

Assessing the Impact of Climate Change and Extreme Weather Events on the Food System in the City of Toronto

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Climate change is expected to increase the frequency and severity of extreme weather events in Toronto, which in turn can pose a significant risk to food processing, distribution and access. The City of Toronto has committed to building the city's resiliency to climate change and, as part of its Climate Change and Health Strategy, in 2017 Toronto Public Health began engaging stakeholders from across the food system to assess the impact of climate change on the food system in Toronto, including potential impacts on vulnerable populations. The findings of this high-level analysis will help increase the resiliency of Toronto's food system to ensure adequate and equitable access to food.

Why assess the impact of climate change on the food system?

Extreme weather events, such as heavy rainfall and ice storms, have already caused extensive damage across Toronto and are expected to become more frequent and severe due to climate change. As cities prepare for climate change and extreme weather, food systems can be overlooked. However, disruptions to critical infrastructure due to extreme weather events have the potential to significantly impact access to food, especially for people with limited resources or those living in neighbourhoods where it is difficult to access food retail stores. A resilient food system would, in a relatively short period of time, have the capacity to provide all residents with adequate and equitable access to food within walking distance after an extreme weather event.

Scoping the assessment

A city's food system – growing, transforming, and moving food from farm to table – is incredibly complex. Food distribution in particular involves numerous businesses and different pathways to transport food products from processing facilities to food retail outlets, community agencies and restaurants. Analysing all the production points and flow of all food products consumed and wasted in Toronto would require a very comprehensive analysis, particularly since the majority of food consumed in Toronto is produced outside of Toronto.

To get started, Toronto Public Health commissioned an eight-month study and engaged the Initiative for a

Competitive Inner City (ICIC) to complete a high-level assessment focused on identifying the most significant, urgent climate change risks for Toronto's food system.

Approach to the food system assessment

Based on historical information and future projections, three extreme weather events – significant rain and flooding, an extended heat wave, and a major winter ice storm – were selected for this analysis because they are likely to occur more intensely and frequently in the near term in Toronto. These three types of extreme weather events have already caused significant damage in the city and could realistically cause widespread damage in the future.

Focusing on these most likely events, the study utilised three complementing tools that analysed a diverse set of data and engaged 49 stakeholders from across the food system to identify the most urgent risks to Toronto's food system:

1. Ontario Climate Change and Health Vulnerability and Adaptation (V&A) Assessment Guidelines

The Ontario Ministry of Health and Long-Term Care developed the [V&A Assessment Guidelines](#) in 2016 to provide public health units across Ontario with a practical toolkit to understand the current and projected future public health risks of climate change, and to identify and develop policies and programmes to increase resilience to these risks. For this study, the analysis focused on potential public health effects related to the food system, including food safety implications and public health impacts due to food or water shortages.

2. City of Toronto's High-Level Risk Assessment (HLRA) tool

The City of Toronto developed the HLRA tool to help implement its Climate Change Risk Management Policy,

"Hurricane Hazel was Toronto's perfect storm" (Toronto Star, October 15, 2016). On October 15, 1954, Hurricane Hazel hit Toronto, with 121.4 mm of rain falling in one day and more than 200 mm of rain falling over 48 hours as well as heavy winds reaching 124 km per hour. Hurricane Hazel left over 4,000 people homeless in Ontario (1,868 people in Toronto) and 81 dead. Significant damage occurred to roads and bridges.

"Toronto's July flood listed as Ontario's most costly natural disaster" (Toronto Star, August 14, 2013). On July 8, 2013, Toronto received 126 mm of rain in a one-day period during a severe thunderstorm, resulting in widespread flooding. This was the most rain Toronto has ever received in a day. More than 90 mm of rainfall occurred in just two hours.



Flooding in Dufferin Street, Toronto. Photo by Eastmain [CC BY-SA 3.0]

which was designed to evaluate the resilience of the city's infrastructure to extreme weather events. For this study, the HLRA tool was used in a facilitated workshop with stakeholders representing different parts of Toronto's food system. The group included municipal and provincial government agencies, private food distributors and retailers, and non-profit food service organisations and associations. Based on their extensive knowledge, the stakeholders were asked to systematically identify climate change vulnerabilities by determining the impacts of the three extreme weather scenarios on seven components of Toronto's food system (e.g., food distribution), as well as the potential impacts on five supporting systems (e.g., electricity). For each component of the food system, the stakeholders were asked to use the HLRA rating system to assess the consequences of the extreme weather event (from insignificant to catastrophic) and the likelihood of those consequences occurring.

Food System Components Analysed for Toronto High-Level Risk Assessment

Regional and local food production
Food processing
Food distribution
Food retail
Restaurants
Food assistance network (e.g., food banks and food pantries)
Home food storage and meal preparation
Food System Supporting Infrastructure
Public transportation
Road network
Electrical power system
Telecommunications
Fuel supply transportation, storage and distribution

3. Initiative for a Competitive Inner City's *Framework for Analyzing Urban Food System Resilience*

ICIC's framework allows cities to analyse the resilience of their food systems to different types of disasters and identify critical areas of weakness. The framework is focused on food processing, distribution and access, and analyses food vulnerabilities at the neighbourhood level to identify areas within the city where food access would be disproportionately

City of Toronto

The City of Toronto has committed to addressing climate change resilience and is part of a vanguard of global cities beginning to focus on the resilience of their food systems to climate change. Toronto is already recognised as a global leader in food system planning and is a signatory city of the Milan Urban Food Policy Pact, which promotes the development of sustainable food systems that are inclusive, resilient, safe, diverse, and able to adapt to and mitigate impacts of climate change. Leaders from 165 cities around the world have signed the Pact, pledging to work across government departments and food industry sectors to build resilient and sustainable food systems. Toronto is also a member of C40's Food Systems Network and was selected to join 100 Resilient Cities in 2016.

impacted. This is advantageous in urban centres like Toronto where food system disruptions could vary by neighbourhood.

Applying the findings

Based on the comprehensive information gathered, a review of actions taken in eight other cities across the world (Barcelona, Calgary, London, Montreal, New York City, Oslo, Ottawa, and Vancouver), and ongoing discussions, a report is being developed with the findings and potential recommendations for public (government), private and not-for-profit food system stakeholders. The emerging findings confirm findings from other cities and suggest that the critical vulnerabilities for Toronto include infrastructure interdependencies for food supply and access (e.g., electricity), and that certain populations (e.g., those with low incomes) could be disproportionately impacted by disruptions to this infrastructure. The report will identify actions that can be taken at federal, provincial and municipal levels to address these risks.

When available, Toronto Public Health will share the findings and next steps in a report that will be made available to the public and in a follow-up article for this publication.

Conclusion

Strengthening food system resilience requires leadership from both the public and private sectors. Our high-level assessment of the food system in Toronto shows that understanding where critical vulnerabilities exist is a manageable and beneficial first step for cities. However, to be meaningful, the assessment needs to engage a broad set of stakeholders from the public, private and non-profit sectors.

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