



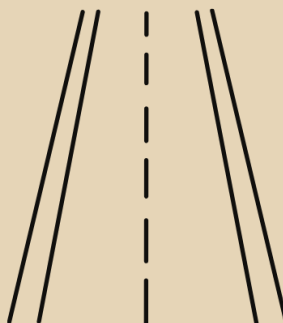
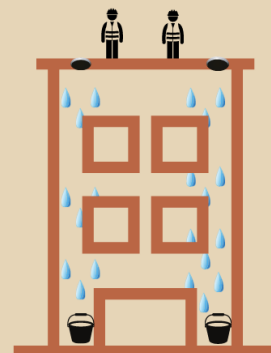
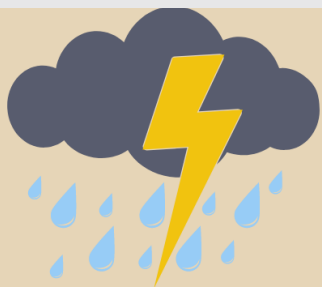
The Shit Storm

enuf

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The Shit Storm

The problem we are exploring is waste management. In this paper, we paint a picture based on:

- 1) Our team's 5-year experience running a student initiative we started at Concordia University in 2016 called "[Waste Not, Want Not](#)" (WNWN). Since our inception, Concordia doubled its annual composting, and each Concordian reduced their annual overall waste by 16%.
- 2) Over 40+ market research interviews conducted for a spin-off of "WNWN" that we affectionately call "*enuf*".
- 3) Information shared by experts during:
 - a) live fireside chats we organized that are available on our [YouTube](#).
 - b) an [Environment workshop](#) organized by the John Molson Sustainable Enterprise Committee that we were invited to moderate.
- 4) Polls that we conducted on our social media channels.
- 5) Academic literature and news articles.

To be clear, the waste crisis is much larger than anything we can face on our own, even with implementing whatever solutions our spin-off offers. While we are reflecting on our experience and vision for the future, we will not be pitching specific solutions. There are no magic tricks, and we hope this map identifies gaps and guides systemic change we can collectively drive. As per [this first-person essay](#) that we recently wrote for CBC Montreal, the only way to address the waste crisis is to take credible evidence-based action together.

To map that system, we will use an imperfect analogy of a city in a storm.

We use a "storm" to represent the waste crisis because of its urgency. The Development Progress Flagship Report projects that global waste will almost double by 2025 relative to 2015.¹ The report also projects that world hunger will only fall from 12% to 8% by 2030. That rate needs to triple to achieve the United Nations's sustainable development goal 2.1 of zero hunger by 2030.

The "city" symbolizes society with different "houses" representing the "environments" of people with different income levels, and "factories" representing economic drivers. There are more symbols used in this imperfect analogy that will be elaborated on throughout the document and associated visual. For the most part, we focus on the Canadian perspective on this global crisis because Canada generates the largest amount of waste per capita in the world.²

The social environment of poorer communities ("houses") makes them vulnerable to various problems resulting from the waste "storm". We represent these vulnerabilities as "holes in the ceiling". In a storm, "buckets" are used as a temporary measure until the storm passes. Similarly, many existing solutions are inadequate particularly in the long term, and unlike a storm, the waste crisis is not going away on its own. There are also semi-systemic solutions being

¹ Nicolai, Susan, et al., "[Projecting Progress Reaching the SDGs by 2030](#)" *Development Progress Flagship Report*, Overseas Development Institute, 2015.

² Byrnes, Hristina, and Thomas C. Frohlich. "[Canada Produces The Most Waste In The World. The US Ranks Third.](#)" *USA Today*, Gannett Satellite Information Network, 12 July 2019.



attempted and are represented in our imperfect analogy by “construction workers” fixing the hole. On the other hand, the “houses” of richer communities have fewer holes and are less vulnerable. Nonetheless, there is a limit to how strong a storm can become before any ceiling collapses. That is to say that while richer communities are less vulnerable than poorer communities to the immediate impacts of the waste crisis, they are not invincible. Here are some of the “holes”, and associated “buckets” and “people fixing the hole” we identified in our research:

1) Plastic waste (affecting all houses):

- a. Hole: Plastic takes hundreds of years to decompose.³ Much of this plastic ends up in our oceans and farmlands which aggressively damages the biodiversity and ecosystems we depend on for many vital functions including our food supply. Nearly a million tonnes of microplastics are added to farmlands in Europe and North America every year.⁴ Scientists recently obtained pictures of microplastic beads in the roots of lettuce and wheat.⁵ Another study found that plastic baby bottles release millions of microplastic particles after going through procedures typically used to prepare baby formula.⁶ Dozens of dyed microplastic particles have even been found in the placentas of unborn babies.⁷



Figure 1: The lifecycle of various plastic items.⁷

³ [“The Lifecycle of Plastics.”](#) World Wide Fund for Nature, 19 June 2018.

⁴ Nizzetto, Luca, et al. [“Are Agricultural Soils Dumps for Microplastics of Urban Origin?”](#) *Environ. Sci. Technol.*, 50, 10777–10779, 26 Sept. 2016.

⁵ Li, Lianzhen, et al. [“Effective Uptake of Submicrometre Plastics by Crop Plants via a Crack-Entry Mode.”](#) *Nature Sustainability*, Nature Publishing Group, 13 July 2020.

⁶ Li, Dunzhu, et al. [“Microplastic Release from the Degradation of Polypropylene Feeding Bottles during Infant Formula Preparation.”](#) *Nature Food*, Nature Publishing Group, 19 Oct. 2020.

⁷ Ragusa, Antonio, et al. [“Plasticenta: First Evidence of Microplastics in Human Placenta.”](#) *Environment International*, vol. 146, no. 106274, Jan. 2021.



b. Buckets:

- i. Recycling: Since the 1980s, recycling has been a widely used model in Canada to divert plastic, glass and aluminum waste from landfills.⁸ However, only 9% of what Canadians put in the recycling bin actually gets recycled.⁹ The system is now used as a greenwashing strategy by companies¹⁰ after the plastic industry faced a backlash in the 1980s so strong that it risked an outright ban on plastic. Finding a way to make recycling appear to work was industry's only way to keep their products on the market.¹¹ The regulations behind the recycling stamp are so unclear that they allow companies to put the recycling stamp on products that are unrecyclable as a marketing tactic.¹³ For instance, five of the seven types of plastic are almost never recycled.¹³ Furthermore, Canadians are also poorly informed on how to sort their waste that much of their recycling is too contaminated and goes to landfills instead. In fact, China has banned the importation of recyclable plastic from western countries including Canada, and set a contamination threshold of 0.5%.¹² The lowest contamination rate of residential recycling in Canada is in St. John's (3%, 6 times higher than China's threshold). Montreal's recycling contamination rate is 7.5%. Since the ban, China reduced Canadian plastic imports by 96% and Canadian paper imports by 65%.¹¹ The under-development of the Canadian recycling industry has caused even more "recyclables" to end up in our landfills.¹⁴ This ban has impacted a company that operates two recycling centres in Montreal to announce that it will cease operations in the near future.¹³ Finally, recycling companies in Canada have no legal obligations to recycle what they collect from institutions if they cannot profit from it.¹⁴

⁸ Lewis, Jeff, and Molly Hayes. "[Reduce, Reuse, Recycle, Rejected: Why Canada's Recycling Industry Is in Crisis Mode.](#)" *The Globe and Mail*, Philip Crawley, 15 May 2019.

⁹ "[Why Your Recycling May Not Actually Get Recycled.](#)" *CBC News*, CBC Radio Canada, 2 May 2019.

¹⁰ Schlossberg, Tala, and Nayeema Raza. "[The Great Recycling Con.](#)" *The New York Times*, The New York Times Company, 9 Dec. 2019.

¹¹ "[Recycling Was a Lie - a Big Lie - to Sell More Plastic, Industry Experts Say.](#)" *CBC Docs*, CBC Radio Canada, 8 Oct. 2020.

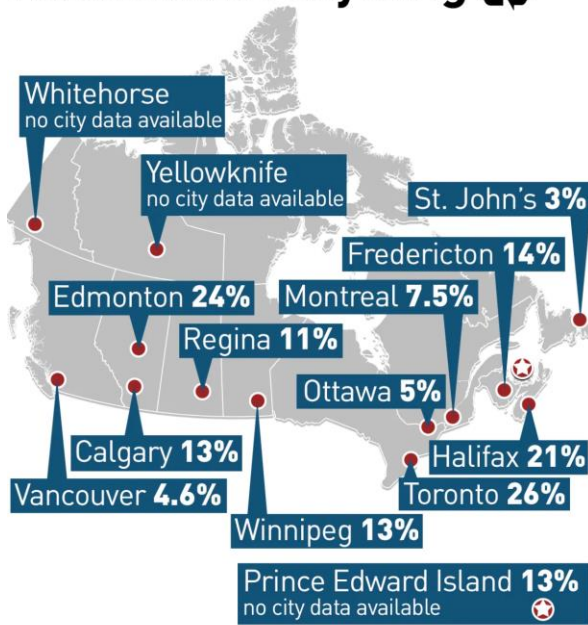
¹² de Freytas-Tamura, Kimiko. "[Plastics Pile Up as China Refuses to Take the West's Recycling.](#)" *The New York Times*, The New York Times Company, 11 Jan. 2018.

¹³ Laframboise, Kalina. "[Montreal's Recycling Operations to Continue If Sorting Centres Close: Plante.](#)" *Global News*, Corus Entertainment Inc., 27 Jan. 2020.

¹⁴ Pedersen, Katie, et al. "[We Asked 3 Companies to Recycle Canadian Plastic and Secretly Tracked It. Only 1 Company Recycled the Material.](#)" *CBC News*, CBC Radio Canada, 9 Oct. 2019.



Contamination rates for residential recycling



cbcnews.ca

Figure 2: Residential contamination rates across Canada.¹⁵

- ii. Consignment: The consignment system in Quebec is funded by a deposit paid by the customer at the point of purchase. However, some containers that do not have a deposit look like those that do. Many stores will not refund containers that were not sold from their specific store. This complexity drives many people to give up on trying to get the refund they are entitled to, sending those containers to landfills instead.¹⁶ Quebec recently unveiled a new consignment system for plastic, glass, and metal containers to include wine, spirit and water bottles, and milk and juice containers that were not previously accepted. The province estimates that more than four billion containers will be returned under the new system every year.¹⁷ These new updates by Quebec attempt to simplify the rules. The success of this attempt remains to be seen. The best practice for consignment is the Finnish

¹⁵ Chung, Emily. "[Many Canadians Are Recycling Wrong, and It's Costing Us Millions.](#)" *CBC News*, CBC Radio Canada, 9 Apr. 2018.

¹⁶ Côté, Charles. "[La Consigne N'est Pas Claire - Un Système Aux Multiples Exceptions.](#)" *La Presse+*, La Presse, 28 July 2016.

¹⁷ Lau, Rachel. "[Quebec Introduces New Deposit System for Glass, Metal and Plastic Bottles.](#)" *Montreal*, CTV News, 30 Jan. 2020.



model¹⁸ where the system is outsourced to a non-profit company funded via product-specific recycling fees. Participating companies receive a tax benefit. This system eliminates the stores' financial incentive for making the rules so complex to keep the deposits. Thus, Finland has an aluminum recycling rate of 95%.

- iii. Compostable plastic: Most compostable plastics end up in the landfills. Most municipalities across Canada do not have the technology to compost plastics marketed “compostable” or “biodegradable”. Additionally, compostable plastic is difficult to distinguish from recyclable plastic, leading to significant contamination in the recycling stream.^{19,20} We visited a composting facility in Quebec operated by GSI and took the picture below of their composting heap showing how littered it is with plastic. The employees we interviewed said that much of that plastic is labelled biodegradable or compostable which clearly does not decompose fast enough. Large pieces are sieved out, but small pieces and microplastic are impossible to remove which reduces the quality of the fertilizer produced by the composting process.



Figure 3: Composting heap contaminated with plastic (before sieving). Much of which is said to have been labelled "biodegradable" or "compostable".

¹⁸ [“Deposit-Based Recycling System for Drinks Packaging.”](#) Sitra, The Finnish Innovation Fund Sitra, 19 May 2017.

¹⁹ Ghebresslassie, Makda, et al. [“The Label Says 100% Compostable Plastic. But It's Likely Ending up in a Landfill.”](#) CBC News, CBC Radio Canada, 7 Mar. 2020.

²⁰ Schwartz, John. [“Why 'Biodegradable' Isn't What You Think.”](#) *The New York Times*, The New York Times Company, 1 Oct. 2020.



- c. Construction workers: Many governments across the world, including Canada, are banning some single-use plastic items.²¹ While these policies have not yet taken effect in Canada nor the EU, we can already learn from Kenya's experience who implemented the world toughest plastic ban three years ago enforced by hefty fines and jail time. Despite the many successes²² of the Kenyan plastic ban, Kenya is still drowning in plastic²³ because companies simply switched to other plastic types not included in the ban.
- 2) Landfills (Not affecting richer houses):
- a. Hole: Landfill waste pollutes drinking water with toxins, which negatively affects the health of nearby communities.²⁴ Landfills are the fifth leading emitter of methane in Quebec.²⁵ Methane is a greenhouse gas (GHG) that captures 70 times more heat than CO₂ over a 20 year period, and constitutes 15% of Canada's GHG emissions.²⁶ According to Canada's Ecofiscal Commission, led by McGill Professor Chriss Ragan, landfill tipping costs are made artificially cheap. Not only are external environmental and health costs of landfills unaccounted for, but also landfill tipping fees do not cover internal costs to build, maintain and upgrade landfills.²⁷ Essentially, taxpayers are subsidizing waste.
 - b. Buckets (not discussed in plastic waste discussion):
 - i. Donating used objects: The average thrift store in the US only sells one third of their donations, and the rest ends up in the landfill.²⁸
 - ii. Composting: Half of what residences and institutions send to landfill is organic and can be composted. Composting transforms organic waste into fertilizers that return nutrients to the soil. Composting also emits less GHG than landfills leading to a net decrease in emissions. Quebec recently announced plans to ensure that all Quebecers have access to municipal compost collection.²⁹ In that plan, Quebec wants all institutions and businesses to compost. Montreal aims for 100% of

²¹ Aklilu, Simret. "[Canada Will Ban Single-Use Plastic Items by the End of next Year.](#)" *CNN*, Cable News Network, 8 Oct. 2020.

²² Reality Check team. "[Has Kenya's Plastic Bag Ban Worked?](#)" *BBC News*, BBC, 28 Aug. 2019.

²³ Mpungu, Pauline. "[Despite Pioneering Ban, Kenya Is Drowning in Single-Use Plastic.](#)" *Al Jazeera - Business and Economy News*, Al Jazeera Media Network, 4 Dec. 2020.

²⁴ "[Ground Water Contamination](#)". *EPA*, 2020.

²⁵ Robillard, Jean-Philippe. "[Des Bacs Bruns Pour Tous Les Québécois D'ici 2025.](#)" *Radio-Canada Info*, CBC Radio Canada, 3 July 2020.

²⁶ "[About Methane Emissions.](#)" *Canada.ca*, Government of Canada, 1 Apr. 2019.

²⁷ Arnold, Jonathan. "[Artificially Cheap: Why Landfills Should Charge the Full Cost of Waste Disposal.](#)" *Canada's Ecofiscal Commission*, Canada's Ecofiscal Commission, 12 Dec. 2018.

²⁸ Gross, Terry. "[The Best Thing You Can Do Is Not Buy More Stuff,' Says 'Secondhand' Expert.](#)" *NPR*, NPR, 4 Dec. 2019.

²⁹ Robillard, Jean-Philippe. "[Des Bacs Bruns Pour Tous Les Québécois D'ici 2025.](#)" *Radio-Canada Info*, CBC Radio Canada, 3 July 2020



schools and large apartment buildings to compost by 2025. The city will also require businesses and institutions to compost.^{30,31} However, there is hardly any coordination between the various government levels and the institutions that are mandated to change their operations. Further, contamination remains a prohibitive challenge. Prior to WNWN, Concordia attempted to pilot adding compost bins in every floor of a major building on campus. However, the community had no idea how to use those bins and they were so contaminated that the university had no choice but to take those compost bins away. Worse still, institutions are faced by a financial disincentive to composting. For example, composting (\$300/mt) is twice as expensive as landfills (~\$150/mt) at Concordia.

- c. Construction workers (not discussed in plastic waste discussion): The European Union has enacted laws ensuring consumer electronics can be repaired for up to 10 years.³² These laws do not include smartphones or laptops.

3) Food insecurity (Not affecting richer houses):

- a. Hole: One in seven Canadians is food insecure.³³ That is 4 million Canadians (1.4 million children) struggling to access healthy food.³⁴ All while Canada wastes 58% of the food produced³⁴- twice the global average of 30%³⁵. Canada³⁴ loses 43% of the food produced before the retail stage compared to 14% globally³⁶. We throw away more food than what we eat. The various reasons, well mapped in a recent report by Second Harvest³⁴, include the fact that consumers do not buy imperfect fruits and vegetables, are likely to buy more if the shelves are full, prefer overfilled plates, and want the assurance of expiry dates. All this consumer psychology is codified in wasteful practices across the entire supply chain and government regulations. In Canada, only five foods are legally required to have expiry dates: nutritional supplements, meal replacements, baby formula, pharmacist-sold foods for very low-energy diets, and formulated liquid diets. “Best before” dates are arbitrary and

³⁰ Curtis, Christopher. “[Montreal Plans to Divert 85% of Garbage Away from Landfills by 2030.](#)” *Montreal Gazette: Local News*, Postmedia Network Inc., 17 Oct. 2019.

³¹ Desson, Craig. “[Compost Bins and Public Education Part of Montreal's Zero-Waste Strategy.](#)” *CBC News*, CBC Radio Canada, 19 Aug. 2020.

³² Smith, Adam. “[New EU 'Right to Repair' Laws Require Technology to Last for a Decade.](#)” *The Independent*, Independent Digital News and Media, 1 Mar. 2021.

³³ “[Coming out the Other Side: a Recovery Plan for Food Security.](#)” *Community Food Centres Canada: Good Food Is Just the Beginning*, A.K.A. New Media Inc., 21 July 2020.

³⁴ Nikkel, Lorri, et al. “[The Avoidable Crisis of Food Waste: The Roadmap.](#)” *Second Harvest*, Value Chain Management International, 2019.

³⁵ “[One Third of World's Food Is Wasted, Says UN Study.](#)” *BBC News*, BBC, 11 May 2011.

³⁶ “[Food Loss and Waste Database.](#)” Edited by Carola Fabi, *Food and Agriculture Organization of the United Nations*, FAO, 2021.



without basis on health or safety for all other foods.³⁷ Further, according to McGill Professor Begg, a surprising driver of food insecurity is the fact that consumers want very cheap food which adds a lot of wasteful pressures across the supply chain, makes the cost of surplus food donation financially unviable, and creates social inequalities driven by poor labor practices.

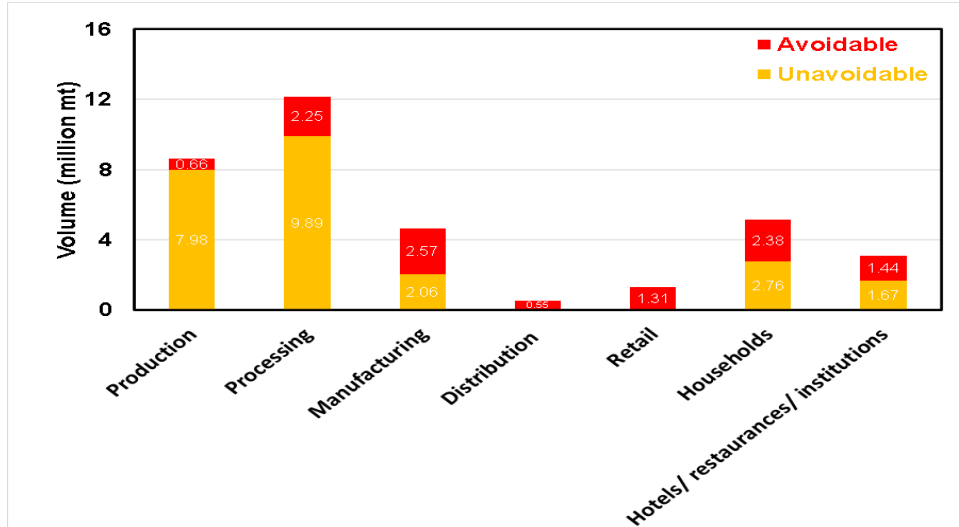


Figure 4: Food loss and waste across the different supply chain stages in Canada. Graph is developed from data in Second Harvest’s report³⁴.

- b. Bucket: Some governments, including Montreal³⁸, are starting to implement food donation mandates. However, Lori Nikkel (CEO of Second Harvest) mentioned in our interview that the surplus food donation infrastructure is still insufficient. For reference, Second Harvest is Canada’s largest food rescue organization that rescued a record 10 million kilograms of food last year. That is 0.01% of annual food waste in Canada.³⁹ This means that we need 10,000 organizations in Canada the size of Second Harvest to redirect all our surplus food from landfills to food-insecure communities.

We must also bring to focus what we are doing with those inadequate buckets. Landfills and recycling centers are often built in poorer BIPOC communities.⁴⁰ These unspoken-for communities have to put up with criminal practices of these facilities. For example, the recycling center in the Mohawk community, an hour’s drive from Northwest Montreal, is (present tense) packed with 15 times more waste than allowed by their permit emitting toxic hydrogen sulfide

³⁷ Nikkel, Lori. “[Lori Nikkel on LinkedIn: #Food #Food #Nocanadianleftbehind.](#)” *LinkedIn*, 2021.

³⁸ Harris, Colin. “[How the City of Montreal Plans to Go 'Zero Waste'.](#)” *CBC News*, CBC Radio Canada, 18 Oct. 2019.

³⁹ Nikkel, Lori. “[Opinion: The Pandemic Has given Us New Insight into Tackling Food Waste.](#)” *The Globe and Mail*, Philip Crawley, 8 Feb. 2021.

⁴⁰ Curtis, Christopher, and Virginie Ann. “[Threats, Fines and Fear: A Dump on Mohawk Land Overflows with Industrial Waste.](#)” *Ricochet*, Ricochet, 10 Sept. 2020.



gas. This is near 10 water wells providing drinking water and irrigation to that indigenous community, and causing nosebleeds, nausea and headaches. This example of systemic environmental racism is in addition to us depending on overseas recycling plants as we previously discussed. Our systemic environmental racism is represented in our analogy by “people pouring buckets of water” on the BIPOC, Africa and Asia “house”. We must note that the BIPOC and African communities have been following the sustainable waste best practices ages before the contemporary sustainability and zero waste culture became the buzz words they are now.⁴¹

Our imperfect analogy cannot properly capture feedback loops that emerge from how interconnected these vulnerabilities are and how they compound on each other. For example, our toxic electronic waste is shipped to African countries which has created an economic reality where the livelihoods of so many workers, including children, are dependent on that work despite the dangerous work conditions.

Going back to our city in a storm analogy, all those “buckets”, despite their varied levels of effectiveness, can only mitigate some of the “leaking” in our vulnerable “houses”. However, the fundamental problem is the “storm” (waste) not the “holes”. The root cause for why the storm exists is the wasteful consumption ingrained in our economic system. Therefore, in the picture we are painting, the polluting “factory” represents our economic system, and its “emissions” represents wasteful consumption. Just like in climate change where the reason for having frequent stronger storms is greenhouse gas emissions.

The gap in this system: No plan can possibly succeed without addressing the fundamentally social problem that is at the root of the waste crisis. If we had to deal with our waste, we would not generate so much of it. Fundamentally, the gap lies in how we disown our waste.

The most effective levers of change we must use to take ownership of our waste are financial and social.

From a financial point of view, we must stop subsidizing waste. The artificially cheap landfill tipping fees render all forms of sustainable waste management such as composting, recycling, and surplus food donation financially unviable. Tipping fees must reflect at least the true internal costs of building, operating, and upgrading landfills, and should not be free for anyone. One idea for residential settings is to fund municipal garbage collection by charging per Kg of landfills instead of taxes, to create an incentive to reduce waste.

From a social point of view, we need to couple top-down infrastructure improvement with credible broad-impact education. This is the WNWN model we have tested at Concordia where each person reduced their annual overall waste by 16%. Just between August 2019 and the shutdown in March 2020, over 35,000 people attended events where the #CUcompost waste ambassadors (who teach attendees waste sorting) were present — that is the equivalent of the entire Concordia undergraduate student population. In the 2019-20 school year, the WNWN

⁴¹ Poitevien, Aisha. “[Why Is the Canadian Environmental Movement so White?](#)” *The Star*, Toronto Star Newspaper, 28 Feb. 2020.



team gave waste-sorting tutorials to 4,800 students via class presentations — that is 40 per cent of Concordia's average annual enrollment. What we are learning is that when we help people take the first small steps of sorting their waste, they take the bigger steps of reducing their waste on their own. Other organizations like Eco Quartiers in Montreal also contribute to this important awareness work.

According to a 2019 report from United Nation's Food and Agriculture³⁶, interventions at the consumption stage will have the biggest effect on reducing GHG emissions. The report further recommends that while food security interventions often favor interventions early in the food supply chain, it is better to intervene at critical loss points that occur downstream from an environmental sustainability point of view. Further, Figure 4 shows that while most of the food loss and waste occur during processing, there is more “avoidable” food waste in households than processing. The most “avoidable” food loss occurs at the manufacturing stage, followed by households at second place.

About 77% of respondents (74 votes) to [our social media poll](#) have observed that they have less food waste when they started cooking at home since the pandemic shutdown. In another [poll](#), 68% of respondents (96 votes) could identify one item they used to buy prior to the pandemic that they now recognize that they can do without.

Finally, credibility is vital. Education and awareness raising cannot be conflated with PR greenwashing (downplaying negative impacts) or impact-washing (overplaying positive impacts) campaigns. CN Rail's sustainability coordinator, Chantal Despres, and waste management expert, Reid Bodley, have emphasized in our interviews that partnering with third party NGOs on their sustainability initiative is critical because it provides the credibility their internal community expects. People must also have faith in the effectiveness of the sustainable waste infrastructure and operation (a lot of people questioned whether recycling or composting is being collected properly and are not simply sent to landfills). This means that sporadic initiatives of education, composting, surplus food donation and regulations cannot continue to be siloed and uncoordinated.

As evident by the pandemic, change, even radical change, is possible in a very short amount of time. Fundamentally, what is missing is credible leadership that treats the waste crisis as such.

