

Unpuzzling Food Inflation:

How Innovation
Adoption by
Canada's Food
Processing Sector
will Flatten
the Curve



CANADIAN
FOOD INNOVATION
NETWORK



Foreword

When grocers were called to Ottawa last autumn to explain their role in the alarming rise in food inflation, I paid close attention. As the leader of the Canadian Food Innovation Network (CFIN), it's my job to build supports and programs that will help every food and beverage business in Canada reach their full potential and that includes grocers and retailers. While retailers can play a part in stabilizing food prices, I was disheartened to see that conversations in parliament were limited in scope and didn't examine food inflation's drivers in a fulsome way. Food affordability and price inflation are driven by complex supply chain issues. It's human nature to want to find simple solutions to urgent problems, but when it comes to grocery price inflation, the causes and mitigations are complex and diverse. While well-intentioned, current policies and discussions aiming to resolve those issues are piecemeal, address a small portion of the supply chain, and will not lead to long-term solutions.



Around CFIN's virtual board room table, our executive team explored this topic and realized that we can use our experience (all of us have deep roots in the food industry) and the learnings from the 70 projects we've invested in over the last three years to broaden the important conversations started by Minister Champagne. We talked about companies like Purdys Chocolates who are reducing the cost of their ingredients and improving the nutrition profile of their iconic chocolates by testing new food ingredients and about BetterCart Analytics who are helping small-and-medium-sized food companies – which make up the majority of Canada's \$34 billion food manufacturing sector – to compete on a level playing field with multinational companies.

We agreed unanimously that technology adoption and innovation in food manufacturing are imperative and powerful tools in the fight to flatten the upward curve of food prices. We also agreed that the conversations happening around news desks and dinner tables was not complete and that people needed to know more about Canada's food manufacturing and processing sector. For instance, did you know that the food and beverage processing sector is the largest manufacturing segment in Canada, in terms of both GDP and employment, representing 17.3 percent of manufacturing GDP and 18.1 percent of manufacturing jobs? Likewise, were you aware that 70% of the food consumed in Canada is grown and processed here at home? If this is all new to you, don't feel badly – this is a story that hasn't been told fully. Until today.

Canada is ripe for innovation in the food industry as a solution to competitiveness, productivity, and food inflation challenges. That is the *raison d'être* for the CFIN - we believe technology, collaboration, and creative problem-solving can transform the food sector and pave the way to a sustainable and prosperous future for Canadians. We know that to address rising food costs comprehensively, Canada must supercharge innovation in the food and beverage manufacturing sector. It will take time, purpose, and investment, but it can be done. I know because the projects CFIN has invested in are already seeing results. I hope that you'll find this whitepaper not just informative, but also inspiring – there are solutions to rampant food inflation, and we know how to implement them.

– Dana McCauley
CEO, Canadian Food Innovation Network

The Challenge:

Increasingly High Food Prices in Canada



Current media coverage, social media activity, and consumer advocacy show that food prices are a major public concern – and that makes sense given that Canadian grocery prices increased 21.6% between February 2021 and February 2024¹. Reflecting the impact of food inflation, in 2021 and 2022, 18.4% of people living in the 10 provinces had insecure access to food due to financial constraints². That's 6.9 million people, including almost 1.8 million children, who are dealing with a precarious food supply. Contributing to the problem are high input and ingredient costs, escalating labour expenses, staffing shortages, a slowdown in consumer spending, and high interest rates that are creating a challenging business environment for many Canadian producers and distributors of food.

While food price insecurity is a multi-faceted issue, its increased prevalence in recent years is due in part to food price inflation. In 2022, food price inflation in Canada hit its highest rate since the early 1980s – an average of 10% across the country. Then, in 2023, food prices rose a further 5 to 7%³. And while that food price inflation occurred in step with high overall inflation (largely due to macroeconomic and supply chain challenges caused by the COVID-19 pandemic), the former exceeded the latter for 13 months between September 2021 and October 2022⁴. Beyond the context of COVID-19, structural and persistent trends, such as the weakening of the Canada dollar versus its American equivalent since 2011, a lack of grocery sector competition in Canada, geopolitical risks, rising food input costs, and extreme weather events have also placed upward pressure on food prices for years⁵.

Despite some recent progress on cooling inflation, grocery prices are not expected to drop substantially even when overall inflation is reduced to the Bank of Canada target range⁶. Consequently, consumers in Canada will not see relief in the grocery store – unless the right actions are taken to mitigate that situation.

¹ https://canadiangrocer.com/grocery-prices-rose-more-slowly-overall-inflation-february-first-time-2021-statcan?utm_source=swiftmail&utm_medium=email&utm_campaign=CG_NL_Express&mkt_tok=ODI1LlUxTUc01NDUAAAGR-n-fKJfTbnlGJ2AbTOSOR11PUarsJjGAvV7az7SRmZriE4qCm5nUpMniz8lYtG8qcbF-zkX3VGIOwp-aOZRz1tV39rChfnP7HGjBHXecU1M

² <https://www150.statcan.gc.ca/n1/daily-quotidien/230502/da230502a-eng.htm>

³ See Food price Report (page 6).

⁴ <https://torontosun.com/opinion/columnists/charlebois-ottawa-will-investigate-food-prices-its-abouttime>

⁵ <https://thoughtleadership.rbc.com/proof-point-food-inflation-will-slow-but-dont-expect-prices-to-drop/>

⁶ <https://thoughtleadership.rbc.com/proof-point-food-inflation-will-slow-but-dont-expect-prices-to-drop/>

The Context:

Limits of Government Action



Due to the complex mix of factors driving food price inflation – from the lingering effects of the COVID-19 pandemic on supply chains, to impacts of climate change and extreme weather on agriculture, to international conflicts limiting global crop production, and persistently high general inflation – no single actor in the food and beverage sector can resolve inflation on their own. However, the public's concern is clearly pushing governments to act.

For instance, recent polling shows that reducing the cost of everyday items like groceries is the top concern of 49% of Canadians, and an issue they think elected representatives should focus on⁷, while cost of living is a top-three issue for 72% of Canadians.⁸

Governments' recent actions on this issue show urgency and some successes. However, the tools at governments' disposal will not be able to address all the macroeconomic and global trends that will persist in driving up grocery prices. For example, consider the following ways Canadian governments have acted to attempt to control increasing food costs, and the corresponding limits on the success of those actions.

- 1. Labour availability:** Changes by the Federal government to the immigration and temporary foreign worker systems, to better meet the needs of Canada's food and beverage producers, especially during the COVID-19 pandemic, were impactful. Further government collaboration with industry partners – such as the Canadian Agricultural Human Resource Council, Food and Beverage Canada, and Food Processing Skills Canada – could result in stronger sectoral labour strategies. However, given Canada's aging population, low birth rate, and the recent reduction in previously planned immigration and temporary foreign worker levels⁹, labour availability will remain a pain point for the food and beverage sector.

⁷ <https://globalnews.ca/news/10253600/affordability-ipsos-canada-poll/>

⁸ <https://www.hilltimes.com/story/2024/03/18/polls-show-across-the-board-generalized-retreat-from-liberals-leadership-change-defibrillator-may-be-needed-to-resuscitate-partys-fortunes-coletto/415100/#~:text=Coletto%20drilled%20into%20particular%20issues,of%20their%20top%20three%20issues>

⁹ <https://www.canada.ca/en/employment-social-development/news/2024/03/government-of-canada-to-adjust-temporary-measures-under-the-temporary-foreign-worker-program-workforce-solutions-road-map.html>

¹⁰ <https://www.statista.com/statistics/481019/leading-grocery-retailers-by-market-share-canada/>

2. **Supply chain challenges:** Struggles with food supply chain challenges for distribution of food inputs and final products in our large, sparsely populated, and northern country are not new, and were exacerbated by the effects of the COVID-19 pandemic. The National Supply Chain Task Force could drive a more coordinated Federal approach to that issue. But, the geography of Canada will not change, and will continue to impede food distribution.
3. **Competition:** Canada's grocery sector is dominated by five companies, with all other competitors holding just over 20% of market share¹⁰. The federal government is considering competition measures to change that situation. And, in July 2021, the Federal, Provincial, and Territorial Ministers of Agriculture called for an industry-led process to improve supplier and retailer relationships. Finally, the entire sector is working towards a voluntary industry Code of Conduct. But, greater intra-sector harmony and more competition, while both good objectives, will not solve all Canada's food affordability challenges.

The Solution: In-Sector Innovation



Ultimately, innovation within Canada's food and beverage sector – strategically supported by governments and industry-convening bodies – will be essential to controlling food prices and reducing food insecurity in the long-term. Given that 70% of the food consumed in Canada is grown and processed here¹¹, there is a clear opportunity for innovation to impact the entire supply chain. Specifically, the creation and adoption of innovations in product development, food processing technology, supply chain management, and waste reduction must be accelerated in order to improve the conditions that set food prices in Canada.

For our part, since 2021, CFIN has focused on creating a network that is now accelerating technology adoption and innovation spanning novel ingredients, waste recovery solutions, AI, digital and robotic technologies, and more. While many of our projects are still midstream, early success stories – including those outlined below – illustrate that continued investment will have positive impacts for consumers, producers, and retailers.

Innovation Opportunity #1: Labour Challenges and Rising Input Costs

Consumer food prices are driven in large part by the cost and availability of the required labour and ingredients required to produce and distribute food.

Canadian food and beverage business leaders commonly lament a lack of access to the necessary workforce and skills required to meet their production goals. For example, the Canadian Agricultural Human Resource Council (CAHRC) recently found that Canada's food and beverage sector is short 50,000 employees and that 66,800 retirements are expected in the sector by 2030. Those job vacancies have substantial, negative economic impacts. The CAHRC research revealed that a single open position in the food and beverage sector costs a business as much as \$190 per day in lost net revenue. To extrapolate, that means losses from vacancies in the sector could have been a staggering \$9.9 million in net revenue per day or \$3.6 billion per year in 2020¹².

Similarly, the Canadian Federation of Agriculture and Food and Beverage Canada found that food and beverage manufacturers are, on average, short 25% of their workforce. This means:

“*Labour access is the most acute issue impacting the food and beverage manufacturing sector. While older, traditional policy tools, like federal-provincial labour tables and welcoming temporary foreign workers, can help the industry address immediate labour shortfalls, they cannot fully account for shifting demographics and the aging workforce. The systemic and chronic labour shortfalls in our sector require an innovation-based approach – such as the businesses and stakeholder ecosystem that CFIN is fostering – to drive technological innovation in a way that complements and builds workers skills, and empowers them to be more productive.*”

-- Kristina Farrell, Chief Executive Officer, Food and Beverage Canada

Clearly, labour challenges impact productivity for Canada's food processors and cost consumers in Canada, but innovations such as automation, robotics, and digitization can be used to provide relief.

CFIN Member Spotlight:

 **Laplace Robotics** deploys artificial intelligence to enhance the functionality of robotic and vision systems on manufacturing lines. Their solutions offer production insights and recommendations, allowing food manufacturers to make data-driven decisions that enhance productivity. They are also deploying AI to improve the performance of advanced manufacturing systems. In a very labour-constrained sector, Laplace's innovations improve food product quality at high production speeds which improves productivity, creating savings that can be passed along to consumers provides in-store.



 **DeepSight Réalité Augmentée** deploys augmented reality technology to accelerate learning and training in the food processing and foodservice sectors. Their platform enables 3D instruction guides that are superimposed on the work environment (when wearing smart glasses). The solution drives skills training and maintenance in the food and beverage sector, by allowing for comprehensive, more rapid training of new employees and upskilling of experienced workers – which is essential for business continuity in food processing plants that are facing a wave of retirement in the near future.



Recently, many food ingredient staples used in Canadian food processing have been subject to rampant inflation. For example, the global price of cocoa doubled to \$7,060 per metric ton between March 2023 and March 2024, surpassing the previous price highwater mark of \$5,110¹¹. Ingredient and packaging costs are invariably passed along the food and beverage supply chain, and ultimately impact consumers. Fortunately, innovation in areas like novel ingredients can offer real cost saving solutions to Canada's food manufacturers.

CFIN Member Spotlight

 **Crush Dynamics Inc.** uses innovative fermentation processes to upcycle wine-making byproducts and agricultural waste to produce a high-performance food ingredient in the form of a powder that enhances food quality by enabling 50% sugar reduction, 80% sodium reduction, improved texture, and increased product shelf-life. This single ingredient provides substantial cost savings to both producers and consumers by shortening ingredient lists and providing a 90% input cost reduction.



¹¹ <https://agriculture.canada.ca/en/sector/food-processing-industry/overview-food-beverage>

¹² <https://cahrc-ccrha.ca/resources/document/agriculture-labour-market-forecast-2023-2030>

Innovation Opportunity #2: Shelf Life and Food Waste

The World Food Program found that, globally, one third – or roughly 1.17 billion tonnes – of food produced for humans is wasted each year. That waste occurs to varying degrees at every point on the food supply chain – from harvester to consumer. About 58% of the food produced in Canada is lost to the landfill¹⁴, so our share of that problem is substantial and has serious consequences. For example, lost food in Canada is worth \$49 billion, and could feed every Canadian for five months¹⁵.

Meanwhile, food releases large amounts of methane, and estimates suggest that 8 to 10% of global greenhouse gas emissions (GHGs) are associated with wasted food¹⁶. In Canada alone, over 56 million tons of GHGs are generated annually by food waste – the equivalent of 17 million gas-powered vehicles¹⁷. Thankfully, new innovations are eliminating food waste that was long thought unavoidable.



Clearly, food waste is a big problem – for consumers, the planet, and industry. The Canadian food and beverage sector is working to reduce waste from farm to fork, including by finding innovative ways of addressing waste in manufacturing and production processes. But, due to the huge scale of the issue, Canada needs to leverage innovation to create new manufacturing processes, recycling and re-use options, and food preservation techniques to truly change the waste dynamic. The innovation ecosystem that CFIN is creating is already supporting companies that are fulfilling that need and will help scale them across the Canadians,



**-- Michael Graydon, Chief Executive Officer,
Food, Health & Consumer Products of Canada**

CFIN Member Spotlight:



Plan Automation developed and launched the first X-ray reclaim facility catering to food and beverage manufacturers. The Plan system allows manufacturers to thoroughly inspect by X-ray a production batch they believe may be contaminated and thus unfit for consumption. Their targeted approach clearly identifies contaminants and isolates them, thus reducing food waste and product loss. Since launching in 2023, Plan has inspected over 10 million kilograms of product, significantly diverting unnecessary waste from landfill and recouping product worth millions.



Beyond wasted food itself, it's undeniable that modern food distribution requires significant amounts of – often plastic – packaging. While optimal packaging decisions are difficult, that amount of waste has undeniably negative outcomes. For example, every year, an estimated 227 million kilograms of plastic food packaging is sent to Canadian landfills¹⁸. In a context where some provinces are running out of landfill capacity¹⁹, that practice is untenable.



Food Cycle Science Corporation is developing enzymes to rapidly degrade biodegradable plastics and transform them, along with food waste, into a beneficial soil additive that reduces reliance on artificial fertilizers. This "one-bin" system will be able to process food waste and bioplastics together, accelerate the adoption of bioplastics and help eliminate single-use and non-durable goods from the food service industry.



¹⁹ <https://www.ctvnews.ca/business/shrinkflation-in-the-chocolate-industry-what-to-expect-this-easter-1.6805111>

Innovation Opportunity #3: Commercial Dynamics in the Food and Beverage Sector

With over 7,600 food and beverage processors operating in Canada, we have a diverse and enviable source of locally produced food. However, because the vast majority of those companies are small or medium-sized businesses (roughly 91% of them employing fewer than 100 employees)²⁰ they often lack the resources of larger brands who have entire teams devoted to innovation adoption and competitive price analysis. These smaller companies often struggle to keep up with the latest technologies and to price products dynamically, which, in an industry with very tight profit margins, can be the difference between surviving and thriving.

Increasingly, new vision and AI technologies are being developed to collect and aggregate data to improve the accuracy of the information available to smaller food processors, so they can optimize production methods and achieve efficiencies which reduce throughput costs and price products correctly. Each dollar saved within these supply chain processes can prevent future food price increases.

CFIN Member Spotlight:

 **Vivid Machines** is demonstrating a new supply chain solution that will integrate data gathered at the apple orchard to forecast the annual volume and quality of apples that will be produced. Currently, fresh fruit supply must be estimated by industry actors like growers, packhouses, and marketers. Vivid's system provides a platform for all points on the fruit supply chain to understand that year's crop and collaborate on fulfilling orders and managing processing plant volumes using accurate and predictable yield data.



 **BetterCart Analytics** is building technology and an analytics platform that provides advanced price analytics and competitive pricing intelligence to food producers, manufacturers, and sellers of all sizes. Through automated insights, the platform can guide strategic decision-making, increase profit margins and market share, and create more holistic, transparent relationships between retailers and brands.



¹⁴ <https://www.canadiancattlemen.ca/news/the-drive-to-reduce-food-waste-in-canada/>

¹⁵ <https://madeinca.ca/food-waste-canada-statistics/>

¹⁶ <https://www.unep.org/resources/report/unep-food-waste-index-report-2021>

¹⁷ <https://canadianfoodbusiness.com/2023/07/25/the-future-of-plastic-food-packaging/#:~:text=Every%20year%2C%20an%20estimated%20metric.road%20motor%20vehicles%2C%20in%20Canada>

¹⁸ <https://canadianfoodbusiness.com/2023/07/25/the-future-of-plastic-food-packaging/#:~:text=Every%20year%2C%20an%20estimated%20metric.road%20motor%20vehicles%2C%20in%20Canada>

¹⁹ <https://thenarwhal.ca/ontario-landfill-explainer/#:~:text=Here's%20the%20problem%3A%20Ontario%20is,nine%20years%2C%20perhaps%20even%20sooner>

²⁰ <https://imi.fpsc-ctac.com/national-regional-data/#:~:text=There%20are%20over%207%2C600%20food,fewer%20than%20100%20paid%20employees>

The Role of CFIN

Creating an Innovation Culture and Support System

In 2018, a *Report of Canada's Economic Strategy Tables: Agri-food*, determined that Canada should invest in innovation and boost competitiveness within the food and beverage sector, particularly through increased automation and digitization²¹. Over five years later, innovation investment and activity levels in Canada's agri-food sector are improving but still not high enough – and CFIN is working hard to change that!

Since forming in April 2021, CFIN has stepped in to fill those gaps and bring a national focus to food innovation, supporting Canada's food and beverage sector with a mission to better connect those working in the sector, stimulate transformative innovation, and ultimately boost the economy.

As CFIN laid out its central mandate and built the organization, its leadership noted the need for a “networked centre or hub for food innovation that would connect existing-food innovation centres to help firms of all sizes test new products and production techniques as well as make better use of technologies and applied research so they can scale up, develop new products and processes, and sell to new consumers.” CFIN has been successful in building and serving a rapidly growing network, with over 4,500 members across the country as of April 1, 2024, representing all of the critical aspects of the supply chain required to drive successful innovation. However, CFIN is just getting started, and is working towards further unlocking the sector's potential by scaling membership to over 20,000 by 2030. This network is an institutional imperative for the sector whose members are embracing the opportunity to share knowledge and collaborate to break down innovation barriers.

CFIN has also taken a leading role in providing critical project support to stimulate innovative Canadian companies developing new technology in the sector. Their success in that regard is exemplified by many of the product studies in this White Paper. With a focus on food waste and circularity, efficient use of resources, next generation ingredients and food, automation, data and artificial intelligence, packaging and retail, CFIN catalyzes growth and breaks through barriers at critical commercialization stages.

CFIN Membership At-A-Glance



12% work in anchor firms (with more than 500 FTEs).



23% work in SMEs (with 20-49 FTEs).



26% are Food & Beverage Manufacturers.



13% work in Foodtech.

²¹ <https://ised-isde.canada.ca/site/economic-strategy-tables/en/report-2018/report-canadas-economic-strategy-tables-agri-food>

“ Working with the Canadian Food Innovation Network has been lovely. Their funding has obviously been a huge support. But, the network that they’re cultivating and the introductions that they’ve made, how they, individually, just care a lot about what we’re doing and what we’re accomplishing here, makes all the difference. I would encourage anyone who’s not a part of the CFIN / YODL network to join, and reach out to their local CFIN representative, because it’s an amazing organization to be a part of. ”

-- Lesley Thompson, Vice President, Sustainability and Communication,
Food Cycle Science

The numbers demonstrate the immense role CFIN has taken within the Canadian food innovation landscape, as we empower leading Canadian food innovation companies:

Program Reporting Data: June 2021 to January 2024

Financial Facts	IP Information	Employment News
\$37.8M in investments supported	67 new IP creations reported	65 Projects funded as of January 2024
\$17.7M in funding approved	11 filings for Provisional Patents	40 Project Partners
\$20M in new revenues reported by URs with completed project	8 filed Patent applications	75+ service providers and supporters
	37 proprietary processes for future protection	125 new jobs created by CFIN Projects
		102 co-op placements created by CFIN Projects

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