that women garden and men farm, or that agriculture is a low-skilled labour-intensive occupation.^{107, 108}

Currently, only 68.7% of food sustainability programs with skills training offer analytical training, compared to 46.9% with technical upskilling opportunities.

Agtech is disproportionately used in indoor agriculture projects, likely out of necessity (small cultivation footprint, short growing seasons requiring indoor cultivation). For instance, Scadding Court Community Centre in Toronto, Ontario offers opportunities for aquaponics training in a controlled-environmental agriculture setting,¹⁰⁹ while in Kuujjuaq, Quebec, a modular growing module from Growcer® is used by a community grocery store to grow local and culturally significant crops, utilizing and delivering training on vertical farming, chemical sensors and data aggregation platforms.¹¹⁰ Seeking opportunities to integrate technology into plot and field agriculture ensures there is not a stark skills discrepancy among agtech users in urban and remote areas, as compared to rural and other city areas, where interventions like community gardens are common and low-tech. Programs should consider upskilling opportunities to support agtech adoption in all projects—including traditional field and plot initiatives—and address stereotypes to support integration of diverse sector participants.

Second, there are discrepancies between what equity-deserving groups have identified barriers to participating in the sector, and which groups receive support. For instance, many 2SLGBTQ+ participants in Canadian agriculture face adverse barriers to participate in food programs, yet remain underprioritized.^{111, 112} Other groups, including immigrants/newcomers and Indigenous Peoples have several concerted programs and best practices to draw from to design skills training opportunities. Moving forward, programs should iteratively work to align offerings with equity-deserving sector participants in their communities.

Third, agtech companies and sector industries should be better leveraged for skills training. Where major agricultural technologies producers are in regions, they should be engaged to support the diffusion of these innovations to influence adoption. Canadian agtech companies are disproportionately located in Ontario (33.8% of Ag Tech companies), Alberta (16.7%) and Quebec (16.3%),¹¹³ but technical training in these regions is below average in Ontario (32.0% of food sustainability programs) and Alberta (8.0%) as compared to the high percentage of technical training observed among food sustainability programs in Quebec (69.0%). In the North, greenhouse and controlled-environmental agricultural facilities are expected to grow technology growth opportunities and Indigenous Peoples participation in food sovereignty and agriculture sector upskilling.^{114, 115}

Concerted programs are necessary to ensure industries provide skills training to their workforce that is applicable to Indigenous Peoples and equity-deserving groups, and integrating community definitions of food acceptability into programs promoting food production agency and skills development. There are opportunities to improve collaboration and expertise sharing from industry partners.

Fourth, academic partners need to be better engaged to support agtech skills training. Many agtech corporations generate products for large operations, but there are numerous agtech innovations generated by small businesses and university researchers—such as Weston Foundation’s Homegrown Challenge competitors—which support small enterprises.¹¹⁶ These innovations have not been mobilized well; regional initiatives to prioritize knowledge translation exist, but are few and far between, and academic partners in regional centres of excellence should be better engaged to support community food sustainability programs and skills training.

Preliminary ecosystem mapping of food sustainability programs in Canada identifies several gaps in the engagement of specific population segments. The following section will discuss the limitations and opportunities for continued engagement of women, Indigenous Peoples, as well as newcomers in food sustainability programs and skills training.

Barriers faced by women

Despite representing nearly half of the population, women are under-represented in agriculture. Women make unique and important contributions to sustainable enterprise practice,^{117, 118} and lead in emerging agtech for urban and vertical farming and agri-tourism, despite the predominant stereotypes of farmers as men and gardeners as women.¹¹⁹

First, more programs are needed to explicitly target women. Our ecosystem mapping exercise identified 11 programs (about 16.2% of programs with a target demographic) that support women. Many provinces and territories also do not have explicit programs for women in agriculture, including Newfoundland and Labrador, New Brunswick, Quebec, Manitoba, British Columbia, Prince Edward Island and Nova Scotia, despite a consistently high average of the female population across Canada of about 50%. Building on national efforts to engage women in agriculture,¹²⁰ more initiatives need to support women's business competencies and skills development needs and provide opportunities for continued upskilling and use of agtech.

Second, programs need to provide further skills development opportunities to women in rural contexts. Women are more educated than their men counterparts, which has enabled them to take advantage of new urban and indoor farming tools and technologies as they emerge.¹²¹ However, women are often not prioritized in rural programs,



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which often include community garden programs, where they do not have access to more technical skills training. Continued improvements on technology adoption can address sector representation and embedded stereotypes that women garden and men farm. Support should not only integrate agtech in greenhouse or controlled-environmental agriculture settings, but promote upskilling opportunities for women across rural, remote and urban food sustainability programs.

Barriers faced by immigrants and newcomers

Immigrants are relied on to fill Canada's labour shortage in agriculture and poised to address farm operator succession, but they are not equipped with the requisite skills to operate technologies, nor are talented and skilled newcomers attracted to the sector.^{122, 123, 124}

Many racialized newcomers in Canada face financial barriers, employment issues, racism and discrimination, language barriers, a lack of social networks and cultural barriers which

limit their access not only to primary food sustainability, but culturally sensitive training programs.¹²⁵

First, there is a lack of targeted interventions to address sector stereotypes for immigrants/newcomers to the sector. Many immigrants/newcomers view agriculture as a low-skilled labour position,^{126, 127} as they historically enter the agriculture and agri-food workforce through the temporary foreign worker program.¹²⁸ Targeted programs can address food insecurity, while providing a skills-based pathway for both established immigrants and newcomers to upskill in the agriculture and agri-food sector. Ideally, this can help bring necessary technical and analytical skills from immigrants/newcomers to agriculture, while addressing longstanding worker and operator shortages in the agriculture sector.

Second, there are regional discrepancies in skills training for immigrants/newcomers. Prince Edward Island, Manitoba, New Brunswick and Nova Scotia, as well as all three territories, currently do not offer targeted skills training initiatives for immigrants/newcomers, but have immigrant populations ranging from 3.19% to 10.37% of their population. In the territories, where controlled-environmental technologies are being adopted, there is a need for more greenhouse technologies training, including utilizing sensors in agriculture, data aggregation platforms and vertical farming. In Atlantic Canada, the small number of farm operators (about 7,500) has had to compete with large scale production in Ontario and

Alberta (40,000 to 50,000 operations), and has long positioned technology adoption as an opportunity to promote interprovincial market competitiveness.¹²⁹ While Atlantic provinces have high variation in technical skills training for the food sustainability programs mapped—ranging from 13.00% in New Brunswick to 67.00% in Nova Scotia and Prince Edward Island—policies can better incorporate agricultural skills with existing specific sector pathways, such as within the Atlantic Immigration Program.¹³⁰ Fostering food agency and acceptability are critical to agricultural analytical and technical skills acquisition among immigrant and newcomer groups, and can align with existing policy instruments.

Barriers faced by Indigenous Peoples

Engaging Indigenous Peoples in food sustainability initiatives is context specific to the community and region and must integrate traditional Indigenous methods of obtaining food.

First, we found many mapped food sustainability programs did not include specific community provisions for food acceptability or agency.¹³¹ We identified nearly 39 programs (57.4% of programs with a target demographic) which have specific training opportunities for Indigenous Peoples to participate in the agriculture and agri-food sector. Only seven made explicit mention of culturally appropriate foods for Indigenous Peoples. To ensure programs do not



perpetuate colonial legacy, as well-intentioned programs may,¹³² so they can provision culturally appropriate food and support food sovereignty, diverse lived experiences need to be braided into the discourse, strategy and execution of community food sustainability efforts.

Second, we found programs disproportionately engage Indigenous Peoples on reserve or community, and Indigenous Peoples in urban environments are often not supported. Many of Canada's Indigenous Peoples do not live on community. In 2021, about 62.5% of First Nations lived off-reserve, and 48.0% in urban areas; specific membership of Métis and Inuit People outside the community is not reported, but certainly a lack of targeted interventions in urban environments means these groups may not be supported.¹³³ Some programs exist, including two Anishinaabeg farmers who farm between

hydro field transmission towers in Toronto, Ontario and provide support for community food sovereignty and foundational training for Indigenous Peoples to create their own agricultural systems and to access healthy, culturally appropriate foods such as the Three Sisters (squash, corn and beans).¹³⁴ Moreover, at Toronto Metropolitan University, the Urban Farm Indigenous Foodways program provides community training in growing traditional medicines—including growing sumac, juniper and white cedar, as well as the Three Sisters plants and nearly 41 medicine plants—prioritizing making them accessible to Toronto's Indigenous community.¹³⁵ The successes of these few programs, among others supporting Indigenous Peoples,^{136, 137, 138, 139} are important to continue to bolster Indigenous Peoples' engagement in agriculture as they feel reflected in the offerings.



Conclusions and Recommendations

Canada has a critical need to address local food insecurity and support continued agriculture and agri-food sector participation to increase the highly skilled labour force and ensure operational continuity as retirements threaten sector continuity.

Improving food sustainability and addressing food security need to be priorities for governments at all levels, as well as businesses, community organizations and educational institutions. Considerable research has been done to address what is required and identify barriers to participation, as well as determine what wraparound supports are requisite to engage different equity-deserving groups in programs and skills training. This report has shown a wide range of diverse initiatives aimed to address food security and sustainability, many of which include skills training components. We found many programs offer foundational training, though upskilling opportunities are limited. Where programs provided concerted support to Indigenous Peoples and equity-deserving groups, we found community definitions of healthy and sustainable food are not always included. Further, the group supported does not always match community

composition, leaving some communities under-supported and under-represented in the sector. Predominantly, these include women and newcomers in rural environments and Indigenous Peoples in urban contexts.

At the same time, there is a gap in addressing the pressing issues related to skills and employment in the sector generally, as well as to support community-based initiatives, which for many program participants is their exposure to agricultural sector careers. In addition, with increased urbanization and moves away from single family dwellings, much of the traditional knowledge and informal learning about farming has been lost, and new strategies are needed to build competencies across increasingly diverse populations.

Recommendations

In the following section we propose several skills-based recommendations to improve sector participation, rectify food insecurity and offer meaningful pathways to skills training and the agriculture and agri-food sector for Indigenous Peoples and equity-deserving groups.

Address cultural preferences and stereotypes

More than one-half of Canadians still view agriculture as a traditional farming opportunity, despite the growing need for highly skilled professionals in biotechnology, food science, engineering and data analytics. Farming is highly gendered despite the fact that women are 30.4% of agribusiness operators, and women lead in urban areas in the adoption of agtech within controlled-environmental agriculture environments. The advancement of women in agriculture requires more specific skills training, especially in the many food sustainability initiatives where agtech is low cost and can be incrementally adopted. Women require further skills training support in non-greenhouse environments, which comprise most food sustainability programs (e.g., community gardens and plots), and to support agtech adoption and technical skills acquisition, to address the gendered stereotypes that men farm and women garden.

For immigrants and newcomers, negative cultural stereotypes from historically participating as labour through the temporary foreign worker program are limiting the transition of highly skilled newcomers into the agriculture and agri-food sector. While many of these groups participate in food sustainability programs, improved visibility and use of agtech, digital tools and technical specializations can help encourage transition into skilled sector opportunities.



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Mobilize knowledge from agtech producers to small farms

Effective partnerships with a community of academic, industrial and governmental partners are important to supporting food sustainability programs. Agricultural technology producers, as well as technical expertise from university and formal education partners, can be leveraged to further support skills pathing among program participants. Partnership is proven to improve educational offerings and learning outcomes and can improve access to funding and industry networking opportunities, which were low among mapped food sustainability programs.

Agtech producers should be better leveraged to support food sustainability programs. Small agtech producers are making scalable technologies, many of which can be applied to different contexts and enterprise sizes. Improved visibility is needed to support diverse agricultural business and small food sustainability programs to adopt these technologies.

Leverage educational expertise from post-secondary institutions

Organizations should also seek partnerships with post-secondary institutions and innovation hubs, which provide opportunities for regional networks to be engaged in more adoption of innovative agtech into food sustainability programs. Partnerships with post-secondary educational institutions and non-institutional educational partners can also improve the diversity and effectiveness of skills training offerings.

Address regional priorities in skills pathing

Regionally, skills training program deficits need to be addressed relative to provincial participation in the agriculture sector. Increased training programs ensure operation continuity and address concern of operation continuity following retirements of farm operators. For instance, training opportunities in Quebec and Alberta should be prioritized considering deficits. These opportunities have the potential to address elevated food insecurity, particularly in Alberta, which is among the highest in Canada.

Address culturally applicable training needs

Engaging Indigenous Peoples in food sustainability initiatives is highly context specific to the community and region and requires explicit wraparound and community support to address legacies of gardening and farming perpetuated by colonization and the residential school system. Common food sustainability programs which offer foundational skills training include community gardens, plots and field agriculture, and do not offer extensive opportunities for skills





Many of the analytical and technical skills training is delivered through community agriculture projects in urban environments and in the North, and these technologies are not applied to traditional community gardening projects.

development beyond learning how to cultivate plants from seed to harvest, nor do they often consider culturally appropriate foods. For Indigenous Peoples, skills pathing needs to build upon community knowledge and enable agency in food production for communities.

Expand upskilling

Many of the analytical and technical skills training is delivered through community agriculture projects in urban environments and in the North, and these technologies are not applied to traditional community gardening projects. Where existing food sustainability programs offer foundational skills training, there are opportunities to further upskill participants using agtech, including the adoption of environmental sensors for soil and air moisture, temperature monitoring, and vision-based systems for crop, disease, and pestilence monitoring. All these technologies, among others, can be integrated into existing community garden, plot and field agriculture initiatives at low costs.

Regional priorities for engaging women

Targeted food sustainability programs for women are few and far between, despite representing about 50% of the population across all provinces and territories. Improved offerings are needed in large agricultural producing provinces including Manitoba and Quebec, where none of the mapped programs included targeted interventions for women, and to address low targeted food sustainability initiatives in provinces like Ontario and Saskatchewan. Regional focuses are needed given the unique contexts to participate. In the prairies, programs should focus on integrating common technologies used for oilseed and grain commodity crops, dominant production in the area, including automated fertigation and irrigation systems, to grow sector participation. In Ontario, where adoption of technology among operations is already among the highest in Canada, women need skills training support for analytical skills to meet the demand in operation management and succession planning.

Regional priorities for engaging immigrants and newcomers

Regional opportunities for growth in food sustainability programs exist for immigrants, particularly as they are not targeted extensively in the provinces where their population percentage is high, including Alberta, British Columbia, Manitoba and Ontario. In Alberta, the agricultural sector has high demand for non-labour-intensive roles, including service contractors and

farm supervisors, and a high emphasis on analytical and interpersonal skills. Our mapping exercise identified Alberta has a generally low proportion of programs, relative to the average, that encourage both technical and analytical skills. This can be improved to include more specific pathways for newcomers. Ontario and British Columbia lead in agtech adoption but struggle with operation succession, despite minimally targeting newcomers in food sustainability programs. More programs to address community needs can address community perceptions of sector opportunities and promote participation among newcomers.

Regional priorities for engaging Indigenous Peoples

Our program mapping identified several programs for Indigenous Peoples in the North and on community and reserve; however, projects that support Indigenous Peoples that do not live on community or on reserve are needed, particularly for Indigenous Peoples in urban environments. In urban areas, more programs are needed to support Indigenous community sovereignty and local food production while providing opportunities for agriculture sector skills training to Indigenous Peoples. Attendant technical and analytical skills development opportunities should be a community priority and should consider education beyond foundational skills to provide technical and analytical upskilling, which could promote further agriculture sector participation and market differentiation.

Competency frameworks for food sustainability programs

Given the variety of different skills offered by food sustainability programs, a unifying competency framework is needed to understand how foundational skills can be upskilled into analytical and technical skills that are applicable to agtech adoption in both controlled-environmental agriculture and traditional food sustainability initiatives in community gardens, fields and allotments. Tailored competency frameworks to the different requirements for ethnocultural groups and different demographics are needed; more tailored support is needed to support skills development among the many diverse participants in food sustainability programs to adopt agtech.

Additional digital tools and artificial intelligence training

Participation in an agtech transition will also require additional competencies in artificial intelligence, data management and digital skills to ensure foundational literacy and tools to engage with agtech. Support is needed for the many small agribusinesses run by equity-deserving groups and Indigenous Peoples to provide necessary skills training.

Improved program evaluation

Many food sustainability programs address food sustainability in communities, but do not include or record the demographic details of participants. Support is needed to improve program evaluation and disaggregated data by food sustainability operations to capture the experiences of women, newcomers, Indigenous Peoples and other equity-deserving groups.

Appendix

Table 3A

Displaying the results of the ecosystem mapping exercise, including program location and offerings across different skills training opportunities.

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
5N2 Farms	Ontario	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	Yes	Yes
Advanced Agricultural Leadership Program	Ontario	Public Sector	Other Skills Training Providers and Support Organizations	Yes	No	Yes	No	No	Yes
Advancing Women in Agriculture (AWC)	Alberta	Private	Foundations	Yes	Yes	No	No	No	Yes
Agri diversity -CAHRC	Ontario	Public Sector	Employment or Settlement Service Providers	No	Yes	Yes	No	No	Yes
Agri Invest -Sustainable Canadian Agricultural Partnership	Ontario	Public Sector	Angel Investors/ Investor Networks/ Financial Institutions	No	No	Yes	No	Yes	No
Agri jobs -CAHRC	Ontario	Public Sector	Employment or Settlement Service Providers	Yes	Yes	Yes	No	No	Yes
Agri Imi -CAHRC	Ontario	Public Sector	Research Institutes / Think Tanks	No	No	Yes	No	No	Yes
AGRI Skills -CAHRC	Ontario	Public Sector	Other Skills Training Providers and Support Organizations	Yes	No	Yes	No	Yes	Yes
Agri talent -CAHRC	Ontario	Public Sector	Business Support Organizations	No	Yes	Yes	No	Yes	Yes
Agri Tech Innovation - Agri-Food Management Excellence (AME)	Alberta	Public Sector	Business Support Organizations	Yes	No	Yes	No	Yes	Yes

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
Agri workforce issues - CAHRC	Ontario	Public Sector	Research Institutes / Think Tanks	No	No	Yes	No	No	Yes
Agribusiness & Agricultural Business Diplomas/Degrees	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No
Agribusiness Diploma Program	Saskatchewan	Education	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No
Agribusiness Risk and Insurance Management	Saskatchewan	Education	College/University Inclusive (public and private)	Yes	No	Yes	No	Yes	No
Agricultural Equipment Operation & Maintenance Training - Skilled Trades Ontario	Ontario	Public Sector	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Agriculture Knowledge Centre	Saskatchewan	Public Sector	Other Skills Training Providers and Support Organizations	Yes	No	No	No	No	Yes
Agriculture Training Program	Newfoundland and Labrador	Not-For-Profit	Other Skills Training Providers and Support Organizations	Yes	Yes	Yes	No	No	Yes
AgriNB Entrepreneurship Training	New Brunswick	Public Sector	Other Skills Training Providers and Support Organizations	Yes	No	Yes	No	No	Yes
Alberta Avenue Community Garden	Alberta	Private Sector	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
Alberta Environment Farm Plan	Alberta	Education	Business Support Organizations	Yes	Yes	No	No	Yes	Yes
Algonquin College	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No
Arctic Focus, Nauvuk greenhouse-Arctic Research Foundation (ARF)	Nunavut	Not-For-Profit	Research Institutes / Think Tanks	Yes	No	Yes	Yes	No	No
ArctiConnexion	Quebec	Not-For-Profit	Other Skills Training Providers and Support Organizations	Yes	No	Yes	Yes	No	No
Arviat Wellness Centre Food Bank	Nunavut	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	Yes	Yes
askîy Project - CHEP Good Food Inc.	Saskatchewan	Not-For-Profit	Other Skills Training Providers and Support Organizations	Yes	Yes	No	No	No	Yes

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
Atikamekw Nehirowisiw Community of Wemotaci	Quebec	Education	K-12 Education Inclusive (public and private)	Yes	Yes	Yes	Yes	Yes	Yes
Aurora Farm	Manitoba	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Ausiris	Quebec	Education	College/University Inclusive (public and private)	Yes	Yes	Yes	Yes	Yes	Yes
B.C. Greenhouse Growers Association	British Columbia	Not-For-Profit	Other Skills Training Providers and Support Organizations	Yes	Yes	Yes	No	No	Yes
Bâtiment 7	Quebec	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	Yes	No	Yes
BC Hothouse	British Columbia	Private Sector	Other Skills Training Providers and Support Organizations	No	Yes	No	No	No	Yes
BioEnterprise	Ontario	Private	Incubators/Accelerators	Yes	Yes	Yes	Yes	Yes	No
Boreal College	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Brampton Off-Grid Food Shed	Ontario	Public (Broader)	Government (Municipal)	Yes	Yes	Yes	Yes	Yes	Yes
Brewer Park Community Garden & Geodesic Dome Greenhouse	Ontario	Public (Broader)	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
Burnaby Community and Continuing Education	British Columbia	Education	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No
Business Development Program	Prince Edward Island	Public (Broader)	Business Support Organizations	Yes	No	Yes	No	Yes	No
Business Management Programs (Various)	Alberta	Education	College/University Inclusive (public and private)	Yes	No	Yes	No	Yes	No
Calgary Catholic Immigration Society (CCIS)	Alberta	Public (Broader)	Ethnic-civic	Yes	Yes	No	No	No	Yes
Canadian Northern Economic Development Agency	Northwest Territories	Public Sector	Government	Yes	No	Yes	No	Yes	Yes
Canadian Organic Growers	Ontario	Not-For-Profit	Professional Associations	Yes	No	Yes	No	No	Yes
CeGep (Various)	Quebec	Education	College/University Inclusive (public and private)	Yes	Yes	Yes	Yes	Yes	No
Children's Garden at Robert F. Legget Park	Ontario	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
City Street Farm	Saskatchewan	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	No
ColdAcre	Yukon	Private Sector	Corporations	No	No	Yes	Yes	Yes	Yes
Common Ground Garden Society	Alberta	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Community Gardening Network	Ontario	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	Yes	Yes
Conestoga College	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No
Crescent Valley Resource Centre	New Brunswick	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	Yes	No
Dalhousie Community Association	Alberta	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
Dalhousie University (Faculty of Agriculture): Landscape Horticulture Certificate	Nova Scotia	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Dalhousie University (Faculty of Agriculture): Organic Agriculture	Nova Scotia	Education	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No
Dalhousie University (Faculty of Agriculture): Plant Science BSc	Nova Scotia	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Dalhousie University (Faculty of Agriculture): Agricultural Science Msc and PhD	Nova Scotia	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Delki Dozzi Community Food Forest (Sudbury)	Ontario	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	Yes	Yes
Durham College (Faculty of Hospitality and Horticultural Science - HHS)	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Ecology North	Northwest Territories	Private	Small and Medium Enterprise (1-499 employees)	Yes	Yes	Yes	Yes	Yes	Yes
Edmonton Community Garden Network	Alberta	Not-For-Profit	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
EtobiGrow	Ontario	Private	Small and Medium Enterprise (1-499 employees)	Yes	Yes	No	No	No	No
Everdale	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
Fanshawe College	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Farm Business Management Programs	Manitoba	Public Sector	College/University Inclusive (public and private)	Yes	No	Yes	No	Yes	No
FCC Women Entrepreneur Program	Saskatchewan	Public Sector	Angel Investors/Investor Networks/Financial Institutions	Yes	No	Yes	Yes	Yes	Yes
FED Urban Agriculture (Greater Victoria)	British Columbia	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Food Down the Road (FDTR)	Ontario	Public (Civil Service)	Unions	Yes	Yes	Yes	No	Yes	Yes
Food for All NB	New Brunswick	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	Yes	Yes
Food from Home = Food for Home (Guelph)	Ontario	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Food Matters Manitoba	Manitoba	Not-For-Profit	Other Skills Training Providers and Support Organizations	No	Yes	Yes	No	Yes	Yes
Food4Good Community Food Centre:	Alberta	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
FoodPreneur: Start Path	Ontario	Private	Incubators/Accelerators	Yes	Yes	No	Yes	Yes	Yes
FoodPreneur: Scale Path	Ontario	Private	Incubators/Accelerators	Yes	Yes	No	No	Yes	Yes
FoodShare Toronto	Ontario	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Fred Victor	Ontario	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	No
Fredericton's Hayes Farm	New Brunswick	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	Yes	No
Fruit and Vegetable Growers of Canada	Ontario	Private Sector	Professional Associations	No	No	Yes	No	Yes	Yes
Gaia College: Organic Land Care Certificate	British Columbia	Private	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No
Gaia College: Organic Gardener Course	British Columbia	Private	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No
Gaia College: Growing Food Course	British Columbia	Private	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
Gaia College: Organic Horticulture Specialist	British Columbia	Private	College/University Inclusive (public and private)	Yes	No	No	No	Yes	No
Gameti Greenhouse & Farm, Tlicho Government	Northwest Territories	Public Sector	Community-Serving Organizations	No	Yes	Yes	No	Yes	Yes
Garden Cities	New Brunswick	Non-profit	Community-Serving Organizations	Yes	No	No	No	No	No
Garden Patch	Saskatchewan	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Green Calgary	Alberta	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Green Igloo by Arctic Acres - Growing Spaces	Nunavut	Private Sector	Corporations	No	No	Yes	Yes	No	No
Greener Village	New Brunswick	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	No
Greenhouse in a Box - Assiniboine College	Manitoba	Public Sector	College/University Inclusive (public and private)	No	No	Yes	Yes	No	No
Grow Calgary	Alberta	Not-For-Profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes
Grow Regina	Alberta	Not-For-Profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes
GROW whistler - AWARE	British Columbia	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	Yes	No	Yes
Growcer Inc. Root Camp	Ontario	Not-For-Profit	Corporations	Yes	Yes	Yes	Yes	No	Yes
Growing North	Nunavut	Private	Small and Medium Enterprise (1-499 employees)	Yes	Yes	Yes	No	Yes	No
Harvest Manitoba	Manitoba	Private Sector	Community-Serving Organizations	No	Yes	No	No	No	Yes
Hay River Community Garden	Northwest Territories	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
Highfield Farm	Alberta	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
Highfield Regenerative Farm	Alberta	Private Sector	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Holland College: Climate Smart Agrology for Economic and Sustainable Production	Prince Edward Island	Education	College/University Inclusive (public and private)	Yes	No	Yes	Yes	Yes	No
Holland College: Climate Smart Agriculture: Fundamentals	Prince Edward Island	Education	College/University Inclusive (public and private)	Yes	No	Yes	Yes	Yes	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Skills Training	Interpersonal Skills Training
Hope Blooms Community Greenhouse (Halifax)	Nova Scotia	Private Sector	Research Institutes / Think Tanks	No	Yes	Yes	Yes	No	No
Humber College	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	No	No
Humber Polytechnic	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Huntley Community Association	Ontario	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	No
Ignatius Farm	Ontario	Non-profit	Business Support Organizations	Yes	Yes	No	No	Yes	Yes
Île-à-la-Crosse Garden	Saskatchewan	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Indigenous Agriculture - CAHRC Diversity	Ontario	Public Sector	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Indigenous Health Centre of Tiohtià:ke	Quebec	Public (Broader)	Ethnic-civic	Yes	Yes	Yes	Yes	Yes	Yes
Inuvik Community Greenhouse	Northwest Territories	Not-For-Profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes
Investment Agriculture Foundation of BC (IAF)	British Columbia	Public (Broader)	Skills Training and Workforce Development Organizations	Yes	No	Yes	Yes	Yes	Yes
Iqaluit Community Greenhouse Society	Nunavut	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	Yes	Yes
Iqaluit Greenhouse Society	Ontario	Not-For-Profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes
Jelly Academy	British Columbia	Education	Skills Training and Workforce Development Organizations	Yes	No	Yes	Yes	Yes	No
Just Food - Alimentation Juste	Ontario	Non-profit	Small and Medium Enterprise (1-499 employees)	Yes	Yes	Yes	Yes	Yes	Yes
Kinngait Community Greenhouse - Green Iglu	Nunavut	Not-For-Profit	Community-Serving Organizations	Yes	Yes	Yes	Yes	No	Yes
Klondike Valley	Yukon	Public Sector	Research Institutes / Think Tanks	No	No	Yes	No	No	Yes
Kuujjuaq Greenhouse	Ontario	Public Sector	Community-Serving Organizations	Yes	Yes	Yes	No	Yes	Yes
Kwantlen Polytechnic University	British Columbia	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
Langara College	British Columbia	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Le Dépôt (NDG)	Quebec	Not-For-Profit	Community-Serving Organizations	No	Yes	No	No	No	Yes
Leif Erickson Park Food Forest	Saskatchewan	Not-For-Profit	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
Loving Spoonful Community Harvest Markets (Kingston)	Ontario	Not-For-Profit	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
Lufa Farms (Montreal)	Quebec	Not-For-Profit	Community-Serving Organizations	Yes	No	No	No	No	No
Lutsel K'e Community Greenhouse	Northwest Territories	Public Sector	Community-Serving Organizations	No	Yes	No	No	No	Yes
Manitoba Métis Federation Greenhouse Network	Manitoba	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
McGill University (Faculty of Agricultural and Environmental Sciences - AES): Farm Management and Technology	Quebec	Education	College/University Inclusive (public and private)	No	No	No	Yes	Yes	No
McGill University (Faculty of Agricultural and Environmental Sciences - AES): B.Sc. (Ag.Env. Sc) Major in Sustainable Agricultural Systems	Quebec	Education	College/University Inclusive (public and private)	No	No	No	Yes	Yes	No
McGill University (Faculty of Agricultural and Environmental Sciences - AES): Post-baccalaureate certificate in Ecological Agriculture	Quebec	Education	College/University Inclusive (public and private)	No	No	No	No	Yes	No
Nanaimo Association for Community Living	British Columbia	Private	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
National Women in Agriculture and Agri-Food Network Project - CAHRC	Ontario	Non-profit	Other Skills Training Providers and Support Organizations	No	No	Yes	No	Yes	Yes
Naujaat Greenhouse - Growing North - Enactus Ryerson University	Nunavut	Non-profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes
NB Community Harvest Gardens	New Brunswick	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
NCIAF Pitch Competition	British Columbia	Non-profit	Angel Investors/ Investor Networks/ Financial Institutions	No	No	Yes	No	No	Yes
New Brunswick Environmental Network	New Brunswick	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	Yes	Yes	Yes
Newviq'vi General Store	Quebec	Private	Small and Medium Enterprise (1-499 employees)	Yes	No	No	No	Yes	No
Next Gen Agriculture Mentorship Program	Saskatchewan	Non-profit	Business Support Organizations	Yes	No	Yes	No	No	Yes
North Island College: Farmworker Fundamentals	British Columbia	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
North Island College: Market Gardener	British Columbia	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Northern Farm Training Institute	Northwest Territories	Private	Small and Medium Enterprise (1-499 employees)	Yes	Yes	Yes	Yes	Yes	No
Northern Hills Community Association	Alberta	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Northern Manitoba Food, Culture, Community Collaborative (NMFCCC)	Manitoba	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Northwest Food Entrepreneurship Training Program	British Columbia	Non-profit	Business Support Organizations	Yes	No	Yes	No	No	Yes
Norway House Cree Nation	Manitoba	Private	Small and Medium Enterprise (1-499 employees)	Yes	Yes	Yes	Yes	Yes	Yes
NorWest Harvest	Saskatchewan	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Off Bank Community Garden	Ontario	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	No
Olds College	Alberta	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Ontario Greenhouse Vegetable Growers	Ontario	Non-profit	Professional Associations	No	No	Yes	No	No	No
Ontario Growing Community Greenhouse	Ontario	Non-profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes
Palette Skills	National	Education	Skills Training and Workforce Development Organizations	Yes	Yes	Yes	Yes	Yes	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
Park and Pine	New Brunswick	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	No
Peter McKee Community Garden	New Brunswick	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	No
Prairie Urban Farm	Alberta	Non-profit	Community-Serving Organizations	No	Yes	No	No	No	Yes
Progressive Intercultural Community Services (PICS) Society	British Columbia	Public (Broader)	Government (Federal)	Yes	Yes	Yes	Yes	Yes	Yes
Qajuqturvik	Nunavut	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	Yes	Yes
Rainbow Community Garden	Manitoba	Non-profit	Community-Serving Organizations	No	Yes	No	No	No	Yes
Rangeview (Calgary)	Alberta	Non-profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes
Red Deer Dream Centre	Alberta	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Red Deer Food Bank	Alberta	Public (Broader)	Community-Serving Organizations	Yes	Yes	Yes	No	Yes	Yes
Regina Food Bank	Saskatchewan	Non-profit	Community-Serving Organizations	No	Yes	No	No	No	Yes
Royal Roads University: Bachelor of Business Administration in Innovation and Sustainability	British Columbia	Education	College/University Inclusive (public and private)	Yes	Yes	No	No	Yes	No
Royal Roads University: Environment and Ecology	British Columbia	Education	College/University Inclusive (public and private)	Yes	Yes	No	No	Yes	No
Salluit Community Greenhouse	Quebec	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	Yes	Yes	Yes
Saskatchewan Polytechnic: Sensors for Agriculture	Saskatchewan	Education	College/University Inclusive (public and private)	Yes	No	Yes	Yes	Yes	No
Saskatchewan Polytechnic: IOT AgriTech Essentials	Saskatchewan	Education	College/University Inclusive (public and private)	Yes	No	Yes	Yes	Yes	No
Saskatchewan Polytechnic: Farming Using Smart Technology	Saskatchewan	Education	College/University Inclusive (public and private)	Yes	No	Yes	Yes	Yes	No
Saskatchewan Polytechnic: Machine Learning and Agriculture	Saskatchewan	Education	College/University Inclusive (public and private)	Yes	No	Yes	Yes	Yes	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
Saskatoon Food Bank & Learning Centre	Saskatchewan	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
Scadding Court Community Centre: Roots and Shoots	Ontario	Public (Broader)	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
Scadding Court Community Centre: Aquaponics	Ontario	Public (Broader)	Community-Serving Organizations	Yes	Yes	No	Yes	No	Yes
Scadding Court Community Centre: Urban Agriculture Program	Ontario	Public (Broader)	Community-Serving Organizations	Yes	Yes	No	No	No	Yes
Seneca College	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Shining Horizons Care Farm	New Brunswick	Non-profit	Skills Training and Workforce Development Organizations	Yes	Yes	Yes	Yes	Yes	Yes
Siloam Mission	Manitoba	Non-profit	Community-Serving Organizations	No	No	Yes	No	No	Yes
Sioux Lookout First Nation Health Authority	Ontario	Public Sector	Community-Serving Organizations	Yes	No	Yes	Yes	No	Yes
Skills Development and Ag Education	Manitoba	Public Sector	Other Skills Training Providers and Support Organizations	Yes	No	Yes	No	No	Yes
Sole Food Street Farms (Downtown Eastside, Vancouver)	Saskatchewan	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	Yes
South Zone Community Garden	Saskatchewan	Non-profit	Community-Serving Organizations	No	Yes	No	No	No	Yes
Spence Neighbourhood Association (SNA) Community Greenhouse Garden	Manitoba	Non-profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes
St. Joe's Supper Table Community Garden	Ontario	Non-profit	Community-Serving Organizations	Yes	Yes	No	No	No	No
Stonebridge Community Garden	Saskatchewan	Non-profit	Community-Serving Organizations	No	Yes	No	No	No	Yes
Succession Planning - Agriculture Alliance NB	New Brunswick	Non-profit	Community-Serving Organizations	Yes	No	No	No	No	Yes
Sunalta Community Association Garden	Alberta	Non-profit	Community-Serving Organizations	No	Yes	No	No	No	Yes
Sunnyside Farm	Yukon	Non-profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes
Supporting Growth for Women in Agri-Food - FEAD	Saskatchewan	Non-profit	Incubators/ Accelerators	Yes	No	No	No	No	Yes
Sweet Williams Farm	Ontario	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	No	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
Territorial Agrifood Association	Northwest Territories	Private	Incubators/ Accelerators	Yes	Yes	Yes	No	Yes	Yes
The Giving Garden	Ontario	Non-profit	Community- Serving Organizations	No	Yes	No	No	No	Yes
The Good Food Project	Ontario	Non-profit	Community- Serving Organizations	No	Yes	No	No	No	Yes
The Growing Place Community Garden & Greenhouse (Saint John)	New Brunswick	Non-profit	Community- Serving Organizations	No	Yes	Yes	No	No	Yes
The Meechim Project: Aki Foods & Garden Hill First Nation	Manitoba	Non-profit	Community- Serving Organizations	Yes	Yes	Yes	No	Yes	Yes
The Nova Scotia Greenhouse industry	Nova Scotia	Public (Broader)	Professional Associations	No	No	Yes	No	No	No
The Stop's Green Barn	Ontario	Non-profit	Community- Serving Organizations	Yes	Yes	Yes	No	No	Yes
Thrive Academy	Ontario	Public (Broader)	Other Skills Training Providers and Support Organizations	Yes	No	Yes	No	No	Yes
Toronto and Region Conservation Authority	Ontario	Public (Broader)	Government (Municipal)	Yes	Yes	No	Yes	Yes	Yes
Toronto Urban Farmer Training (TUFT) (Seneca)	Ontario	Education	Skills Training and Workforce Development Organizations	Yes	Yes	Yes	Yes	Yes	Yes
Tr'ondëk Hwëch'in	Yukon	Non-profit	Community- Serving Organizations	No	Yes	Yes	No	No	Yes
Tr'ondëk Hwëch'in Teaching and Working Farm	Yukon	Education	College/ University Inclusive (public and private)	Yes	Yes	Yes	Yes	Yes	Yes
Tuktoyaktuk Community Greenhouse	Northwest Territories	Non-profit	Community- Serving Organizations	No	Yes	Yes	No	No	Yes
UNB Campus and Municipal Community Gardens (Fredericton, Saint John)	New Brunswick	Public (Broader)	Community- Serving Organizations	No	Yes	No	No	No	Yes
University of Alberta (Faculty of Agricultural, Life & Environmental Sciences - ALES): Bachelor of Science in Agriculture	Alberta	Education	College/ University Inclusive (public and private)	No	No	No	Yes	Yes	No
University of Alberta (Faculty of Agricultural, Life & Environmental Sciences - ALES): Bachelor of Science in Agricultural/ Food Business Management	Alberta	Education	College/ University Inclusive (public and private)	No	No	No	No	Yes	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Skills Training	Interpersonal Skills Training
University of British Columbia (Faculty of Land and Food Systems - LFS): Food Science (MSc, PhD)	British Columbia	Education	College/University Inclusive (public and private)	No	No	No	Yes	Yes	No
University of British Columbia (Faculty of Land and Food Systems - LFS): Integrated Studies in Land & Food Systems (MSc, PhD)	British Columbia	Education	College/University Inclusive (public and private)	No	No	No	Yes	Yes	No
University of British Columbia (Faculty of Land and Food Systems - LFS): Plant Science (MSc, PhD)	British Columbia	Education	College/University Inclusive (public and private)	No	No	No	Yes	Yes	No
University of Guelph Ontario Agricultural College: Crop Science (BSc Agr)	Ontario	Education	College/University Inclusive (public and private)	No	No	Yes	Yes	Yes	No
University of Guelph Ontario Agricultural College: Horticulture	Ontario	Education	College/University Inclusive (public and private)	No	Yes	No	Yes	Yes	No
University of Guelph Ontario Agricultural College: Honours Agriculture	Ontario	Education	College/University Inclusive (public and private)	No	Yes	No	Yes	Yes	No
University of Guelph Ontario Agricultural College: Associate Diploma in Agriculture	Ontario	Education	College/University Inclusive (public and private)	Yes	Yes	No	Yes	Yes	Yes
University of Guelph Ontario Agricultural College: Associate Diploma in Horticulture	Ontario	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	Yes
University of Manitoba (Faculty of Agricultural and Food Sciences): Agronomy (BSc)	Manitoba	Education	College/University Inclusive (public and private)	No	No	No	Yes	Yes	No
University of Manitoba (Faculty of Agricultural and Food Sciences): Diploma in Agriculture	Manitoba	Education	College/University Inclusive (public and private)	No	No	No	Yes	Yes	No
University of Saskatchewan (College of Agriculture and Bioresources - AgBio): Kanawayihetaytan Askiy	Saskatchewan	Education	College/University Inclusive (public and private)	Yes	No	No	Yes	Yes	No

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
University of Saskatchewan (College of Agriculture and Bioresources - AgBio): Precision Agriculture	Saskatchewan	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
University of Saskatchewan (College of Agriculture and Bioresources - AgBio): Introductory Agriculture	Saskatchewan	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
University of Saskatchewan (College of Agriculture and Bioresources - AgBio): Agronomy	Saskatchewan	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
University of Saskatchewan (College of Agriculture and Bioresources - AgBio): Crop Science	Saskatchewan	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
University of Saskatchewan (College of Agriculture and Bioresources - AgBio): Horticulture Science	Saskatchewan	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
University of the Fraser Valley (Agriculture Department): Horticulture Crop Production and Protection	British Columbia	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
University of the Fraser Valley (Agriculture Department): Agriculture Technology diploma	British Columbia	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
University of the Fraser Valley (Agriculture Department): Bachelor of Agricultural Science	British Columbia	Education	College/ University Inclusive (public and private)	Yes	No	No	Yes	Yes	No
Urban Agriculture & Hidden Harvest Ottawa	Ontario	Non-profit	Community-Serving Organizations	No	Yes	No	No	No	Yes
Urban Bounty	British Columbia	Private	Community-Serving Organizations	Yes	Yes	No	No	No	No
Vaughn Harvey YMCA	New Brunswick	Non-profit	Community-Serving Organizations	No	Yes	No	No	No	No
Western Environment Centre	Newfoundland and Labrador	Non-profit	Community-Serving Organizations	No	Yes	Yes	No	No	Yes

Food Sustainability Program Name	Province or Territory	Sector Type	Ecosystem Category	Offer Training	Foundational Skills Training	Analytical Skills Training	Technical Skills Training	Resource Management Skills Training	Interpersonal Skills Training
Yellowknives Dene First Nation Greenhouse: Gardening and Growing in Dettah	Northwest Territories	Public (Broader)	Ethnic-civic	Yes	Yes	Yes	No	No	Yes
Yellowknives Dene First Nation Greenhouse: Gardening and Growing in Ndilo	Northwest Territories	Public (Broader)	Ethnic-civic	Yes	Yes	Yes	Yes	Yes	Yes
Youth in Food Systems Program	Ontario	Non-profit	Community-Serving Organizations	Yes	Yes	Yes	No	Yes	Yes
Yukon Aboriginal Women's Council	Yukon	Non-profit	Ethnic-civic	Yes	Yes	Yes	Yes	No	Yes
Yukon Agricultural Association	Yukon	Public (Broader)	Other Skills Training Providers and Support Organizations	No	No	Yes	No	Yes	Yes
Yukon Food Security Network	Yukon	Non-profit	Community-Serving Organizations	No	Yes	Yes	Yes	No	Yes
Yukon Gardens	Yukon	Non-profit	Community-Serving Organizations	No	Yes	No	No	No	No



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