

WASTE NOT, WANT NOT



REDUCING FOOD LOSS AND WASTE
IN NORTH AMERICA THROUGH
LIFE CYCLE-BASED APPROACHES

Foreword

Globally, an estimated one-third of all food produced is wasted rather than eaten. In North America, an estimated 30 to 40 per cent of the food available for human consumption is lost. This food loss and waste occurs throughout the food supply chain: on farms, in processing and manufacturing facilities, during transport and distribution, in retail and foodservice outlets, and in households.

Fortunately, there is growing national, regional and international impetus to address food loss and waste, and food waste-related policies and programmes across North America are gaining momentum. The 2030 Development Agenda underscored the importance of the issue by including the target of reducing per capita global food waste production by one-half by 2030. The United States government has a national goal for food loss and waste reduction and also runs the Food Recovery Challenge with businesses and organizations that have been taking steps to reduce their food waste since 2011. The Canadian government is also paying growing attention to the food waste challenge. And many states, provinces, cities and private actors are increasingly focused on the issue as well.

This report is the product of a collaboration between UN Environment North America and the United States Environmental Protection Agency. The study examines ways in which life cycle thinking and related tools such as life cycle assessment can be used to inform effective policymaking, aimed at reducing food loss and waste. It describes how these methodologies can help decision makers prioritize policies and interventions through better estimates of the environmental impact of food loss and waste, comparisons of food waste disposal options, and evaluations of alternative intervention or abatement strategies. Case studies presented in the report highlight examples of how life cycle thinking is already being used successfully to reduce food loss and waste in North America.

We hope that the report will be useful for policymakers and other stakeholders, as we all confront the critical challenge of reducing food waste and loss around the world.

Dr. Barbara Hendrie
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Executive Summary

Food loss and waste is a major challenge globally, and in North America an estimated 30 to 40 per cent of the food available for human consumption is lost. Achieving both global and national food loss and waste reduction goals will require a broad-based effort across the supply chain, from farm to fork and beyond. It also will require the involvement of a broad range of stakeholders, including national and sub-national policymakers, farmers, businesses such as grocery stores and restaurants, and consumers. Fortunately, there is growing national, regional and international impetus to address food loss and waste, and food waste-related policies and programmes across North America are gaining momentum.

The causes of food waste are often deeply embedded in the complexities of food systems and engrained in the perspectives and behaviours of stakeholders throughout the food supply chain. Often what is needed to effect change is a fresh framing and perspective and a new set of tools for evaluating success. The goal of this report is to highlight one such framing – life cycle thinking and associated analytical methodologies – and to explore its usefulness for reducing food loss and waste.

Life cycle thinking is a holistic way of approaching the environmental, social and economic effects of our actions when we design, purchase and use products and services. These impacts occur at all stages of a product's life cycle: raw material extraction, processing and manufacturing, distribution, consumption and waste management. Consideration of this full life cycle perspective can be helpful in avoiding unintended consequences, re-evaluating "conventional wisdom", choosing between products and prioritizing competing programmes.

Life cycle assessment (LCA) focuses on quantifying the environmental impacts associated with a product's life cycle. It is perhaps the most

developed and applied of the quantitative methods based on life cycle thinking. While LCA has become more standardized through decades of development, methodological choices made for specific studies can influence results. It is therefore important for those who interact with and interpret LCA results to have a foundational understanding of the method itself. This report provides the starting point for that foundation.

Evidence from LCA has shown that for most food products, the bulk of the environmental impacts occur earlier rather than later in the life cycle. By the time food waste is ready to be discarded, most of the environmental impacts have already occurred. Thus, preventing food waste and therefore reducing excess food production is a far more effective strategy for minimizing environmental impact than optimizing end-of-life management.

This notion – a focus on food waste prevention, and solutions that address it directly – applies across the food value chain: from household behaviours and attitudes to entrenched practices and attitudes in food service, retail, processing and on farms. While often acknowledged, the simple fact that preventing waste is more environmentally beneficial than managing waste is not always reflected in policies, programming and investments related to food loss and waste.

Life cycle assessment and related assessment methods can help inform a number of important questions in the food loss and waste arena, thereby supporting decision-making and directing programming. Such inquiries include estimation of the environmental impact of food loss and waste, evaluation and comparison of food waste management options, and evaluation of intervention or abatement strategies.

Life cycle thinking helps us recognize that minimizing the generation of food loss and waste will lead to the greatest environmental benefit,

but that eliminating this waste altogether is not fully possible, and the existing waste must be dealt with somehow. LCA is an effective tool in comparing the environmental impacts connected with various food waste destinations (management methods). While results are dependent on local conditions and system specifics, most studies that compare management options find that anaerobic digestion – treatment that generates and collects methane for use as biogas and produces a soil amendment – has lower environmental burdens than composting, and all of these outperform landfilling.

A collection of case studies presented in this report show how life cycle thinking is being used to address food loss and waste in North America¹:

- Oregon's Department of Environmental Quality has deeply engrained life cycle thinking and LCA in its long-term vision and strategic planning. This has led to, among other things, a concerted effort to change the conversation about food waste in order to prioritize prevention over recovery efforts and to make investments in non-traditional (for an environmental quality department) information-gathering on how Oregonians buy, use and dispose of food in search of drivers of preventable food waste. This is informing messaging and outreach activities and leading to programming from a materials management entity directed at prevention of household food waste.
- In Canada, Provision Coalition, an alliance of 16 member associations representing the food and beverage manufacturing industry across the country, is helping food manufacturers think differently about food loss and waste in their plants. Cost-shared facility assessments are identifying potential interventions and

¹ For the purposes of this report, the North American region is generally understood to include Canada and the United States but not Mexico. This is in order to be broadly consistent with United Nations regional groupings.

encouraging businesses to evaluate these food loss and waste prevention strategies not in terms of the costs of waste disposal (as is typical) but in terms of the value of the food right before it is lost. This leads to short pay-off periods and to significant economic, environmental and social savings through reductions in food waste.

- The US Environmental Protection Agency's Waste Reduction Model (WARM) provides a valuable life cycle-based tool for evaluating the environmental benefits associated with changes in materials management, including food. It can estimate the reductions in greenhouse gas emissions due to food waste reduction, as well as shifts in disposal, and is being used by municipalities to support decision-making as well as by private enterprises to communicate the value of their services.
- North American entrepreneurs are demonstrating the power of food upcycling: turning what may be otherwise considered food waste into valuable products, thereby blazing the way towards a circular economy.

Efforts to tackle food loss and waste are accelerating throughout North America and around the globe. Life cycle thinking and associated analytical methods offer a framework to support these efforts, helping to assure that they move towards the ultimate sustainable development goals of improved human livelihood, reduced environmental impact and prosperous economies. A central lesson from this perspective is to "get real" about emphasizing food waste prevention over recovery efforts. Still, recovery and disposal will be necessary, and a life cycle approach helps to minimize the impacts of these actions. Ultimately, life cycle thinking is a philosophy, a world view, and one that can be adopted by individuals as well as be institutionalized by governments and corporations at all scales.