RBC
Thought
Leadership

The Next Generation of Growth

Cultivating a new crop of agriculture talent and innovators

Key Takeaways

Canadian agriculture has immense potential but an innovation drain is slowing it down. Canada is home to some of the world's most productive soils and innovative farmers. But agriculture's annual growth in productivity has declined to about 1% over the past decade from 2% the previous decade, suggesting that few breakthrough innovations are making it to farms.

The sector is not attracting enough talent. Job vacancy rates are 1.5% above the national average. Less than 1% of STEM and business graduates, who play increasingly important roles on the modern farm, are choosing occupations in agriculture.

The research and development system is becoming less diverse. Public investment in agriculture knowledge generation, which includes R&D, has declined by 15% since 2010. Private sector outsourced R&D to universities is down 77% over the past five years. And the number of enterprises conducting R&D in the past decade has shrunk by 29%.

Other countries are pulling ahead. Canada has fallen behind Australia, the U.S., Japan, and Brazil in public investment in agriculture knowledge generation. Home-grown agriculture commercialization is in a slump as the country's trade balances grow in innovation areas including agriculture chemicals, fertilizers, and services.

Commercialization of agriculture solutions are headed south. Investment in American agri-food technology startups has been 22 times larger than Canada's over the past 5 years. The outsized market for investment in the U.S. is pulling Canadian innovation south for capital, mentorship, and market application.

Canada's agriculture sector has all the ingredients to be the best in the world—productive soils, temperate climate, advanced on-farm mechanization, and a growing agri-food manufacturing sector. The size of the opportunity for Canada really comes into focus when you consider the scale of production as a breadbasket to the world, rapid development of digital tools, which are transforming every aspect of farming, and growing access to expand in high-potential export markets, most notably in Europe, the Middle East, and Asia.

Capitalizing on this moment, however, won't be easy. Productivity has been steadily declining in recent years.1 And the sector has struggled to attract the right mix of talent and maintain the level of investment in R&D that is required to remain a global leader. Addressing these challenges as the sector undergoes a generational shift is not only essential for strengthening the resilience and competitiveness of Canadian agriculture but also for advancing the country's broader pro-growth ambitions. It can unlock new economic opportunities, keep innovation within Canada's borders, and position the country as a global leader in sustainable, high-quality agri-food production. But Canada needs a gameplan. One that starts with a strategy that sets the next generation of agriculture leaders up for success.

Shrinking the talent gap

The Canadian agriculture sector needs more diverse, highly qualified talent to innovate. Job vacancy rates in the sector have been, on average, 1.5% higher than national vacancy rates over the past 10 years.[2] And it's only getting worse. The Canadian Agricultural Human Resource Council estimates that the sector's domestic labour gap could grow to more than 100,000 by 2030.[3] And that's before 40% of Canadian farmers hit retirement age by 2033.[4] Not everyone will call it quits, of course, but there is no doubt that the sector is on the verge of a massive shift.

From a technological standpoint, it already is. Advanced technology—automated tractor steering and animal feeding, robotic milkers, and GIS for soil mapping—is commonplace on today's Canadian farms. And it's big business. The number of farmers reporting annual revenues over $1 million has grown year-over-year since 2015, up 67% in 2023.[5]

Automation demands diversified skills: Farmers remain the cornerstone of the sector, but the industry needs new skills to embrace the technological revolution that's underway. All kinds of professions—from engineers and data scientists to marketers and business administrators—play crucial roles. The Conference Board of Canada revealed that 1 in 3 jobs in agriculture could be automated in the next decade.[6] This suggests an opportunity to mitigate the projected exponential growth in the on-farm labour gaps, but demands more STEM-trained talent applying their expertise to agriculture. And yet, attracting diverse, highly qualified talent, has proven challenging.

The talent pool is shrinking: In 1931, 1 in 3 Canadians were part of the farm population; in 2021, it was 1 in 61—or 1.6% of the country's population.[7] While a testament to advances in production systems and technology, it is also a barrier to attracting talent. While younger generations in the farm population are more likely drawn to agriculture careers, there's a need to attract a new talent pool. But many Canadians with engineering, business and computer science degrees are unaware that the sector needs their skills. If Canadians are not exposed to, for example, how engineering, business and computer science is applied to the agriculture sector via robotics, the operating of multi-million-dollar farming businesses or creating soil-health monitoring software, it is unlikely those with that skillset will consider growing their careers in the sector.

For proof, look no further than postsecondary enrollment. Agriculture and natural resources are the second smallest field of study in Canada, only ahead of personal improvement

and leisure.[8] And those with agriculture-focused diplomas and degrees in the workforce are concentrated in general agriculture and production (32%), horticulture business and services (19%), veterinary technician, administration, and medicine (18%) and food, plant and animal sciences (18%).[9]

Agriculture grads are not landing in increasingly influential professions such as policy, data, trades and finance. These occupation fields have an important role in managing risks for agriculture but less than 1.5% in each field have some form of agriculture-focused post-secondary training.[10] That's a missed opportunity for entrepreneurial activity in applying data and computer scientist, finance, and trade technician skills to unlock new ways to approach farm management, automation, and financial capital in agriculture.

A path forward

Creating more experiential and workplace learning opportunities for students is one way to break down silos when it comes to fields of study, attract those from outside of agriculture disciplines, and build up Canada's agriculture talent pool.

Collaboration across faculties on college and university campuses might be one place to start to offer students more diverse courses and experiences that are not conventionally born from agriculture departments. For example, Olds College, a uniquely agriculture focused institute in Alberta, offers programs in digital agriculture that includes a wide range of courses, including plant science and data management and analytics. Creating cross-disciplinary hubs also provide a centralized place to expose students to new skills and tools like the University of Guelph's AI for Food, an AI and data hub for agri-food.

But to truly advance student exposure, non-agriculture institutions should consider doing more to connect students to career opportunities in agriculture. This requires fostering academic and industry relationships that could be catalyzed by non-agriculture academics attending existing agriculture conferences that typically only attract delegates from within the sector to learn about the opportunities for their students.

Curating workplace placements in agriculture would give students not enrolled in agriculture degrees a first-hand look at the sector's career path potential. Greater work placement opportunities require greater engagement from the sector, which is especially important at a time when disruptive technologies like AI are reducing entry level jobs. Sector engagement could build upon successful programs like the Youth Employment and Skills Program (YESP). Training and youth experience programs like YESP could also consider developing STEM, business or sustainability recruiting streams for youth that directly respond to skills demanded in the sector.

1 in 3 jobs in agriculture could be automated in the next decade"

Case Study

Diversifying delivery—Network approach to upskilling agriculture's talent pool

Sustainable Food Systems for Canada's (SF4C) approach is leveraging a network of education institutions to deliver experiential learning for the next generation.

Kick-started by a federal research grant, SF4C is an agri-food training-and-innovation platform designed to connect learners inside and outside of agriculture fields of study and occupations to agri-innovation skills that the sector needs to grow. Launched in 2025, the pan-Canadian network includes 13 universities and colleges, Indigenous organizations, incubators, and industry innovation groups to offer the following:

- **Skills:**

  Training of thousands of highly skilled, job-ready professionals by offering workplace experience and interdisciplinary training in agri-food innovation through upskilling platforms like micro-credentials.

- **Collaboration:**

  Enabling cross-sectoral partnerships by creating a one-stop shop for participants to engage and use experiential learning and collaboration spaces that attract stakeholders for hackathons, pitch contests and design jams.

- **Mentoring:**

  Reduces the "valley of death" in agri-food innovation by preparing start-ups for already-existing incubator and accelerator programs. Provides mentorship, connections to funding opportunities, and commercialization support to would-be entrepreneurs as they prepare to raise funds and pitch incubators and accelerators.

The network approach is pooling resources to reduce duplication in Canada's agri-food training and is working to provide Canadians with real world experiences in agriculture.

Re-energizing Research & Development

Canadian agri-food R&D has sparked innovations that have reached billions: the Spartan apple, canola, and Yukon Gold potatoes, to name a few. It's also made the country a global leader in transformative development such as greenhouse tomato production, animal genetics and welfare, and largescale grain production. But dwindling investment in R&D and roadblocks across the innovation pipeline has diminished the sector's competitive edge. As a result, startups are leaving Canada, often going to the U.S., for funding and to test their innovations. And multinational agribusinesses are moving their R&D investments aboard.

Agriculture knowledge is in freefall:
Investment in R&D is critical to sparking innovation and attracting talent. Canada's federal, provincial, and territorial governments have boosted investment by $500 million for the current agriculture policy framework, Sustainable Canadian Agriculture Partnership (SCAP) (2023-2028), which is a five-year $3.5 billion funding pack. Still, Canada's public investment in R&D has been in decline. According to OECD, agriculture knowledge generation has dropped by 15% over 10 years[a].[11] Meanwhile, Australia, Brazil, and the U.S. have seen an uptick in public spending. Canada's federal investment in agriculture science and innovation is projected to decline even further, down 12% between now and 2027.[12] These cuts challenge the government's ability to participate in networks of R&D institutes and build impactful public-private partnerships.

Government support for commercializing R&D in agriculture is shrinking under its science and innovation portfolio. AgriInnovate, the federal program for targeted agriculture commercialization, has contracted 42% from $165 million (2013–2018) to $95 million (2023–2028).[13]

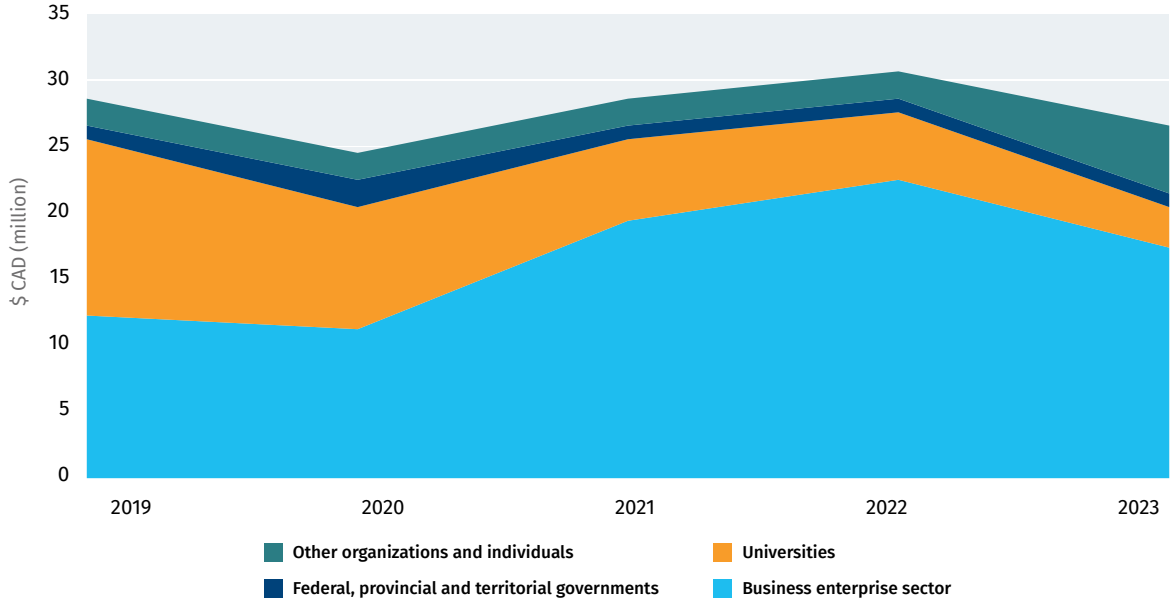
Private funding is changing: There is also a growing divide between industry and academia, as businesses have reduced their outsourced R&D funding to universities. And private investment for in-house research is also changing. While Canadian-owned agriculture companies continue to increase in-house R&D investment, up from $101 million in 2018 to $120 million in 2023, international companies investing in in-house agriculture R&D in Canada dropped from $60 million in 2018 to $40 million in 2023.[14]

Strong innovation hubs are often defined by clusters of universities, colleges, businesses and governments that collaborate along the innovation cycle—from idea generation to growth.[15] In Canada, the prospects of building these hubs for agriculture are deteriorating, with the number of enterprises conducting agriculture-focused R&D down 29% over the past 10 years.[16]

Canada is not the first place innovators trial solutions: Over the past decade, Canada has fallen from third among all countries in agri-food technology investment value to tenth.[17] [18] Canada has the tools to fast-track R&D commercialization, but they are being under-utilized. These include mechanisms like the Canadian Intellectual Property Office (CIPO)'s Green Technologies Program, which can be used to position Canada as a strong competitor in agriculture technology. While this program's utilization remains low, patents have a higher grant rate of 95% relative to 69% for standard patent applications.[19] This is a potential competitive advantage for Canada in agriculture technologies that contribute to positive environmental outcomes as the United States Patent and Trademark Office terminates its Climate Change Mitigation Pilot Program. Yet, Canada has a steep hill to climb, as it's not in the top five countries for filing patents in the

Private sector-outsourced R&D to universities is down 77%

Business-outsourced agriculture R&D in Canada over five years



Source: Statistics Canada, RBC Thought Leadership

top agriculture technology subdomains: Pest and disease management, crop adaptation and genetics, smart farming (e.g., sensors), livestock management, and mapping and imagery.[20] Canada's time to market for agriculture innovations would need to be addressed to attract more investment and Canada-based R&D, as Canada's trade deficit across pesticides and agriculture chemicals has grown by 159% over the past 10 years. [21]

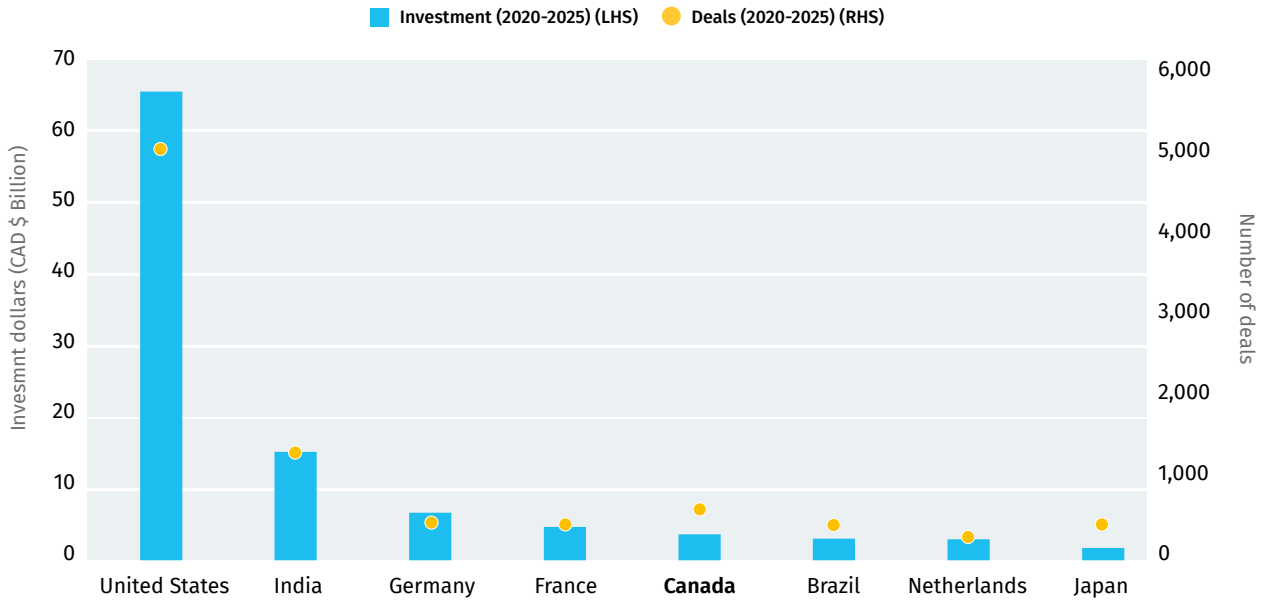
R&D incentives are not as lucrative as others in the OECD: Canada has strong tax incentives for R&D investments as a percentage of GDP, ranking 9th in the OECD. But when looking across its suite of R&D incentives, it's lacking platforms for transformative match funding, ranking 23rd for direct R&D spending as a percentage of GDP among OECD nations.[22] Programs that have cost-share funding opportunities for R&D and commercialization exist, including AgriScience and AgriInnovation. But generally, budget cuts, inefficiencies in program delivery, and some mismatch between research priorities and industry demand, risk underdelivering innovation.[23]

A path forward

Foster an outcome-driven approach to boosting private demand for Canada-made agriculture R&D and commercialization. One option is to prioritize agriculture as a pilot sector under the forthcoming Canada Innovation Corporation (CIC). Prioritizing agriculture, which has a clear problem in innovation characterized by lacking R&D spending and commercialization, could be a business case for the rest of Canada on how to streamline and reorientate a sector's approach to R&D to focus on delivering applicable results for the industry and the wider economy.

Agri-food tech investment in the U.S. is 22x larger than in Canada

Select leaders in agri-food tech investment over 5 years



Source: AgFunder, RBC Thought Leadership

Case Study

Embracing a commercial approach to leverage funds

Grow[AG], AgriFutures' digital platform is a centralized place to connect and invest in agri-innovation projects in Australia.

AgriFutures Australia is a centralized research and development institute with a mandate to leverage public and private funding—combining funds from industry taxes, government contributions, and private investments. It has a distinct mandate to serve the R&D needs of both specific levied industries and entirely new agricultural sectors. The unique positioning allows it to act as a catalyst for future industry growth, a function that is often fragmented across multiple organizations in other countries.

AgriFuture's Grow[AG] platform helps address fragmentation in agriculture innovation by creating a one-stop shop of research projects, funding opportunities, startups, and new collaboration opportunities – streamlining access to opportunities for those looking to partner in R&D, commercialization and company growth.

The Grow[AG] platform is an innovation "gateway" that not only provides a clearing house service for domestic investors, researchers and start-ups but it also provides global users with a clear path to identify opportunities to invest in Australia's agriculture innovation.

The people that make up Canada's agriculture sector are champions of it. But the sector needs to raise its profile to emerge as a viable and desirable place to innovate and build careers.

Boosting engagement among young Canadians could give the agriculture sector a jolt of innovation as new blood enters the workforce and positions the sector as a renewed international force in agriculture talent, ideas and production.

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Footnotes

[a]Baseline is a three-year average.

Endnotes

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