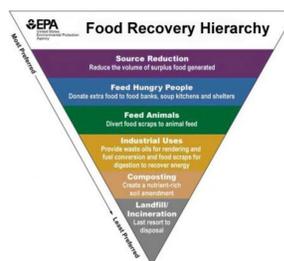


Food Waste Research

Resources to get you to the top of the food recovery hierarchy.



Food Waste Research in College and University Settings: An Overview Compiled by MCURC Sustainability Members

In the United States, nearly 40% of food is wasted every year. [Recycling Works](#) of Massachusetts estimates that residential students waste 142 pounds of food per year and non-residential students waste 38 pounds of food per year, although it is unclear how accurate this data is or what the source is.

There is not much solid data on how much food is wasted and in what ways on campuses (outside of trayless dining which has been well researched). More importantly, the fiscal impact of food waste on college campuses has not been widely researched. MCURC's Senior University Administrators Committee, in combination with the MCURC Research Working Group, is uniquely poised to collect this data and fill in the lack of knowledge on this subject. This will lead to prioritization of actionable outcomes that will reduce waste while saving money.

Below is a summary of the most applicable research at colleges and universities and organizations working on this issue.

I. Student Research on College and University Food Waste

Written Messages Improve Edible Food Waste Behaviors in a University Dining Facility

This study was published in 2013 in the *Journal of the Academy of Nutrition and Dietetics* and conducted by MCURC member Kelly Whitehair of Kansas State University. The researchers studied 540 students in a residential based meal plan. This study assessed whether simple prompt-type message interventions had an influence or if the addition of more personally relevant feedback-based data elicited greater change in student beliefs and food waste behaviors. A written questionnaire and individual student tray waste tracking were used to gather data. Simple print-format messages were evaluated, allowing the effect of an affordable message campaign to be determined. They tracked the waste from over 7,000 trays in an all-you-care-to-eat dining operation. Findings:

- On average, more than 57 g edible food was disposed of per tray, accumulating to over 1.5 tons of food waste during the 6-week study.
- The simple to-the-point prompt-type message stimulated a 15% reduction in food waste.
- The addition of a more personalized feedback-based message did not stimulate an additional change beyond that of the prompt message.

LeanPath & Natural Resources Defense Council Data

Lean Path partnered with the NRDC to aggregate the data from their customers for different segments. Findings include:

- Colleges and universities have on average .05 pounds of pre-consumer food waste per meal (before tracking food waste).
- That equates to 5% of the total meal weight.
- The main food loss reasons were (% based on \$\$ value):
 - Overproduction – 55%
 - Expired- 19%
 - Trim waste- 11%

Diners Waste More Food when they Know it will be Composted

This report released by Ohio State researchers in 2017 found that diners wasted more food when told the waste would be composted. The diners who'd read about the harm related to waste left behind almost 77 percent less as a group than those who'd received the financial literacy material. The educated diners were 39 percent more likely to clean their plates.

UC Davis Study on Trayless Dining

UC Davis piloted trayless dining in 2008 and found a 60% reduction in food waste (from 5.2 ounces/person to 1.98 ounces/person).

Impact on Plate Waste of Switching from a Tray to a Trayless Delivery System in a University Dining Hall and Employee Response to the Switch

This 2012 research paper was published in the *Journal of the Academy of Nutrition and Dietetics*. The study was done in a Big 10 college at an all-you-care-to-eat dining hall serving about 1,000 meals per day.

Findings:

- A significant decrease in solid waste per patron (0.81 oz) was observed in switching from the tray to the trayless system (4.39 oz vs 3.58 oz per patron).
- A nonsignificant reduction was observed with liquid waste (49.77 mL vs 46.36 mL).

Trayless Cafeterias Lead Diners to Take Less Salad and Relatively More Dessert

This 2012 study by Brian Wansink of Cornell found that students in a university dining hall found over two evenings that the percentage of students who took salad decreased with trayless dining. Findings:

- Trayless dining decreased the percentage of diners who took salad by 65%
- But did not decrease the percentage who took dessert- leading to a markedly higher ratio of dessert to salad.

Exploring the Economic, Environmental, and Social Implications of Trayless Dining at Colgate University

This class project from 2011 at Colgate University found that:

- During their trayless experiment, food waste decreased by approximately 10% on the day without trays relative to the day with trays.
- Their food provider, Sodexo, stated that they have seen a 30% reduction in food waste in trayless dining operations.
- The students found that given their assumptions and various sampling data, Colgate can expect to save between \$128,234 and \$412,200 annually by going trayless.

Without Cafeteria Trays, Colleges Find Savings

2009 New York Times article on trayless dining. Highlights include:

- Rochester Institute of Technology estimates they've saved 10% on food spending.
- Williams College saved 14,000 gallons of water annually in one dining hall.

The Business and Cultural Acceptance Case for Trayless Dining

- Aramark conducted a survey of 186,000 students at 25 colleges and universities. The survey found that on days when trayless dining was implemented on these campuses, food waste was reduced by 25 to 30%.
- On average, Aramark reports food waste quantity was reduced by 1.2 ounces to 1.8 ounces per person per meal when trays were removed from dining venues.
- Case Study at University of Maine reduced food waste by 5 ounces per person (46 pounds per year per person) with an overall reduction in food waste of 65,000 pounds and 288,288 gallons of water.
- Case study at Grand Valley State University reduced food waste by 6 ounces per person (56 pounds per year per person).

Why Do Students Waste Food at Dining Halls?

This is a 2010 research paper by a student. She surveyed 500 students about why they did not finish their food in the dining hall. Results showed that a la carte serving and the use of trays helped generate less food waste. Poor food quality and being served too much at buffet dining halls were top reasons why students wasted food. Data highlights include:

- In 2005, students at these four all-you-can-eat-dining halls discarded about 1.2 tons of unconsumed food after being served
- 50% of students thought that they did not finish their food because they did not like it. 28% of the students thought that taking too much food or being served too much were

reasons they did not finish their food. 2% of the students pointed out they did not waste food other than crumbs or excess sauces.

[UNH Research on Food Waste](#)

In 1999, UNH's dietetic interns conducted a food waste study which found a total of 4 ounces of pre and post consumer food waste was generated per meal served. It resulted in over 4 tons of food waste per week. Currently, they estimate they collect 25,000-40,000 pounds of food waste each month during the academic year.

[Exploring Food Waste Reduction in Campus Dining Halls](#)

This is a 2012 research paper from a class at Western Michigan University. Students conducted a few waste audits of post-consumer food waste. They also looked at best practices in food waste reduction at other universities. Data found include:

- Patrons wasted about 2.9-4.3 ounces of food per person (based on three waste audits).
- 20% was animal products, 66% was carbohydrates, and 14% was fruits and vegetables.
- Past audits found that going trayless reduced food waste by 30%.

Findings from their research on other universities included:

- St Mary's College cut waste 10-15% by allowing students to submit recipes to dining services as an incentive.
- Drew University served steak dinners as an incentive for food waste reduction.
- UC Davis post-consumer food waste audits found 2 oz of food wasted per person.

II. Organizations Focused on University Food Waste

ReFed

<http://www.refed.com/>

ReFED is a multi-stakeholder nonprofit, that takes a data-driven approach to move the food system from acting on instinct to insights to solve our national food waste problem. ReFED has identified 27 of the best opportunities through the Roadmap to Reduce U.S. Food Waste, a first-of-its-kind economic analysis, making it easier for stakeholders across the food supply chain to meet the national 50% reduction goal by 2030. Opportunities can be filtered by financial benefit, waste diverted, emissions reduced, water saved, meals recovered, and other criteria.

ReFED is working with Stanford's FEED Collaborative and R&DE to create a university-focused version of their Roadmap. The project is currently in the research phase, with students interviewing dining staff and using design thinking to find the most effective ways to prevent, recover, and recycle food on campuses and what the relative cost and impact of each solution is.

They recently released a [Food Waste Innovator Database](#) with over 400 innovators and [Food Waste Policy Finder](#).

Natural Resources Defense Council (NRDC)

The NRDC, led by Stanford alum Dana Gunders, has led the way in food waste research, with Dana's report, [Wasted: How America is losing up to 40% of its food from fork to landfill](#). NRDC has recently launched a consumer facing webpage, Save the Food, to bring the data and message to the public and lead behavior change. They also published a fact sheet entitled [National Call to Action! 10 Strategies for Achieving U.S. Food Waste Reduction Goals](#).

Dana has said she is working on a university focused resource as well.

<https://www.nrdc.org/issues/food-waste>
<http://www.savethefood.com/>

Further With Food: Center for Food Loss and Waste Solutions

<https://furtherwithfood.org/>

Further With Food provides comprehensive information about food loss and waste in the United States and about solutions dedicated to reducing it. This virtual resource center offers a broad spectrum of users – such as businesses, government entities, investors, NGOs, academics, and individuals — a platform to find and share information about proven solutions and innovative new approaches to reduce the volume of surplus food generated, feed hungry people, and divert food and scraps to the highest beneficial use.

EPA/Federal Government

In 2015, the Obama Administration set the first-ever national target to reduce food waste across the U.S. with a goal of a 50% reduction from 2010 by 2030. This goal is one that is now used by other organizations and could be a good baseline goal for universities.

In the United States, EPA estimates that more food reaches landfills and incinerators than any other single material in our everyday trash, about 21 percent of the waste stream. Reducing food waste will help the United States address climate change, as 20 percent of total U.S. methane emissions come from landfills. By keeping wholesome and nutritious food in our communities and out of our landfills, we can help address the 42 million Americans that live in food insecure households. (Source: [EPA](#))

The EPA has many resources including

- A [Call to Action by Stakeholders](#) (one of the calls is collecting data)
- [Food Recovery Challenge](#)- a challenge for organizations to reduce food waste
- [U.S. Food Waste Challenge](#)- a similar challenge, more geared to K-12 schools, but anyone can join.
- [Guide to Conducting Food Waste Audits](#)

LeanPath

<http://www.leanpath.com/>

LeanPath's waste weighing system is used in many college and university operations and they have many years of aggregated data that they will be send. LeanPath weighs pre-consumer items and gives the dollar amount of the waste (both on the screen for the staff person to see and in aggregated charts).

Scrapworks

Scrapworks is a startup spun out of a Stanford d.school class that is working to get data on food waste in the dining halls. They are currently weighing food pre-consumer food that is not served and calculating the cost of throwing out these items.

III. Organizations Focused on General Food Waste

WRAP:

WRAP is a UK-based research organization which has evidence-based research in household food waste reductions that they use to consult to organizations to help them reduce food waste and save money.

Closer to the college and university segment, WRAP recently worked with the UK government and hospitality industry to create a 3-year voluntary agreement to reduce waste and increase recycling. The targets (one is to reduce food waste by 5% from 2012 baseline by 2015) are measured in carbon dioxide equivalents.

Hospitality Segment Agreement:

<http://www.wrap.org.uk/content/hospitality-and-food-service-agreement-taking-action-waste>

Love Food, Hate Waste Campaign:

http://www.wrap.org.uk/sites/files/wrap/West%20London%20LFHW%20Impact%20case%20study_0.pdf

Harvard Food Law & Policy Clinic

<http://www.chlpi.org/food-law-and-policy/about/>

The Food Law and Policy Clinic of Harvard Law School (FLPC), a division of the Center for Health Law and Policy Innovation, was established in 2010 to link Harvard Law School students with opportunities to work with clients and communities on various food law and policy issues. The FLPC provides legal and policy guidance to a range of clients seeking to increase access to healthy foods, assist small and sustainable farmers in breaking into new commercial markets, and reduce waste of healthy, wholesome food, while educating law students about ways to use

law and policy to impact the food system. The FLPC engages a strong policy orientation as well as substantive expertise in the food system to assist a range of federal, state, and local clients around the world in understanding the legal and policy regimes that apply to food production and sales.

Their current projects that are relevant include research on laws and policies related to food recovery and expiration dates.

IV. Organizations Focused on Food Donation

The best resource for laws related to food donation is the [Harvard Food Law and Policy Clinic](#). Note that the Bill Emerson Good Samaritan Food Donation Act passed in 1996 by the U.S. Congress provides civil and criminal liability protection to food donors who donate food in good faith. In addition, all fifty states have passed state liability protection acts. Other organizations who focus on food donations nation-wide are listed below. Regional food runner/recipient groups are not listed.

A Guide to End Food Waste on Campus

<http://campusfoodwaste.org/>

Universities Fighting World Hunger, an initiative of Auburn University's Hunger Solutions Institute, and The Campus Kitchens Project have created this suite of multimedia hunger-fighting resources and tools. Developed for students by students, with support from The Rockefeller Foundation, this resource includes educational information, step-by-step suggestions for both individual and campus-wide activities and a number of awareness-building social media tools including shareable videos.

Campus Kitchens Project

<http://www.campuskitchens.org/>

Student volunteers develop partnerships, recover food, plan menus, run cooking shifts, organize drivers, garden, glean and teach nutrition education to children and families. They keep track of all of the paperwork (so we know everything's being done safely), organize fundraisers, develop curriculum and recruit new student volunteers. They accomplish an incredible amount of work every day.

Food Recovery Network

<https://www.foodrecoverynetwork.org/>

Focused on universities, FRN has student volunteers develop partnerships, recover food, plan menus, run cooking shifts, organize drivers, garden, glean and teach nutrition education to children and families. The Sodexo Foundation provided FRN with founding funding to hire a full-time staff and transition into a professional nonprofit!

Food Donation Connection

<http://www.foodtodonate.com/>

Food Donation Connection provides an alternative to discarding surplus wholesome food by linking food service donors with surplus food to local hunger relief agencies. We do this by creating and maintaining an efficient communication and reporting network that links available sources of food to those in need through these existing charitable organizations.