

# Growing Opportunity

Canada's plant-protein potential

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## Message from CEO Bill Greuel

The world is approaching the end of another year and preparing for the beginning of a new one, but here at Protein Industries Canada we're approaching a different sort of end and beginning. As of April 1, 2023, we'll have officially finished our first round of funding under the initial Innovation Superclusters Initiative and begun our next round as a Global Innovation Cluster.



This transition brings with it plenty of opportunity, for both Protein Industries Canada and our member companies. We've already begun seizing this opportunity through the launch of our artificial intelligence program in mid-September. Thanks to this program, we'll be able to support agrifood companies across Canada in implementing new artificial intelligence technology tools that will help make their operations more efficient and more sustainable, improving our sector as a whole.

This builds on the success of our already-established

technology and capacity building programs, both of which saw high uptake throughout our first five years of funding. We'll continue to offer these streams of programming throughout our next five years, though with some changes. But regardless of what may change within how the programs run, there's one thing we don't expect will change: the high success rate of the companies who take part.

Since our launch, 430 organizations have been involved in technology and capacity building programs, leading to the creation of 633 products, services and process. You can read about some of these organizations and developments in this magazine, but I hope that you also take the time to reach out to some of them directly. Our partners and members have incredible stories to tell—more than we could ever share here or on our website.

Together, our member companies are changing Canada's plant-based landscape—making it more sustainable, more profitable, more functional and more competitive in the global market. I'm proud to be a part of their journey, and I hope you enjoy reading more about it.



## Global partnerships make Avena a Canadian plant-based leader

Avena Foods was built on collaborative innovation. Its pulse business traces its roots back to 1936 and its oat business was established in 2008. The plant-based ingredient processor has maintained its focus on partnering with farmers and manufacturers, making it one of Canada's most highly regarded agrifood companies.

That reputation and commitment to collaboration continues today. Through multiple Protein Industries Canada projects, Avena Foods has partnered with companies across Canada and around the world to develop new pulse and oat ingredients for use in a wide variety of foods and beverages—helping solidify Canada's leadership in the supply of plant-based food, pet food and ingredients.

"Realizing the full potential of these specialty milled pulse and oat ingredients requires a lot of work that is done in close collaboration with our customers and supply chain partners every step of the way," Avena Foods CEO Gord Flaten said. "It includes discovering the most promising applications, conducting initial trials, gauging customer response, confirming processing parameters, developing indicative tests, and repeating until we and our customers are satisfied with the results."

Through its Protein Industries Canada projects, Avena Foods has developed specialty milled oat and pulse flours for use in a variety of applications, ranging from

baked goods, to snacks, to sauces, to plant-based beverages and meat alternatives. While these end products will soon be making their way to Canadian grocery store shelves, Flaten is pleased they are also finding a home in international markets.

"We have a significant number of international customers, and they're important to our business," Flaten said. "Each market has its own particular needs. The products that are popular with consumers in other parts of the world can be significantly different than what's going on the shelves in Canada or in the United States. It's important to go beyond North America when we think about growing the market for Canadian food ingredients."

One notable benefit of the Protein Industries Canada projects is that they have enabled Avena to establish a Research and Development department.

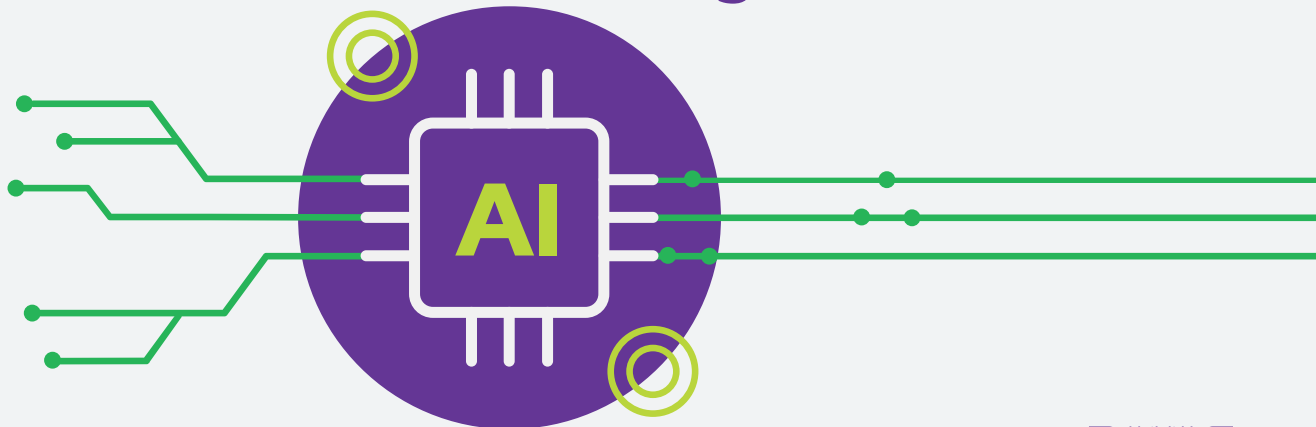
Initially focused on specialty milled flours, Flaten said the department is helping to expand product lines through new crops or new ingredients.

In the meantime, Avena will continue to work with their partners—as well as potential new collaborators—to determine what opportunities may lie ahead.

"You have to be broad-minded as you start these projects, experiment, identify where the successes and the possibilities are, and then focus on those, while also being open to new opportunities," Flaten said.

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Cover photo: Ingredient formulation at Avena Foods Ltd.

# New post-secondary programs provide increased opportunity to join the plant-based labour market

As plant-based companies across Canada scale their operations, they're also looking to scale their workforce. However, finding the employees they need—with education backgrounds ranging from crop genetics, to mechanical engineering, to food science, to culinary arts—can be a difficult task.

In an effort to increase companies' access to the trained talent they need to succeed, Protein Industries Canada has partnered with post-secondary institutions across the country to offer a new range of educational programs. All are focused on different points of the plant-protein value chain, helping to strengthen both the sector and Canada's economy.

"We need to make sure that we get new ideas, and new people, coming over from different cultures and different experiences that can actually bring us

more knowledge," Palette Skills Program Manager Ednali Zehavi said. "In order to find someone that ... understands agriculture and is highly skilled and highly trained, it takes a lot of effort and time to identify this employee, and a lot of times you don't have good retention and you still need to train them."

Palette Skills has partnered with the University of Saskatchewan (USask), the Enterprise and Machine Learning Initiative (EMILI) and Economic Development Regina to design and deliver a reskilling program that helps solve this training and retention problem. Currently focused on Saskatchewan residents, the Palette program helps students move from their current area of employment into the agrifood sector. The program will be offering a second round of training to new students in Winter

With the expected growth around agrifood processing, this is an opportunity to get ahead of that curve and bring Indigenous people into a sector that we know is really going to grow.



2023, building on the success of its first cohort.

This ability to upskill, rather than learning a trade or technical skill from the ground up, has proven to be a sought-after path for potential students. Zehavi explained that Palette has had to limit enrolment to those students most likely to see success in both the program and the sector, helping ensure a high employment rate post-program.

"We're committed to at least a 90 per cent placement rate," Zehavi said. "What we do is we match them at the end not just with a job, but with a career. So we identify for them the right employer and the right opportunity that will allow them to grow."

Such is the type of success other sector-specific programs are hoping to see. Together with Whitecap Dakota First Nation, the Saskatchewan Indian Institute of Technologies (SIIT) recently launched a micro-credential program focused on helping Indigenous youth gain employment in agrifood processing. The first cohort of students is expected to complete the program near the end of January.

To ensure the program would meet the needs of industry, SIIT worked with companies across the value chain to develop the curriculum and offer students hands-on experience. The program also offers valuable networking opportunities, helping to further solidify post-program employment.

"We're really starting to blur the line between skills training, skills development and employment. This is a pretty strong partnership with industry," SIIT Vice President of Academics Tavia Laliberte said. "Industry has kind of been in step with us right from program creation, but even in program design and the delivery ... Our students will, in many ways, be going to work every day while they're going into their program. There'll be really strong connections with industry."

This strong collaborative approach has proven beneficial to more than just the program. Importantly,



Laliberte explained, it also supports Indigenous entrepreneurs and businesses, and supports Indigenous youth in gaining the skills they need to gain long-term employment in one of Canada's fastest-growing industries.

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"We're really seeing growth around Indigenous inclusion and participation in the agriculture sector as a whole, but there's still lots of low-hanging fruit and opportunity for Indigenous people to participate," Laliberte said. "With the expected growth around agrifood processing, this is an opportunity to get

ahead of that curve and bring Indigenous people into a sector that we know is really going to grow."

Canada's plant-based sector is growing, and its need for skilled labour is growing along with it. But with an increase of programs such as those offered by Palette Skills and SIIT, Canadian talent will be well-positioned to meet that need.

## To enroll...

Potential students interested in enrolling in either of these programs may visit:

- SIIT's Agri-Food Processing Micro Credential Program: [siit.ca/programs/agri-food-processing](https://siit.ca/programs/agri-food-processing).
- Palette Skills' Automation and Digital Agriculture Specialist Program: [paletteskills.org/agtech](https://paletteskills.org/agtech).



Lupin field. Photo provided by Lupin Platform

## New crops help secure Canada's food supply chain

When many think about securing Canada's food supply chain, they often think about the finished foods and beverages that make their way to grocery store shelves across the country. But the work to ensure we have a strong, sustainable domestic food source starts long before that, at the crop development stage.

"Given the ever-increasing trends in plant-based foods, it is important to continue the research to seek new protein crops and find ways of maximizing their utilization for zero-waste ecosystem in plant-based products," Lupin Platform Inc. CEO Tristan Choi said. "Anytime there is an increase in the number of high-protein crop choices to grow and process in Canada is a positive. Global processing companies are now recognizing the numerous benefits of being situated in close proximity to the raw product source versus importing whole seed and are setting up infrastructure in Canada."

Lupin Platform has an ongoing project with PURIS, Lumi Foods, and Hensall Co-op, with a co-investment from Protein Industries Canada, to increase the production and processing of lupin for high-valued ingredients and food in Canada. Lupin is proving to be a promising crop for the plant-based sector, with its

nitrogen-fixing characteristics, high protein and dietary fibre, and resistance to Aphanomyces, a deadly Root Rot disease which is commonly found in other legume types such as peas and lentils.

So far, Choi said, lupin flour and lupin protein isolate have been particularly functional in keto-friendly bakery and pasta products for those who are looking for high-protein and low-carb diet, as well as dairy and egg alternatives. He expects the Lupin Platform team will expand on these functional uses as it

continues its research into the crop.

"On a research side, we have been experiencing a high level of cooperation and willingness to work on lupin by those in the agricultural community in both breeding, agronomics and value-added processing, but as it is a new crop to Canada there is very little expertise in the crop kind," he said. "The collaboration among commercial seed growers, ingredient producers, and food centres and research kitchens is very much needed to produce high-yielding crops for specific ingredients and breed out antinutritional factors and undesirable flavours in processed ingredients within the zero-waste full eco cycle."

**“This will result in generating an improved variety that will be grown and processed in Canada, enabling us to give a better solution for the meat substitute product.”**

Such collaboration has been a significant contributor in the development of other new crops within the sector, as well. While hemp isn't as new to Canada as lupin, it's seeing a significant increase in both acres and use within the plant-based sector, thanks in large part to efforts to increase its functionality as a protein ingredient.

"Canola, wheat and other crops, [their protein content] was compromised because the desirable trait at that time was oil and starch production, and also looking for the yield," NRGene General Manager Masood Rizvi said. "Increasing the current portfolio of the crop will provide diverse plant-based sources for farmers and also for processors."

Similar to the Lupin Platform, NRGene is part of a consortium of partners working to increase hemp's functionality as an ingredient in plant-based foods. With a co-investment from Protein Industries Canada, the company is working with Farmer's Business Network Canada, Pulse Genetics and Manitoba Harvest to increase the protein content, and improve the starch content and texture of hemp and peas as ingredients, in an effort to increase their use along the plant-based value chain.

Rizvi expects this will lead to benefits across the value chain, from farmers right through to food manufacturers.

"This will result in generating an improved variety

Masood Rizvi, General Manager of NRGene. Photo provided by NRGene



that will be grown and processed in Canada, enabling us to give a better solution for the meat substitute product," he said. "It could help make industrial hemp a rotational crop, in the future. This is also one of the things we're looking for, which is more crop choices for farmers."

Plenty of progress has been made in improving the functionality of both hemp and lupin, but Rizvi and Choi agreed that more work needs to be done to fully build out Canada's high-protein crop options. While this partly comes down to ensuring the proper infrastructure and

programs are in place to support the right research, it's also a matter of utilizing technology in new ways to both achieve our climate goals and research crops that the plant-based sector may currently be under-utilizing.

"We have so many other crops," Rizvi said. "One of the crops that could be very valuable for Canada is quinoa, for instance. It's drought-tolerant, it doesn't require a lot of water to

grow, and it's a very under-utilized crop."

Once fully utilized, these new crops—from lupin to hemp to anything new that may come along—can help achieve Canada's goals, including meeting the growing global demand for protein while reducing our sector's net zero emissions.

"It is important we integrate zero-waste processing for these new Canadian crops to reduce food waste and negative environmental impacts," Choi said. "Plant protein processors should continue to find new uses for protein processing by-products, starch, fibre, oil etc., and integrate processed water treatment to allow for re-use."



Tristan Choi, CEO of Lupin Platform. Photo provided by Lupin Platform



# Smart technology adoption leads to benefits across the value chain

Investment into Canada's plant-based sector is fostering significant and exciting innovation. New products are appearing on retail shelves and in restaurants on a regular basis, both here in Canada and around the world.

Just as important, innovative minds across the country are also looking at new ways of using technology to help them develop the healthy, sustainable protein the world is demanding.

"We've already seen immense benefits from advances in seed genetics, enhanced efficiency fertilizers, and improved processing technologies for more efficient and effective protein extraction as well as an improved sensory quality," Alberta Innovates Acting Executive Director of Agri-Food Innovation Ron Clarkson said. "The next shift we're expecting to see is related to the digitalization of agriculture and food processing to make use of the information in real time and along the entire production cycle, from breeding to harvest and post harvest. Environmental, management and genetic data can be combined to provide a more accurate analysis of the plant potential. We also expect to see extraction and processing techniques that will make the plant-based alternative protein sector more environmentally sustainable."

As the sector evolves, companies across the value chain have a variety of technology-based tools at their disposal. While many come from the development of tools in other sectors—such as artificial intelligence—others come from direct investment into the sector itself.

The McGill Centre for the Convergence of Health and Economics, for example, is leading a Protein Industries Canada project with Canada's food and

beverage organizations that relies on data to build a national, sector-wide platform that will help Canada's plant-based companies make connections and build partnerships. Through this improved use of technology, the sector will help to strengthen Canada's domestic food supply chain, while improving its own international competitiveness.

However, according to Laurette Dubé, Chair and Scientific Director at McGill Centre for the Convergence of Health and Economics, creating this technology isn't enough. It must also be accessible

to Canada's plant-based companies.

"Economies are made of SMEs," she said. "It's not just getting technology to them, it's finding ways of making sure [they] know how to use it ... and doing so in a manner that doesn't interrupt everyday business."

Jacqueline Keena, Managing Director at the Enterprise Machine Intelligence & Learning Initiative (EMILI), agrees with this sentiment. Much of EMILI's work — including three projects co-invested through Protein Industries Canada — is focused both on developing data-driven solutions for the agriculture and agrifood industry and ensuring they're accessible to the sector.

One such project is the EMILI Data Initiative. The project aims to address data literacy gaps in the agrifood sector and is engaging with important questions raised by the growing use of data, both on-farm and beyond the farm gate. Ultimately, the

*Photo provided by Alberta Innovates*



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*EMILI staff explored ways that digital technology is integrated into modern farm operations on a recent tour of Innovation Farms Powered by AgExpert in Grosse Isle, Manitoba. Photo credit: The Enterprise Machine Intelligence and Learning Initiative (EMILI)*

project aims to build the data governance capacity in the agrifood sector so that business owners can make smart, strategic decisions when it comes to data and digital technologies.

"Data literacy training is vital to increase understanding of the fast-changing context surrounding digital technology in the agriculture sector and enable people to ask the right questions of their trusted advisors, technology vendors and equipment dealers," Keena said. "Our goal is to reach people working in the agrifood sector who we know are already busy with their day-to-day responsibilities. That is why we are designing our training materials to be clear and easy to digest, while providing access to solid, trusted, and reliable information."

Asking the right questions is a crucial step in the technology adoption process. Dubé stressed that questioning a technology's usefulness long-term is one of the most important things a company can do before implementing a full adoption plan.

"Look at [your] own portfolio, market and performance, and see how new technology would

fit. What would the new technology address?" she said. "How does the new technology fit, and will it be sustainable for your business? What is its lifetime?"

Once such questions are addressed and a new piece of technology is successfully adopted, its potential benefits can be well worth the cost. Most often, companies find themselves in a position to scale their operations, develop new products more efficiently or lower their greenhouse gas emissions—all while increasing their contribution to Canada's economy.

Such benefits reach far beyond the company level.

"Data-driven insights can also improve decision-making and help increase environmental performance while also offering consumers greater transparency about where their food comes from," Clarkson said. "Genetic tools have the potential to increase protein yield per crop hectare and to improve sensory attributes/functionality and food production practices. With the opportunity to share the data, there's also better access to information for producers."





Sunny Gurnani (centre) and members of the Plant Veda team.  
Photo provided by Plant Veda

## Seeing the opportunity in the Canadian plant-based sector

Canada's plant-based food, feed and ingredients sector is one of opportunity. New companies join the space on a regular basis, often headed up by entrepreneurs who began their careers outside of the sector—and, occasionally, outside of Canada.

Plant Veda CEO Sunny Gurnani has experienced this draw toward the Canadian plant-based opportunity first-hand, and is able to compare it to that of both India and the United States. Thus far, the success he, his family and his company have found here has been plentiful enough to count their move into the country as worthwhile.

"There are a lot of forward-thinking people here," Gurnani said. "A lot of things which are already in the

United States, they are here very easily. So any of our R&D-related work, product development, became much faster ... because there are so many suppliers available and R&D expertise available and talent available here versus anywhere else."

// We have got this beautiful home, the planet Earth, and nature has designed it just amazingly well. So keeping it the same for the next generation is important to us, otherwise they will not see such a huge biodiversity which we already have.

Gurnani's move to Canada and establishment of Plant Veda wasn't an overnight decision. He began his career in Silicon Valley, where he was working for eBay in the late 2000s. While he enjoyed the job, a curiosity about health, nutrition and the animal protein industry led him in a new direction.

After taking his own vegetarian diet a step further into veganism, Gurnani decided to use his experience, and the results of his nutrition and health research, to

open a plant-based foods company in India in 2012. However, between still living in the United States and the attitude toward plant-based food in India at the time, the company didn't see the success Gurnani had hoped for.

He returned to the software industry, but not for long. When his American visa was nearing its renewal date, he and his wife considered their home and work options: they could stay in the United States and wait for the renewal, move to India and start a business there, or move to Canada and start a plant-based business here.

The Canadian opportunity was too good to pass up, despite the difficulties associated with moving to a new country and establishing a new business.

"It gets very overwhelming running a company, particularly a start-up," Gurnani said. "But then, it keeps reminding me of the reasons why we are into this, and that keeps me back on track."

While still near its start-up stage, Plant Veda has seen success with its line of plant-based dairy alternatives, including lassis, creamers and yogurts. Currently, the company is partnered with Avena Foods, HPP Canada and Thirstea Beverages, with a co-investment from Protein Industries Canada, in a project that will help

expand this line by incorporating oat concentrates into Plant Veda's products.

Together, the selection of products is helping Gurnani accomplish his goal of supplying consumers with healthy, sustainable products that meet both their dietary and ethical needs.

"We have got this beautiful home, the planet Earth, and nature has designed it just amazingly well. So keeping it the same for the next generation is important to us, otherwise they will not see such a huge biodiversity which we already have."

While making the move from one industry to another—and one country to another—wasn't a simple decision for Gurnani, he doesn't regret

it. He also encourages other potential entrepreneurs to take the risk to jump into the plant-based sector, if they're considering it.

"You have to listen to your heart," he said. "It definitely is a huge risk from the career and from the financial point of view when you make a change from your existing career to another, but then, at some point, you'll see that your life will be way more worthwhile. That you will be way more satisfied by doing something which you really wanted to do."

Photo provided by Plant Veda

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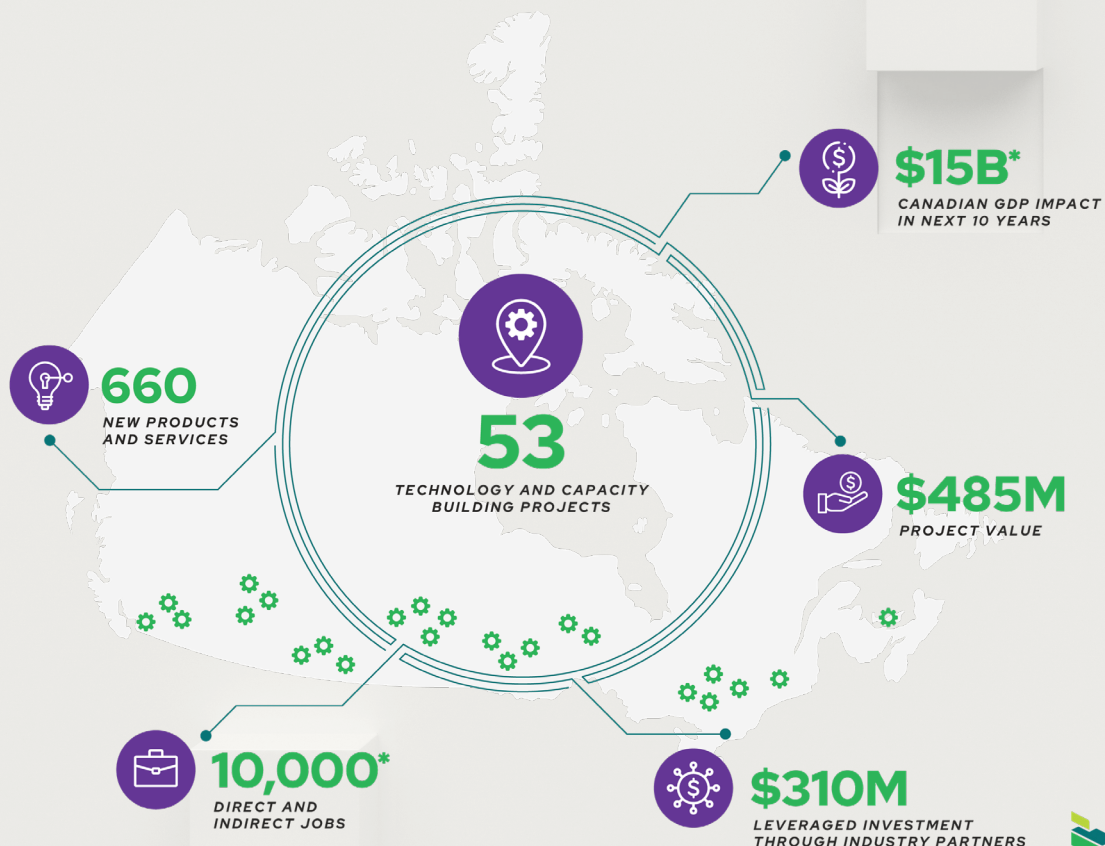
# Building the Future of Food on Sustainable Innovation

[Our consortium] allows us to kind of create products that are going to pave the way for the industry, but it'll also really put Canada on the map in terms of what kind of quality ingredients we have and what kind of quality manufacturing we need to have in order to compete against global competition.

**Blair Bullus, Founder of Wamame Foods**

Innovation can take on many forms, including something as simple as sliced bread to something as truly transformational and sector-changing as electric vehicles.

Through a collaborative innovation project, Wamame Foods is the developer of a plant-based alternative to Wagyu steak. Created with Canadian ingredients, driven by Canadian innovation and co-invested in by Protein Industries Canada, Wamame Foods' wagyu-inspired plant-based steak is available across Singapore and Hawaii; it is also listed with both Gordon and Sysco Food Services in Canada.



\*from 25 analyzed projects