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**VITAL INNOVATIONS
TO ENHANCE
GLOBAL FOOD
SECURITY**



**OVERCOMING
FOODSERVICE
CHALLENGES
THROUGH SMART
AUTOMATION**

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ADDRESSING FOOD SHORTAGE AND REDUCING WASTE THROUGH INNOVATION

Considering the current state of human life on the planet, there are few challenges or issues posing as great a threat to our collective health and existence as food insecurity. A distinct lack of accessibility to healthy foods and ingredients in communities around the world, in combination with enormous amounts of wasted food, is exacerbating the increasingly critical nature of the situation.

In fact, according to most estimates, almost 60% of the food produced in Canada is wasted, representing the equivalent of 35.5 million tonnes, with 32% of it—or 11.2 million tonnes—edible and totalling \$49.46 billion in recoverable waste. It's a problem that requires solutions, and fast.

With this need in mind, in efforts to overcome this incredible challenge, innovators from across the country are working diligently to develop solutions and, where possible, encourage a renaissance of sorts to inspire new ways of doing things and a changed perspective concerning the potential of some of the latest techniques and technologies.

Within this issue of *Canadian Food Business*, we explore some of these innovators and the solutions that they're presenting to enhance food security and the lives of people across the country and all over the world.

Focusing on the latest in the development of smart technologies and automated kitchens, we speak to cutting-edge company Gastronomous about the ways its innovative equipment can help improve efficiencies and find cost reductions for restaurateurs, while dramatically limiting the amount of food that's wasted.

In addition, we go in depth concerning the ways in which some laboratories across the country are pushing the boundaries when it comes to the uses of organic waste, and their potential positive impacts with respect to the generation of renewable natural gas. We also take a look at the ways in which applied research and data can help to identify the causes and sources of food waste in restaurant kitchens, helping to reduce the waste and loss and improve operations.

It's clear that the issue of food insecurity and food waste poses a significant threat to the health and sustainability of human life on our planet. And with the continuous innovation that's occurring across the country and the world, it seems as though it's only a matter of time before these challenges are once and for all addressed and overcome.



Sean Tarry
EDITOR



In 2022, the **Canadian Institute of Food Science & Technology (CIFST)** and *Canadian Food Business* magazine launched a partnership to create a platform for leading experts, innovators and scientists to showcase the latest trends, knowledge and developments that are changing the face of Canada's food industry today. For further information, contact sbrowne@dvtail.com

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2022 FCC Beverage Report:

Demand shifting from retail to service

The annual FCC Beverage Report highlights opportunities and risks for Canadian beverage manufacturers. It includes an annual sales forecast for 2022, product sales performance and a gross margin rate index.

Industries featured in the report are:

- Breweries
- Wineries
- Distilleries
- Soft drinks and other non-alcoholic beverages

Dairy and fruit/vegetable-based beverages are covered in our food report under the dairy and fruit and vegetable manufacturing industry sections.

The pandemic shifted consumer purchases from food service to retail, limiting a revenue stream with usually strong margins for most beverage manufacturers. In 2021, consumers started to shift their purchases back to the service industry; however, lingering restrictions and higher production costs reduced profitability.

Three key observations from this year's report:

1. Beverage manufacturing sales increased in 2021

Increased foodservice volumes and continued retail growth boosted total sales 11.3% YoY to \$14.5 billion in 2021 (Table 1).

Beverage manufacturing sales are projected to decrease 1.0% in 2022, driven by:

- Broad inflation shifting consumers' choices
- Elevated wholesale/retail inventory levels limiting downstream sales
- Shift towards service-based sales where consumers tend to drink fewer alcoholic beverages than at home

FCC Economics expects sales declines coming from larger alcoholic businesses focused on retail, with smaller operations (who represent a minority of total revenues) benefiting from growth in the service industry and a return to selling direct to consumers. Companies with a diversified portfolio of beverages catering to different audiences will outperform (for example, beer and seltzer, caffeinated and non-caffeinated).

Table 1: Manufacturing sales and exports grew in 2021 YoY

	2021 (millions \$)	YoY % change	2020 (millions \$)	YoY % change
Beverage manufacturing sales	14,555	11.3	13,080	3.0
Beverage exports	1,458	3.8	1,405	2.1
Beverage imports	6,157	3.6	5,945	1.2
Beer, wine and liquor retail sales	26,445	2.5	25,800	6.6
Bar sales	1,554	12.7	1,379	-44.2
Total estimated alcoholic retail-focused sales	27,999	3.0	27,179	1.9

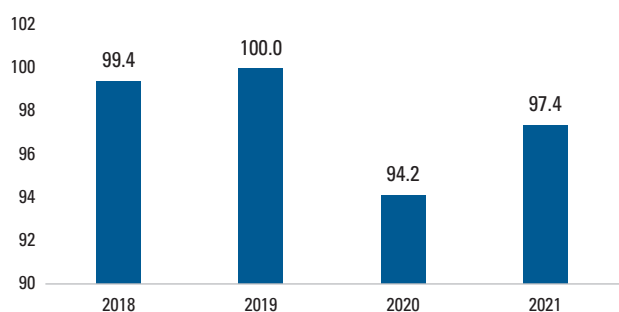
Source: Statistics Canada

2. Industry gross margins expected to improve

Supply-chain disruptions lowered the availability of key packaging and raw inputs, driving up costs. Despite growing topline sales, gross margins struggled to regain 2019 levels (Figure 1). Strong competition in the alcoholic beverage sector makes it difficult to pass on higher costs, resulting in beverage inflation lagging food inflation.

We expect margins to improve in 2022 as consumers are willing to pay higher prices for beverages, assuming costs don't continue to rise. Bar, taproom, wine tasting rooms and restaurant sales are also often at a higher margin than retail. Non-alcoholic companies successfully pass on cost increases with little impact on volumes year-to-date and overall supporting margins.

Figure 1: 2021 beverage gross margin rates remained below pre-pandemic levels



Source: Statistics Canada, FCC Economics

3. Beer remains the number one alcoholic choice among Canadians but also faces pressure

Beer sales at the retail level for the 2020-21 year declined 1.4%, with total litres sold falling 2.3%. Total beer volumes have now declined for five

consecutive years. Canadian breweries have taken market share from internationally produced beer over that timeframe, although their volume has also declined, just at a smaller rate. Overall, beer's market share compared to wines and liquor fell by two percentage points to 36%. Gains in distilled beverages came from growing demand for hard seltzers, which many breweries are shifting focus towards to offset declines in market opportunities for beer.

Table 2: Beer lost retail market share in Canada in the 2020-21 marketing year

Beverage type	Total beverage market share %	YoY % change
Beer	36.0	-2.0
Wine	33.8	-0.6
Distilled liquor	30.2	2.7

Source: Statistics Canada (Apr 2020 – Mar 2021)

*Performance does not line up with calendar manufacturing sales due to timing and inventory levels at wholesale and retail stores.

The bottom line

Low retail inflation relative to rising input costs is a trend to monitor. Look for data-driven ways to boost margins, manage inventory, product mix and pricing strategies. Find ways to maintain or grow market share by connecting with Canadian consumers, through tourism or capitalizing on their desire for niche and "locally produced." The alcoholic beverage market is competitive; however, product innovations, including seltzers, pre-mixed drinks, non-alcoholic drinks and other beverages, are supporting growth.

Read the full report at fcc.ca/BeverageReport

Kyle Burak, FCC Senior Economist



DOUBLE BENEFIT

Innovative Canadian Companies are Impacting our Economy and Food Security in Positive Ways

By Dana McCauley, Chief Experience Officer, Canadian Food Innovation Network

When you hear the term “global food security”, it’s easy to feel helpless and imagine that this is a topic for world politicians to tackle, and not a place where food and beverage industry leaders can be change agents. But the truth is that food security is an issue facing every community in Canada, and Canadian companies can have a significant local and national impact. And sometimes our efforts can even lead to global improvements.

Complexities of food insecurity

Solving food insecurity is a much more complex issue than simply producing more food. On a recent episode of the CBC radio show *Spark*, Dr. Evan Fraser from the University of Guelph said that today we produce enough calories to feed all eight billion people on the planet. Unfortunately, those calories are not necessarily in the right place at the right time, or of the quality that we need to ensure a healthy global population. “We don’t produce anywhere near enough fruits and vegetables for us all to eat a healthy diet,” he noted. “I think if we all ate the Canadian Food Guide, like globally, the world would run out of fruits and vegetables by March — and then we would have none for the rest of the year.”

While stories like this one and nightly news headlines can be disheartening, I’m fortunate to have a front row seat to the future of food innovation, and I can tell you that Canadian innovators are creating new technologies and services that are part of the long-term food security solution.

Supporting positive impacts

The Canadian Food Innovation Network (CFIN) is a not-for-profit organization accelerating innovation in the food and beverage industry through connections, collaborations and investments across Canada’s food ecosystem. CFIN has a unique opportunity to identify emerging innovation in the food sector through information shared by our Innovation Advisory Council and our more than 2,000 members. We use this insight to create funding programs and services that help food businesses and their partners bring innovative ideas to market, with an emphasis on smart product and process development and sustainable food supply chains. Since 2021, CFIN has worked with many companies whose efforts today will have a positive impact on food security in the future.

The good news is that Canadian agricultural researchers are addressing this issue by developing hardier crops that are more resistant to weather extremes such as drought or high heat. At the same time, many Canadian nutrition and food researchers are working to offer healthier, more nutrient-dense products that provide a better overall nutrition profile, and to optimize the way foods are formulated so that our bodies process and absorb as many nutrients as possible. For example, the Institut sur la nutrition et les aliments (INAF) at the Université Laval is studying how the gut microbiome works and improving the absorption of nutrients so that the calories we take in deliver maximum impact.

CFIN members are using such knowledge and their entrepreneurial initiative in exciting ways. Food waste is a problem in many wealthy societies where we squander not just food but resources that could have been used to invest in helping other countries to feed their populations. According to Waste Reduction Week Canada, an astonishing 58% of food is lost in Canada each year. Imagine if we could recapture that \$49 billion of value and redirect it to solving hunger caused by poverty, political upheaval and natural disaster.

“We don’t produce anywhere near enough fruits and vegetables for us all to eat a healthy diet,” Dr. Evan Fraser noted. “I think if we all ate the Canadian Food Guide, like globally, the world would run out of fruits and vegetables by March—and then we would have none for the rest of the year.”

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Upcycling waste

BioTrim, a mobile on-farm system created by Burnaby, BC-based Trendi Tech Inc., uses robotics and automation to upcycle fruit and vegetable waste at the farm and food processor level to create nutrient-dense, shelf-stable powders that can be used for many applications. From a food security point of view, products developed with these powders can be used in standalone vending-style machines that can provide hot, nutritious soup or filling fruit smoothies in schools, shelters and other places where cooking and storage resources are scarce.

Extending shelf life

Other CFIN members tackling this problem from both a health and food preservation standpoint include Innodal, a Longueuil, QC-based company using fermentation to create clean label ingredients that extend shelf life and prevent the growth of bacteria on meat, resulting in less illness and

less waste. Also working to boost the shelf life of produce is Saint-Hubert, QC-based flavour designers Foodarom. The company is developing a solution composed of natural ingredients with antimicrobial properties to eliminate multi-resistant fungal contaminants that are often found in concentrated fruit syrups and purées. Success will allow these highly nutritious seasonal foods to be more widely available for more months of the year.

AI-driven nutrition

Then there is Calgary-based Nutrimeals, a company working to make meals more nutritious. This meal prep company that delivers fresh and healthy pre-made meals across Alberta, leverages artificial intelligence to provide ready-to-eat meals that are customized to each customer’s dietary needs. And by digitizing their ecommerce platform and logistics model, Nutrimeals will be able to seamlessly deliver hyper-localized bespoke meals that satisfy very specific nutrition needs so that every calorie counts.

Tracing technology

Another inspiring CFIN member is Toronto’s Index Biosystems which is testing BioTags, unique microscopic barcodes that are water- and heat-resistant and that can be safely sprayed on crops. From field to market, BioTags can be scanned using DNA barcoding to trace the product back to its point of origin. When widely used, this technology will reduce the waste of products that are currently discarded when foodborne disease outbreaks occur. Consider historic recalls of romaine lettuce, for instance. Using BioTags consistently would mean that contaminated lettuce leaves could be traced back to the exact field in which they were grown and pulled from stores selectively, leaving the safe lettuce intact and available for purchase on store shelves.

The right direction

Resolving global food insecurity is not a simple issue, but these technology-based innovations offering real-life food waste and nutritional solutions are a step in the right direction. As these and other innovations reach the market in coming years, CFIN will continue to support Canadian companies making a difference in the fight against food insecurity through funding programs and by connecting them with the people, processes and resources they require. **BL**



Dana McCauley is chief experience officer for CFIN. Contact her at dana@cfjn-rcia.ca.



Six foodtech projects receive CFIN funding

The Canadian Food Innovation Network (CFIN) recently announced an investment of \$530,000 in six unique foodtech projects valued at \$1 million.

“These six projects are prime examples of the breadth of exciting food innovation that’s happening here in Canada,” says CFIN CEO Joseph Lake. “CFIN is extremely excited to fund homegrown, innovative solutions that have the potential to reduce emissions, increase domestic production, and establish Canada as a global leader in new and emerging food sectors.”

Bolton, ON-based Plan Automation received part of the funding to pilot the world’s first fully automated reclamation technology that can detect and reclaim foreign matter from packaged food and beverage products. Suppli, a Toronto-based provider of reusable packaging, is piloting technology to deliver real-time data and help streamline the management of reusable food packaging. Forward Water Technologies in Toronto is developing a new food-safe line of equipment for cold concentration of foodstuffs. Radish Cooperative in Montreal is working on a lightweight digital twin system to enable restaurants to easily monitor and predict their inventory stores. Cascadia Seaweed from Sidney, BC, is seeking to extend the shelf-life of fresh seaweed and boost processes. And Escarpment Laboratories in Guelph, ON, is hoping to introduce Canada’s first commercial Tempeh and Koji cultures.



SOCIAL MEDIA MESSAGING IS CONTRARY TO HEALTHY EATING

New research funded by the Heart and Stroke Foundation shows there are millions of posts on social media about unhealthy food and beverages each year. These conversations about fast food restaurants, sugary drinks, candy, chocolate and snacks are not only driven by food and beverage brands but by individual Canadians, representing a newer form of marketing called user-generated content (UGC). Younger people are vulnerable to UGC because of their increased trust and familiarity of people within their social networks. It is as effective as company advertising, which is cause for concern.

“Canadians are being fed millions and millions of social media posts promoting unhealthy food and beverages each year, and this includes children and youth who we know spend an immense amount of time online,” says Dr. Monique Potvin Kent, associate professor at the University of Ottawa and author of the study. “All of this online chatter is just another form of marketing, which influences the foods kids eat, which in turn can severely impact their health.”



New Canadian allergen management guidelines released

Food Allergy Canada has released its *Allergen Management Guidelines for Food Manufacturers*. The organization worked with Université Laval and food manufacturers to develop the guidelines. The *Safe Food for Canadians Act* calls for preventive control measures to be in place throughout the food and beverage manufacturing process. The guide provides a framework for allergen control planning and facility assessment, and offers recommendations on the use of precautionary allergen labelling. The guidelines and related resources, including online training and user guides, can be downloaded from Food Allergy Canada at foodallergycanada.ca/AllergenGuidelines.



Two East Coast brands reimagine pizza crust

Atlantic Canada's Greco Pizza chain has partnered with Waterville, NB-based Covered Bridge Potato Chip Company, to reinvent the pizza crust. In a new mashup, the Storm Chips Pizza comes encrusted at the outer edge with potato chips available in Storm Chip, creamy dill, ketchup, BBQ, and sea salt & vinegar. Covered Bridge worked closely with Greco Pizza to ensure the kettle chips retained their crunch and complemented the pizza flavour.

RABBA IS GOING GREEN

Toronto-based specialty grocer Rabba Fine Foods has teamed up with Green Integrations and Star Energy Solutions to reduce the carbon footprint of its distribution centres, which house grocery, refrigerated, dairy and frozen goods, as well as specialty items. A total of 2,585 solar panels will be installed, generating more than 1.5 million kWh of electricity annually and lessening the company's reliance on the provincial electricity grid. The company hopes to reduce its carbon dioxide output by 822 tonnes, the equivalent of planting 362,000 trees. The project is expected to be completed by the end of 2023.





Six policy priorities identified to improve climate change and strengthen global food systems

By Sean Tarry

It's no secret to anyone with even a peripheral understanding of the state of the world's environment that there's grave concern about the health and future of the planet. However, the degree to which these concerns are resonating among experts may not quite be as clear. In fact, in 2021, the United Nations Intergovernmental Panel on Climate Change described the climate change crisis as "code red for humanity", and one that requires urgent action lest the world's food systems will continue to be impacted, dramatically more so as we move forward.

In response to the crisis, the International Food Policy Research Institute (IFPRI), in concerted efforts with the Alliance of Bioversity and the International Center for Tropical Agriculture, the International Water Management Institute and other partners, recently released the IFPRI's 2022 *Global Food Policy Report*, identifying six policies that researchers say need to be implemented around the globe immediately in order to begin addressing the increasingly complex challenge of climate change and its impact on food systems.

And, although the health and viability of food systems are directly linked to climate change, much more so in developing countries, resulting in reductions in agricultural

productivity, disrupted supply chains, increased hunger and malnutrition, they are also often contributors to the problem. In fact, most recent estimates indicate that food systems contribute more than a third of the greenhouse gas (GHG) emissions causing climate change. It's a double-edged scenario that's resulted in the topic of food systems being placed under a microscope of sorts and at the centre of discussions concerning the impacts of climate change and the solutions that can potentially help to alleviate the associated problems.

As a result, many within the global food industry have expressed their concerns, pointing to transformational requirements that are necessary in order to lessen and improve the impact of food systems on climate change. The transformations that are being called for will need to be supported, facilitated and governed by the introduction of major policy reform, substantial financial investment, and an approach that embraces and encourages innovation.

In an effort to advance the work and thinking required to achieve a more efficient food supply around the world and lessen the negative contribution toward the exacerbation of climate change, the *Global Food Policy Report* identifies the following six policy priorities:

1. Research, development and innovation investment

Given the recent acceleration of digital technologies and the capabilities that are inherent within them, it's no surprise that the report identifies investment in research and development and technological innovation as one of the foremost policy recommendations. A number of recent innovations, including solar-powered irrigation pumps and cold storage, genome editing advancements and the digitization of many points along the value chain have demonstrated incredible promise when it comes to their ability to help increase productivity and efficiency while also reducing related emissions. The report describes the results of the use of current technological capabilities as a "win-win opportunity in the fight against both hunger and climate change", suggesting that more significant incentives are required to elicit greater adoption of these technologies by producers around the world.

2. Improved resource governance

In order to properly and responsibly transform global food systems, however, the report suggests that mechanisms need to be put in place in order to manage the close links between water, energy, land use and the use of global resources. And, it says, to adequately increase sustainable resource management, an integrated landscape management approach must be taken, whereby long-term collaborations between a number of different and, at times, disparate groups, including land managers and stakeholders, are formed to ensure optimized outcomes and positive progress related to their efforts.

As a result of the complexities involved in integrated landscape management projects, the report underscores the importance of governance that's arrived at through thoughtful and deliberate means. And, given the potential that integrated landscape management poses toward the improvement of food systems, it's proposed that policymakers incentivize the approach, motivating stakeholders to invest in sustainability and participate in resource governance, promoting the use of clean energy sources, the restoration of soil quality, the strengthening of land tenure rights and the ensuring of equitable access to water and other natural resources.

3. Healthier, more sustainable production

It's estimated that more 3 billion people across the globe—the equivalent of approximately 40% of the world's population—are unable to afford a diet of adequate nutritional value, lending toward malnutrition and a threat to global health. In light of this, the report recommends greater focus be paid toward establishing and ensuring greater access to healthier and more affordable foods to complement a healthy diet. In order to support the increase in dietary health, it's also suggested that countries throughout the world develop, implement and promote national guidelines that direct and instruct people with respect to healthier choices. In addition, research and development related to identifying nutrient-rich foods and ways in which labeling, certifications and standards

highlighting the nutritional and sustainable features might entice greater adoption of these foods among the general public.

4. Enhancement of value chains

The report notes that climate change is invariably affected by the "entire food value chain, from production and harvesting, to processing and transportation, to marketing and consumption." Because of this, mass improvements are required in order to lessen the negative impacts of the food supply on the environment. The report cites increased investment in climate-friendly processes and practices that pose the potential to reduce emissions and cost while also serving to prevent food loss and waste. By combining strong policy with increased investment in climate-smart solution advancements, the IFPRI suggests that meaningful momentum can be built toward decreasing the environmental harm caused by the global food system value chain.

5. Inclusion and social protection

To effectively influence change among a population, it's imperative that everyone is involved in the process of transformation and adaptation. However, all too often, many within societies all over the world are marginalized from the conversations and execution of the change. It results in a discontented, ineffective and underserved proportion of the population that is limited when it comes to their capacity to participate and benefit from progress. In order to alleviate this obstacle to positive change, the report recommends the institution of more dedicated social protection services in countries around the world, services that include policies and programs meant to educate and inform, thereby reducing poverty and increasing social inclusion and the participation in positive climate-friendly and sustainable practices.

6. Climate-smart finance

In order to meet the aforementioned goals and make the adjustments to the global food supply that would be necessary, some estimate that the cost could reach somewhere in the region of US \$350 billion, per year. It's an astronomical amount of funding that simply doesn't currently exist. Therefore, the report suggests that by repurposing much of the government funding that's disbursed today, directing it toward agricultural sectors, research and development related to green innovations, incentivization and investment resources for farmers to help support their adoption of innovations will result in significant change.

A more sustainable future?

Referring to the recommendations included within the *Global Food Policy Report*, there seems to be a number of shifts that will be required in order to create a more sustainable global food supply. However, the Institute believes that, despite the adversity that we collectively face in overcoming these challenges, there is hope yet, stating that "Climate goals are still attainable, but only if we start acting now and if we act together." **BL**



Gastronomus' smart automated technology set to revolutionize the foodservice industry.

Overcoming foodservice challenges through smart automation

State-of-the-art automated technology helping restaurants modernize their businesses and optimize operations

By Sean Tarry

The foodservice industry in Canada is one that is familiar with challenge and adversity. Traditionally, many of the challenges that are faced by those operating within the sector come and go, like the current labour crisis and disruptions to the supply chain, for instance. It's not to suggest that their impacts can be easily dismissed. But purveyors can often wait out these types of strains on the business, making adjustments for short-term compensation. One challenge that's perennial to the industry, however, and which can't be adjusted for, is that of food waste. In many cases, it's the scourge of the foodservice sector, blighting the efforts of many to optimize their operations and increase revenue. In order to address these challenges, offering a means by which to help overcome them, and so many more, automated technology innovator Gastronomus has created a range of solutions, from smart appliances to fully autonomous kitchens. And, according to

the company's Co-Founder and COO, Kristian Tazbazian, they're solutions that are going to revolutionize foodservice and the ways in which the sector operates.

"Our main clientele and focus is the quick service restaurant sector," he explains. "If you look at the industry, those operating within it are pleading for solutions and new innovation that can help them deal with their challenges. The solutions available to them today just aren't good enough and are, in fact, holding many behind, limiting their progress and evolution. Times are changing. Economics are changing. Consumers are changing. Yet the equipment, facilities and ways that restaurants operate have not adapted to these modern times. As a result, there are a number of challenges that they aren't currently meeting, restricting them from realizing the full potential of their business. We're here to provide restaurants with the kitchen equipment that they



currently use, including grills, fryers, fridges, dispensers, and so on, with advanced automation technologies and techniques that can help increase efficiencies, reduce food waste, and enhance reliability and productivity.”

Overcoming kitchen challenges

Tazbazian, along with fellow Co-Founders Kevork Sevadjian, CEO, and Andrew Skrepnek, CIO, all bring years of experience working within the automotive industry where they helped design and manufacture, among other things, automated passive safety components for vehicles, including air-bag inflators and seatbelt pretensioners. With their roots in advanced automation, Tazbazian says that the trio possess a firm understanding of the ways in which these types of technologies and techniques can be applied to a number of different products and environments. And, when looking to shift gears, so to speak, and leave the automotive industry in search of another sector in which to apply their knowledge and expertise, the group identified the foodservice industry as one in need of modernization in order to overcome many of the challenges its operators face.

“Over the past few decades, most industries, including manufacturing, mining and agriculture, have evolved,” he says. “And, they’ve managed to advance and evolve through the adoption and use of smart technologies and automation. The question we asked ourselves was: why had these types of technologies not yet been leveraged at the brick-and-mortar level with respect to innovation within each storefront? One of the reasons, from our perspective, is the fact that there is a certain amount of variability when working with food given the differences from product to product, which causes a degree of complexity when it comes to automation. And, the other significant reason keeping automation out of kitchens is due to the fact that the technology that’s needed to deal with those inputs have been extremely expensive. It’s

only been recently when the cost of these technologies and equipment have come down to a level that restaurateurs are presented with a meaningful return on investment.”

Strategic partnerships

Tazbazian goes on to explain that in light of the current stresses and pressures being placed on those operating within the foodservice industry, which include a shortage of qualified talent, inflated costs and rising rent, the time is now for restaurant owners and operators to explore and adopt smart technologies, lest they be left behind. It’s a sentiment that’s shared by the Canadian Food Innovation Network, which recently awarded the smart kitchen equipment manufacturer a \$1.9 million grant to advance its development and manufacturing efforts.

Gastronomous has also cultivated meaningful partnerships with industry players Sodexo Canada Limited—a leading catering and facilities management service provider—and Recipe Unlimited Corporation—owner and operator of several restaurant chains, including Swiss Chalet, Harvey’s and The Keg, and food distributor for large operations. These partnerships have allowed Gastronomous to further deepen its collective understanding of the needs and challenges of today’s restaurant operation. And, according to Tazbazian, it’s an understanding that he says forms the foundation from which everything the company does is built.

“We believe that every great company begins with the voice of the customer,” he says. “And, we really take that message to heart, listening to our clients to gain a comprehensive appreciation for their operation, identifying the challenges that they face as well as the areas in which there are opportunities to find greater efficiencies and increased production. Listening to them also provides us with the insights necessary to explore and determine the automated

solutions that would fit best with their business, aligning with their goals and objectives, giving us what we need to design the right technologies and techniques for them.”

Constant evolution

Tazbazian explains further that, in addition to listening to the customer, the team at Gastronomous also conducts site visits in order to intimately understand exactly what retrofitting might be required in order to properly implement the tools and technologies into their clients’ kitchens. He describes the way that they work with their clients as a very “synchronized and harmonized” approach—one that he says allows the company to remain nimble, flexible and open to new ideas that can help improve the technologies they offer, resulting in greater end benefits.

“A big mistake that a lot of start-ups make is that they are, from the beginning, too much in love with their own product to allow themselves to properly evolve and grow,” he says. “It’s another huge benefit that results from speaking with and listening to our clients as intently as we do. Everyone has ideas. And when the end goal is to satisfy the needs of the customer and to help them overcome challenges that they’re facing, we’re always open to exploring different concepts and ideas.”

Wide-ranging benefits

It’s an approach that has enabled Gastronomous to design and manufacture smart automated kitchen equipment that offers a range of positive outcomes, including the following:

Reduced food waste and cost: The accuracy of the automated technology and techniques allows restaurant owners to leverage and utilize every piece of a given product, minimizing waste and, by proxy, the cost associated with the food being used.

Maximized efficiency and throughput: The technology enables the optimization of all orders in queue by parallelizing tasks to ensure maximum efficiency and throughput. Its system is powered by proprietary intellectual property that incorporates order scheduling, an interactive user interface, inventory control, and equipment diagnostics.

Enhanced consistency of quality: The automated technologies enhance the quality of any restaurant offering, ensuring that every item is cooked, dispensed, and prepared accurately, every single time.

Increased labour utilization: By relieving kitchen staff from redundant cooking operations, the autonomous technology allows workers to spend more time completing more strategic tasks and servicing the customer in different ways.

A smaller footprint: Products utilize a much smaller square footage than existing layouts, allowing restaurants to

drastically reduce their store footprint, allocating space more wisely.

Reductions in waste and energy usage: Through accurate portioning and dispensing, the autonomous technology helps eliminate the vast food cost variance present in most restaurants today. Moreover, products are 60% more energy-efficient than current solutions, allowing restaurants to significantly reduce their carbon footprint.

Enhanced food safety: Food safety is a top-of-mind issue for many customers today. Automation allows for much stricter control of pathogens within the kitchen environment.

Setting a standard

Over the past couple of years, Gastronomous has been working with one of Canada’s leading fast-food groups on the development of one of its most innovative products that Tazbazian says is going to go a long way toward setting a standard for the future of kitchen automation. The product is nearing the end of its manufacturing phase and will be in a store within the Greater Toronto Area by the beginning of February 2023. He explains that the product will be tested for three to four months before rolling it out within a network of stores across the country. In addition, Tazbazian says that, as a result of the “universal” nature of the product combined with its effectiveness in helping kitchens achieve greater efficiencies, the company has also engaged with a number of other potential clients, with whom pilots are planned for the summer of 2023.

Going forward

When connecting the dots, recognizing the challenges that most, if not all, restaurants face in today’s increasingly digital world and the ways in which Gastronomous’ automated technology solutions help to address and overcome them, it’s no wonder that the company is on a steep upward trajectory. However, according to Tazbazian, he and the team have no plans to rest on their collective laurels. In fact, he says that the designers and manufacturers of smart autonomous kitchen equipment are only getting started.

“We know that we have some fantastic products that can really help a lot of restaurant owners improve all facets of their operations. We’ve obviously received some great reception so far. But we’ve constantly got innovations and plans in the works. In fact, our strategy is to consistently have one product in the rollout phase, one that’s being piloted, somewhere in between the whiteboard and rollout phase, and another that’s purely in the conceptual phase. It ensures that we’re always on our toes with respect to identifying the challenges that the industry faces and ways we can help them not only overcome them, but to succeed and grow their businesses as well. It’s the way we approach every innovation and product. And it’s what we plan to continue doing.” **BL**



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Why Figs?

Figs are trending! They certainly have their place in ancient history but today chefs and consumers are rediscovering the fig and simply can't get enough. In fact, new products containing fig ingredients are on the rise around the world for flavor, functionality and nutritional benefits. This is likely due to the fig's ability to fit into today's top trends: organic, kosher, GMO-free, high-fiber, all-natural, gluten-free, trans fat-free, on-the-go and more

Figs are also a blank canvas for the world's cuisine. From Mediterranean and Chinese to Indian and Japanese, figs and fig flavors are sublime in sauces, snacks, dressings, spreads, candies, baked goods, beverages and more. The flavor is unique and makes any recipe or product distinct and delicious.

While figs continue to gain momentum as a culinary staple, their reputation as a nutritious addition to the diet also remains strong. California Figs provide a nutritional punch that is unmatched by any other fruit.

In addition to being a good source of fiber, figs contribute essential vitamins and minerals to your diet, including iron, calcium, potassium, magnesium, vitamin B6 and copper. Figs are also rich in antioxidants, and are fat, sodium, and cholesterol-free.



Why California Figs?

California Figs are grown in the fertile soil of the Central San Joaquin Valley, home to one of the world's most famous fruit and vegetable growing regions. Commercial fig orchards are located in Fresno, Madera, Merced and Kern Counties. California Figs are harvested in the late summer and early fall. California Dried Figs are available year-round while Fresh Figs are available May – November.

WHEN YOU THINK FIGS, THINK CALIFORNIA!

California produces seven major varieties of figs: Black Mission (dried/fresh); Brown Turkey (fresh only); Conadria (dried only); Kadota (dried/fresh); Sierra (dried/fresh); Tena (dried only); and Tiger (fresh only). Darker skinned figs, such as Black Mission and Brown Turkey, are rich purple to black in color. Lighter skinned dried figs, such as Conadria, Kadota, Sierra and Tena, may be treated with sulfur dioxide to prevent browning.

Quality and food safety are among the highest priorities for California's fig farmers. That's why state of the art equipment and sustainable growing practices, such as water and tree management, are in place. In addition, California Figs are inspected by the Dried Fruit Association (DFA) of California to certify for grade and quality standards required by California's Department of Food & Agriculture, ensuring California Figs are the best in the world.

California Fig ingredient products are unique to California. The ingredients were developed to provide solutions to product developer needs. You won't find many of these products anywhere else.

For more information, visit CaliforniaFigs.com



The potential of renewable natural gas from Canada's food and organic waste

Supporting Canada's goal to net zero emission by 2050

By Animesh Dutta, Professor of Mechanical Engineering, School of Engineering, University of Guelph and Omid Norouzi, Research and Development Specialist, Anaergia inc.



Canada has committed itself to be a net zero emission country by 2050—a commitment that will be driven by the *Canadian Net-Zero Emissions Accountability Act*. The Act will establish a legally binding process to set five-year national emissions-reduction targets for 2030, 2035, 2040, and 2045, as well as to develop credible, science-based emissions-reduction plans to achieve each target. The Act was introduced in the House of Commons by the Minister of Environment and Climate Change on November 19, 2020. Additionally, in 2021, Canada has increased its commitment to reduce its GHG emission levels by 40-45% (of the 2005 level) by 2030, superseding its original goal of 30% which was set in 2016. Ontario accounts for the second-highest GHG emissions in Canada and will need to implement a diverse range of actions to meet the 2030 goals. One of the key actions to meet the target goals includes phasing out food and organic waste that is being sent to landfills by 2030, dramatically reducing the amount of methane that is released into the air.

Canada's current waste situation

The Canadian economy currently seems locked into an inefficient system. Production, economics, contracts,

regulation, and consumer behaviour all favour the linear model of production and consumption. This model applies to our current food and beverage industry and is very wasteful. Between 33% and 50% of food is wasted, and many food production techniques cause widespread environmental degradation. When organics decompose, they generate gases such as methane and carbon dioxide, both of which are major contributors to climate change. Nearly 90% of emissions associated with waste come from waste sent to landfills. The situation will exacerbate within the next 30 years due to population growth and shifting demographics. The current waste management strategies, which mostly rely on engineered landfills and composting, do not encourage recycling and waste reduction. It has been forecast that Ontario's landfills may run out of capacity in 20 years if we do not make changes to how we handle waste.

Canada generates 35.5 million tonnes of waste containing 20 to 40% organic waste. This amount of organics can be converted into about 12,000 kWh of renewable energy per year. The current waste management infrastructures in Canada can only capture 2.6 million tonnes of organic fraction from landfills. Among the provinces, New Brunswick diverted the most organics (57.57%), followed by Nova Scotia (46.84%),

Prince Edward Island (36%), British Columbia (35.33%), Alberta (34.62%), Ontario (34.27%), Manitoba (25.38%), Newfoundland and Labrador (21.57%), Saskatchewan (16.98%), and Yukon (15.69%). In these provinces, managing technologies to establish organic fraction includes biological and thermochemical conversion systems such as composting, anaerobic digestion, hydrothermal carbonization, pyrolysis, gasification, and incineration. Among all others, anaerobic digestion seems to be a more sustainable system and can be integrated with or replace conventional waste management strategies more efficiently. Anaerobic digestion is becoming an important technology in the conversion of organic fraction municipal solid waste, waste-activated sludge, agricultural waste, animal manure, and food waste.

Canada's existing infrastructures for solid waste management

Seven types of waste management facilities are actively operating in Canada, which are transfer station assets, composting, material recovery facility, anaerobic digestion, engineered landfill, incineration, and energy from waste. Ontario (1813), Quebec (713), Alberta (1204), British Columbia (581), Newfoundland and Labrador (324), Manitoba (595) and Saskatchewan (1074) have adopted waste management facilities. Currently, landfilling is the most common approach for municipal waste disposal in Canada. Although modern municipal solid waste landfills are able to collect and treat leachate and capture greenhouse gasses, it is still not a suitable approach for the disposal of waste. Environmental analysis of implemented waste management facilities has shown that anaerobic digestion has obvious advantages in the environmental criteria over other methods. Thus, in recent years, Canada's municipal solid waste treatment plants are gradually adopting the anaerobic digestion mode of operation in which the organic fraction can be converted into renewable natural gas, electricity, and fertilizer. The two most populous provinces, Ontario and Quebec, recycled the most organics and implemented the highest number of anaerobic digestion plants in 2018, with 40 and nine plants, respectively. In Ontario, such fast-paced green development is due to provincial incentives such as the FIT program.

Guideline for better selection of organic waste management methods

Anaerobic digestion is a process by which organic waste streams produced in the food and beverage industry, the paper industry, agriculture, waste water treatment plants, and households, are converted into biogas, renewable natural gas (RNG), liquid, and solid fertilizers, owing to the anaerobic bacteria or facultative anaerobic bacteria. At present, anaerobic digestion technology has been significantly advanced in Europe and turned into a well-established waste management strategy within the continent. With 18,943 biogas plants, 725 biomethane plants, 15.8 billion m³ of

biogas and 2.4 billion m³ of biomethane Europe is considered the leading producer of biomethane. However, compared with Europe, biogas production in Canada is a small but fast-growing industry. Canadian gas utilities are looking at measures to support a target of up to 10% RNG into natural gas pipeline distribution systems by 2030. Nationally, this amount of RNG would be equal to approximately 10.6 million m³ of natural gas per year. This volume of RNG could fuel 3.1 million homes with renewable fuel annually. It would result in 14 megatonnes of GHG emission reductions per year, the equivalent to removing 3 million cars from the road.

Introducing the organic fraction from municipal solid waste into a city's existing wastewater treatment plants could provide significant opportunities for Canada's renewable energy market. Some robust, cutting-edge solutions for organic waste recovery from municipal solid waste in Canada are available. Unlike traditional approaches, these solutions can recover 90% of organics without limitations on in-feed contamination levels. For example, the Dufferin Organics Processing Facility is designed to process 55,000 tonnes per year of source separated organics (SSO) collected through the city of Toronto's Green Bin program. It generates renewable energy, high-quality digestate, and treated water for process re-use. The waste consists of kitchen scraps and organic waste (including animal waste, food, diapers, and soiled paper and packaging).

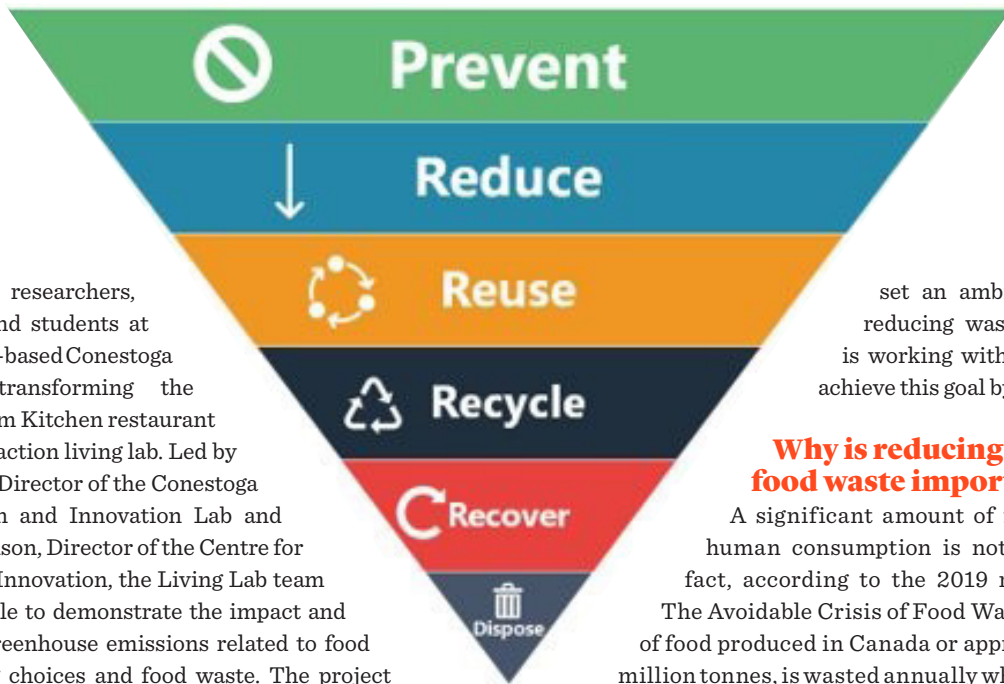
Another important by-product alongside RNG that should be considered in the anaerobic treatment of organic fraction municipal solid waste is digestate. Currently, Canadian project developers and policymakers mainly focus on financial subsidies for RNG production. They do not consider the market opportunities of digestate in agricultural applications (i.e., organic fertilizer) and non-agricultural applications (i.e., soil remediation, biochar production, landfill cover and landscape restoration). In line with the circular economy concept, the European Commission has specified certain principles to collect revenue from organic digestate. This approach is being introduced in other developed countries, including Canada. Policymakers are working on national regulations defining digestate quality to ensure the economic viability and environmental safety of OFMSW (organic fraction of municipal solid waste) digestate use. The most successful reference of using OFMSW digestate as a class A fertilizer is the Realto bioenergy facility in California. This facility has the capacity to receive 700 tonnes per day of pre-processed source-separated organics and 300 tonnes per day of dewatered wastewater treatment plant sludge and convert them into 3 MW electricity, 1200 standard cubic feet per minute RNG, and 26 tonnes per day biochar.

Becoming a net zero emission country by 2050 is certainly no small feat. However, by leveraging the potential of renewable natural gas from Canada's food and organic waste, and optimizing a currently inefficient system, it's a goal that may yet be possible. **BL**

Reducing food loss and waste at BLOOM RESTAURANT

Applied research explores ways to identify food waste and how to address it

By Nicole Detlor, Director, Food Research and Innovation, and Stephen Thomson, Director, Centre for Supply Chain Innovation, Conestoga College



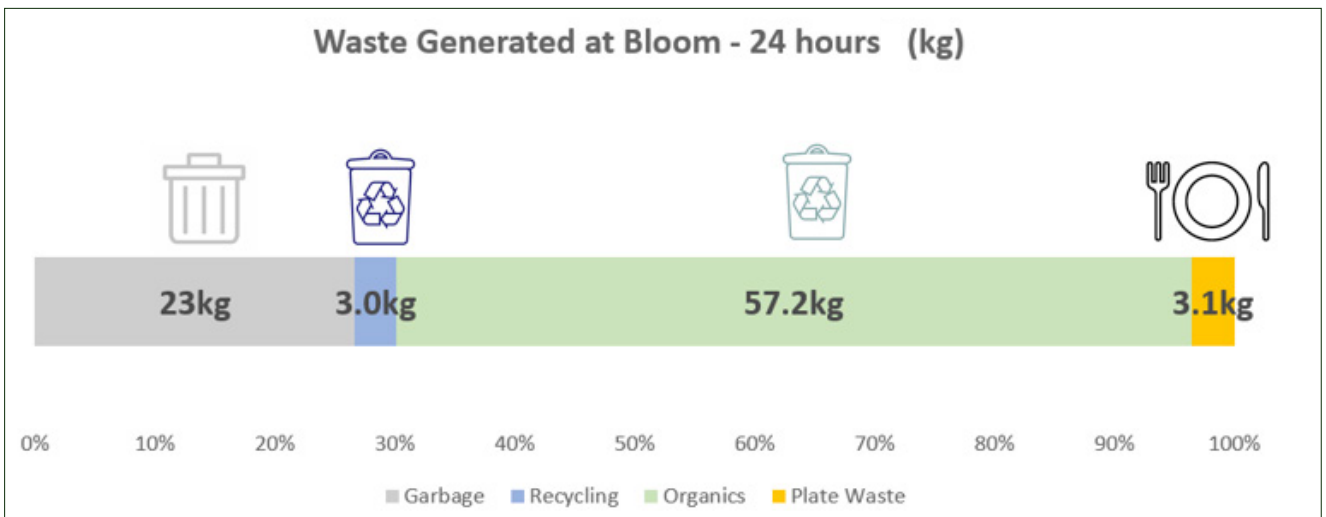
A team of researchers, faculty, and students at Kitchener, ON-based Conestoga College is transforming the campus's Bloom Kitchen restaurant into a climate action living lab. Led by Nicole Detlor, Director of the Conestoga Food Research and Innovation Lab and Stephen Thomson, Director of the Centre for Supply Chain Innovation, the Living Lab team hopes to be able to demonstrate the impact and solutions to greenhouse emissions related to food and packaging choices and food waste. The project

set an ambitious target of reducing waste by 50% and is working with Bloom staff to achieve this goal by early 2023.

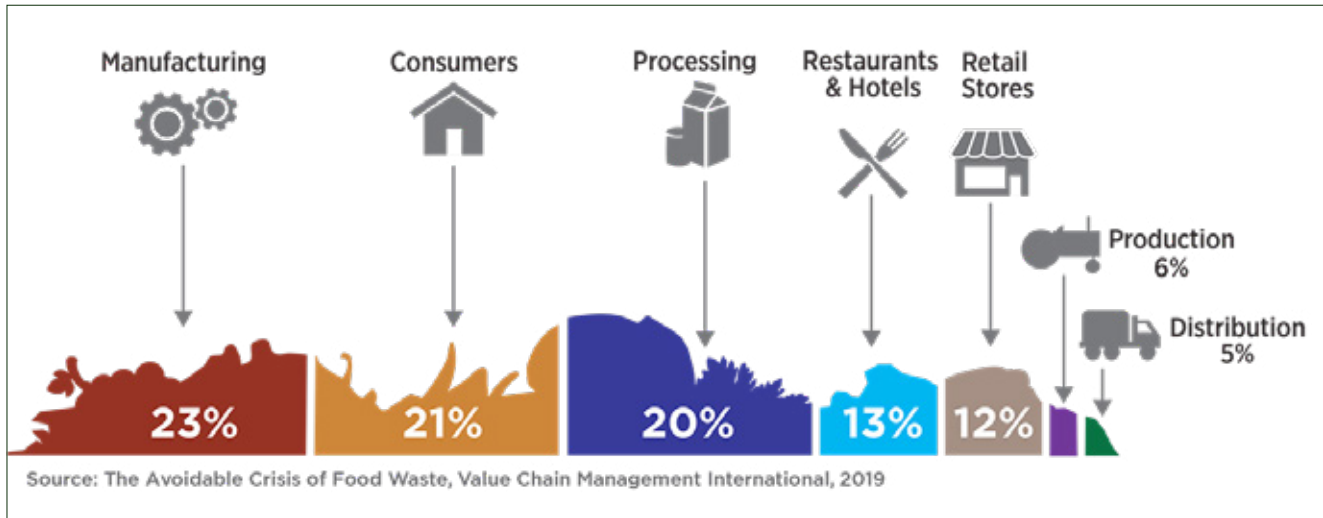
Why is reducing food waste important?

A significant amount of food grown for human consumption is not consumed. In fact, according to the 2019 research paper, *The Avoidable Crisis of Food Waste*, nearly 60% of food produced in Canada or approximately 35.5 million tonnes, is wasted annually where 32% or 11.2

Waste Generated at Bloom - 24 hours (kg)



Sources of Food Waste



million tonnes of that food is edible and could be redirected. The value of the rescuable waste is \$49.46 billion. There are economic, environmental and social reasons why this is a significantly important problem to address.

Economic

Food wasted and lost during harvesting, processing, storing, and transporting is considered a cost of doing business. Reducing food waste at the source is the most preferred method of food and cost recovery. In addition to reducing costs, food heading to the waste stream could be diverted to uses that add revenue. An example of this is the use of spent grains from beer-making being sold to bakeries to make bread.

Environmental

When food is wasted, the land, water, feed, fertilizer, fuel, and other inputs are also wasted. The greenhouse gases (GHG) required to produce these inputs is also wasted and totals 56.5 million tonnes of CO₂ equivalent emissions. Especially concerning is that organic waste in the landfill produces methane gas on decomposition, which is 25 times more damaging to the environment than carbon dioxide.

Social

The number of people using food banks in Canada is at an all-time high. According to a recent report from Food Banks Canada, there were nearly 1.5 million visits to food banks in March 2022, which was 15% higher than the number of visits in the same month in 2021 and 35% higher than the visits in March 2019. It is important to identify any sources of food waste that could be redistributed to vulnerable populations.

Where's the waste?

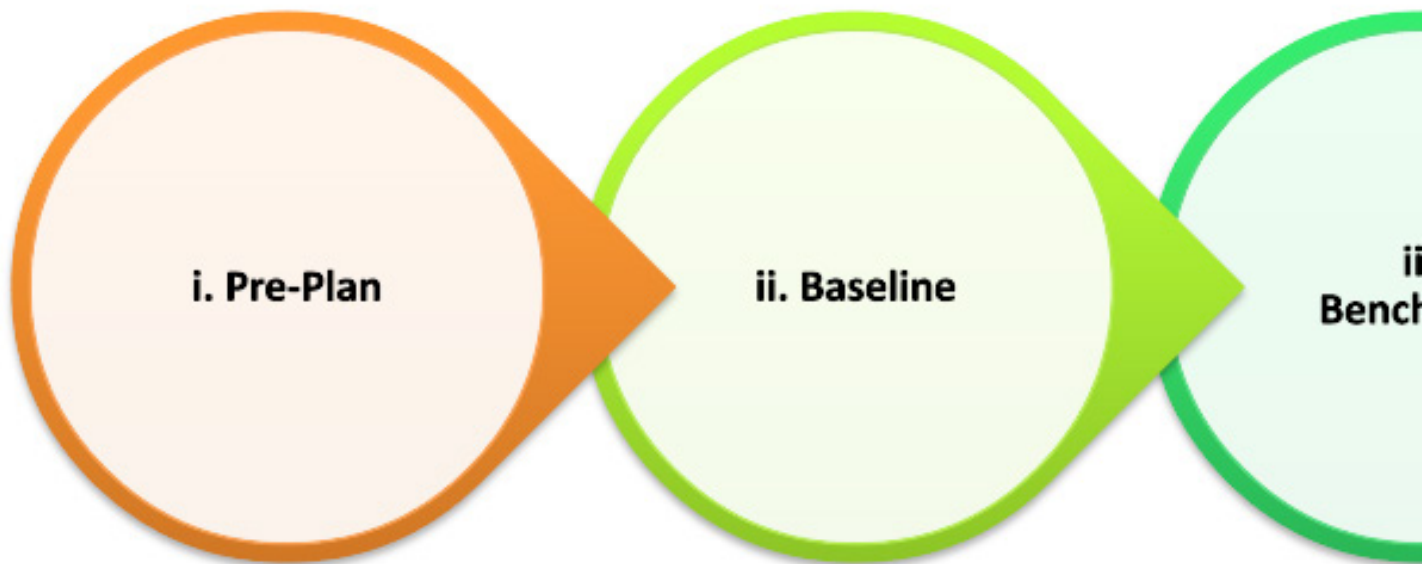
The sources of food waste on the value chain are as follows: manufacturing (23%), consumers (21%), processing (20%), restaurants and hotels (13%), retail stores (12%), production/harvesting (6%), and distribution (5%).

Although waste from restaurants and hotels only accounts for 13% of system waste, the results of the research will inform the supply chain practices at Bloom, which we will share with industry and look for waste reduction opportunities along the entire value chain. Within the context of restaurants and hotels, where this research focuses, previous studies have found the major categories of food waste in restaurants include food preparation waste (45%), inedible food waste (21%), and food left uneaten by customers (34%).

Food waste at Bloom Restaurant

A 50% reduction of waste is a significant goal. To help reach this target, the Living Lab team brought in the expertise of Laura Matheson, a professor in the Sustainability Business Management Program at Conestoga College, to help identify the best way to approach the challenge. Being familiar with other process improvement frameworks, like Plan-Do-Check-Act (PDCA), the team decided on the following approach which recognizes the continuous nature of improvement:

- Step 1**—Identify food loss and waste (conduct a food audit)
- Step 2**—Identify the root causes of food loss and waste
- Step 3**—Select and evaluate solutions
- Step 4**—Implement solutions
- Step 5**—Monitor results



Conducting a food audit

Under Matheson's guidance, students enrolled in the sustainable operations course planned and conducted a food waste audit on the week of October 10, 2022, to identify the sources of waste and to set a baseline to monitor the progress towards a 50% reduction. The result of the audit provides data to reach the benchmark goal. In Spring 2023, a follow-up audit is planned that will serve to monitor the results and identify any new ways to reduce waste further.

Initial results

The initial results of the audit found that of the 86.3 kg of waste collected during a 24-hour period, food waste made up 75% (65 kg). The food waste was found in three different streams: 3.1 kg was from the dining room/plate waste, 57.2 kg from the kitchen compost bins, and 4.9 kg of organics was found in the garbage stream.

Reduction of food waste

This research project focuses on practical, low-cost solutions to reduce food waste. The restaurant waste can be separated into two large categories: back of house and dining room/plate waste. Back of house waste is food waste from preparation or food that is spoiled or past expiry date. Plate waste is mainly uneaten foods from the consumer but can include dropped plates or food sent back to the kitchen.

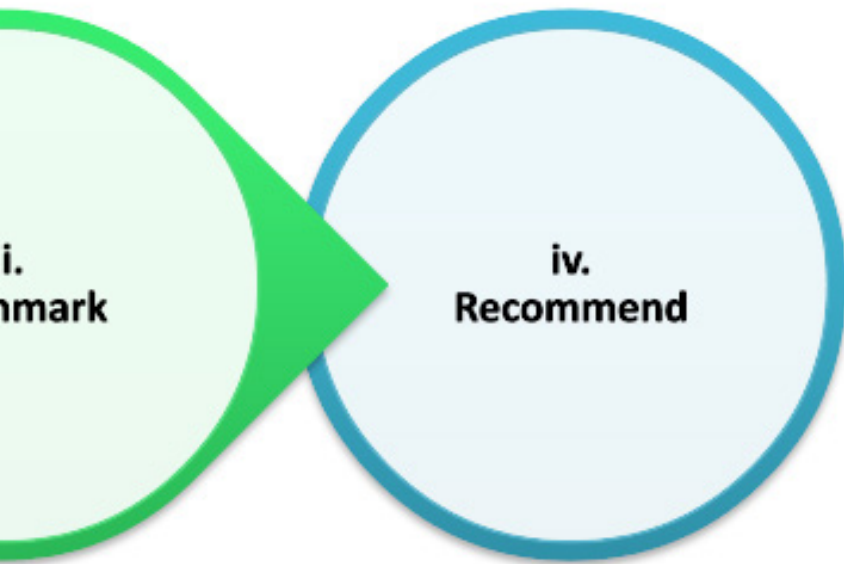
Food preparation waste

Although some waste is unavoidable in the preparation of food, having a plan can enable redirecting as much as possible. We have focused our efforts at the Living Lab on the hierarchy

of waste reduction: prevent, reduce, reuse, recycle/upcycle, recover, and compost. As with any change, regular training is crucial to success, and staff need to understand the different waste streams and their correct usage.

The avoidance of spoiled ingredients and prepared food as a waste stream is dependent on a robust inventory management system tied to an ability to forecast sales. The implementation of techniques such as FIFO (first-in, first-out), DOH (days on hand), colour coding and multi-use ingredients all assist with managing inventory. FIFO is an inventory management system that organizes ingredients in a way that they are rotated to ensure that oldest ingredients are used first. DOH provides data to those ordering ingredients to calculate the average number of days that inventory is held before use. This can help with future decision-making regarding ordering, ensuring that the days on hand are kept for as short a time as possible. Colour coding makes quick decision-making when selecting ingredients from storage and helps the person ordering ingredients. Another approach is to include date received and use-by date labelling on all ingredients and prepared foods. An ingredient with a single use may be more difficult to manage in inventory as its turnover rate will depend more heavily on the accuracy of sales forecasting. Multi-use ingredients offer some flexibility in the menu and ensure that ingredients can be used within their shelf life.

Having a plan for prepared food that will not make it to the consumer before reaching the end of its usable shelf life can also help reduce waste. Several apps have been developed that help connect customers with restaurants (and other food services) to ensure excess prepared food does not go to



waste. As well, having a plan to donate food while it is still useable is another way to prevent food from going to a waste stream.

Upcycling edible streams may include using vegetable trimmings for soup, stocks or sauces, using trimmed fruit for smoothies or dessert toppings, or using stale bread for croutons or breadcrumbs.

Ensuring that any food waste goes to compost rather than landfill is important. Ensuring easily accessible compost bins in the food preparation area of the kitchen limits the effort and helps to ensure compliance.

Dining room waste/plate waste

The waste generated in the dining room impacts the consumer experience more than the other categories discussed. Therefore, implementation with this understanding is important. Through a waste audit, it is possible to identify menu items that more often end up in the waste stream (or that are not taken away by consumers). Adjustment of portion sizes to reflect consumption is one way to address this source of food waste. Ongoing review of the impact on the consumer experience is important when adjustments are made to the menu to ensure the desired results are achieved.

Results of the waste audit at Bloom found that plate waste was mainly side dish carbohydrates such as potatoes or a bun. Offering consumers an opportunity to “opt in” to these parts of the meal may reduce this plate waste. Another strategy is to reduce the quantity of side dish carbohydrates with the option of a “refill” if desired. Providing staff with easy access to compost bins for plate waste helps to ensure this stream is disposed of correctly.

There will always be opportunities to reduce food waste. Having fact-based data to support strategies to reduce food waste is critical. By making small incremental changes, we can all have an impact to reduce our food waste. **BL**

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Canada's Food Waste Reduction Challenge

Bringing together innovators to help solve one of the country's most pressing issues concerning food

By Sean Tarry



In an effort to combat one of the most negative contributors to food insecurity, the Government of Canada launched its first-ever Food Waste Reduction Challenge in November 2020. One of the main pillars within the government's introduction of *The Food Policy for Canada*, the challenge involves four streams of funding for selected applicants that have proven to be companies that display innovation and creativity, presenting potential to significantly divert waste at any point in the value chain, from farm to plate, either by way of business models or technologies.

Multiple streams

Streams A and B within the challenge involve organizations and companies that have developed solutions that are ready for commercialization, while streams C and D involve those that are currently developing technologies that are at the prototyping or testing phase and present the potential to extend the life of perishable food or transform surplus food that would otherwise be wasted into another product.

Reducing waste across the supply chain

It's a challenge that received an inordinate number of submissions prior to the application deadlines for each of the streams, and is a bid to allay the amount of waste that's produced within the country each year. According to most estimates, more than half of Canada's food supply is wasted annually, representing an astonishing \$50 billion worth of avoidable waste. By encouraging more solutions to food waste in Canadian society, suggests Marie-Claude Bibeau, Canada's Minister of Agriculture and Agri-Food, the potential results could be incredibly positive.

"Reducing food waste is necessary for so many reasons: it can help save consumers money, improve food security, support efficiency in the agriculture and food sector, and significantly reduce greenhouse gas emissions," she said. "Through this exciting challenge, our government is finding new ways of reducing food waste across the supply chain."

Helping to meet climate change targets

It's a sentiment that's shared by Jonathan Wilkinson, Canada's former Minister of Environment and Climate Change (2019-21), who stresses the importance of the challenge toward helping the government achieve other goals and objectives that have been set.

"In order to meet our climate targets, Canada must address emissions from all sectors, including emissions from food loss

and waste," he says. "From production, to transportation, to disposal in landfills, food loss and waste is a significant contributor to greenhouse gas emissions. The Food Waste Reduction Challenge will help Canadians develop innovative and effective solutions to this problem and I am excited to see the results."

Winners to be announced

The Food Waste Reduction Challenge represents an overall investment of \$20 million, with \$1.5 million awarded to the winner of each stream within a meticulous and well-thought-out gated process that carefully evaluated each and every applicant. Now, more than three years since the launch of the challenge, many are looking ahead with anticipation toward the announcement of winners, with stream A and B awards set to be announced during Fall 2023, and recipients within streams C and D announced during Spring 2024.

Eliminating waste

Meant to be a significant part of the government's creation of a roadmap of sorts to guide Canada toward the development of a healthier and more sustainable food system, the challenge serves as a potential means which will enable people across the country with greater access to healthy food. And, according to Chair of the Zero Waste Council, Malcolm Brodie, it also represents an extremely positive step in the right direction toward eliminating waste in the country.

"The National Zero Waste Council congratulates AAFC (Agriculture and Agri-Food Canada) on introducing the Food Waste Reduction Challenge, which will help address food loss and waste by giving our nation's small and medium companies a chance to scale up their innovative business models while also encouraging leadership from the biggest players," he says. "We are pleased that the Challenge aligns so well with our Food Loss and Waste Strategy for Canada, and applaud the Government of Canada for its leadership and support for efforts to reduce food loss and waste for the benefit of Canada's food security, economy and climate."

For a full list of remaining applicants eligible to win the Government of Canada's first-ever Food Waste Reduction Challenge, and for further information and details concerning the criteria, process and funding, visit <https://impact.canada.ca/en/challenges/food-waste-reduction-challenge>. **BL**



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