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Food Loss and Waste in the US: The Science Behind the Supply Chain

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Multidisciplinary Review Team and References available on the FPRC Website.

Accompanying YouTube Video: "Love Letter to Food" - http://youtu.be/-5i-dCv7O8o

Summary of Findings:

- Roughly 40% of the United States (US) food supply (1500 calories/person/day) is never eaten, which is among the highest rates of food loss[i] globally. Addressing this loss could help reduce food insecurity and the environmental impacts of agriculture.
- Tremendous resources are used to produce uneaten food in the US: 30% of fertilizer, 31% of cropland, 25% of total freshwater consumption, and 2% of total energy consumption.
- Food waste generated when people discard food in homes and foodservice accounts for 60% of food loss, is mostly avoidable, and is under-emphasized as an opportunity to improve the food system.
- Targeting efforts on reducing waste of meat has great potential to benefit both the environment and the household budget.
- Clarifying the meaning of date labels on foods could also reduce consumer food waste.

Background

Roughly 40% of the United States (US) food supply is never eaten. At 1500 food calories lost per person per day, that is twice as much as most other industrialized nations and 50% more than was lost in the 1970s. Producing food uses resources and causes environmental impacts, such as water pollution, soil erosion, and greenhouse gas emissions. Discarding food drains the food supply in a world with a growing demand. Despite the global importance of food loss, much remains unknown about its extent, characteristics, and causes. For instance, a landmark global study reports collectively for the US, Canada, Australia, and New Zealand: 17% of food loss occurs during harvest, 6% in handling and storage, 9% in processing, 7% in retail and distribution, and 61% in the consumption stage. The most comprehensive US study reports only retail and consumption losses (Table 1) and treats restaurants and households as the same entity. Food loss in the distribution, retail and consumption stages is called food waste[i] and presents a major opportunity to improve the efficiency of the food system.

Table 1. Annual rates and values (per capita) of combined retail and consumer food loss

Added sweeteners	41%	$21
Added fats and oils	38%	$43
Dairy	31%	$87
Grains	31%	$36
Vegetables	30%	$97
Fruit	29%	$64
Eggs	28%	$10
Meat, poultry, and fish	26%	$157
Tree nuts and peanuts	15%	$7

Producing uneaten food requires a major investment of resources: 30% of fertilizer use, 31% of cropland, 25% of total freshwater consumption, and 2% of total energy consumption. This food loss is the largest component of municipal solid

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[i]Definitions of food loss and waste vary. *Food loss* tends to refer to a decrease in mass or nutritional quality of food originally intended for human consumption, and includes *food waste,* the food fit for human consumption that is discarded or spoils in retail, foodservice, and consumption.

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waste incinerated or sent to landfills, where it creates methane. Meat has among the lowest rates of loss (Table 1), but on a per pound basis, meat loss squanders the most calories and causes the greatest environmental impact, as feed and other resources used over the lifetime of the animals increase the magnitude of the loss. Loss of meat also has the highest monetary value (Table 1).

Reducing food loss would likely reduce food prices, and presents opportunities to directly alleviate food insecurity through redistribution. If 30% of US food loss were redistributed, it could provide the total diet for nearly 50 million people, the number of Americans living in food insecure households. However, even though a majority of food loss is avoidable, current distribution streams and income factors mean only some food could be recovered and reach food insecure populations.

Causes of Food Loss and Waste

Food loss occurs because food is perishable; it passes through complex supply chains between harvest and consumption; and it represents a small portion of total expenditures for many Americans. Thus, the convenience of wasting food often outweighs the cost.

Food loss and waste have many causes, including:

- Overplanting of crops to guarantee supply
- Edible crops left in the field due to diminishing returns on investments in harvesting
- Damage, contamination, or inefficiencies in harvest, storage, processing, and distribution
- High cosmetic standards leading to culling of visually imperfect products
- Overstocked product displays at stores
- Inconsistent date labels that confuse consumers, leading to premature disposal
- Over-preparation, large portion sizes, and aversion to eating leftovers
- Lack of awareness about the occurrence and impacts of food waste

Initiatives to Reduce Food Loss and Waste

In June 2013 the United States Department of Agriculture (USDA) and Environmental Protection Agency (EPA) launched the US Food Waste Challenge, a joint effort of producer groups, processors, distributors, retailers, food service, and government with the goal of leading "a fundamental shift in how we think about and manage food and food waste in this country." The EPA also runs a Food Recovery Challenge to help businesses and organizations measure and reduce their food loss. Organizations working to reduce food waste include the food industry's Food Waste Reduction Alliance, hunger alleviation groups, and environmental non-governmental organizations (NGOs) like World Resources Institute, which is leading an effort to develop a global standard for measuring food loss and waste. This work should be complemented with further US-focused research, as much remains unknown about US food loss, especially regarding the relative importance of the causes of food waste.

Recommended Actions

- Standardize and clarify date labels on foods to help reduce consumer food waste.
- Target efforts on reducing waste of meat, which would benefit the environment and household budgets.
- Institute a national research program to identify the quantity and causes of food loss and waste as a step towards committing to reduction targets.
- Create public awareness campaigns devoted to reducing consumer food waste. A United Kingdom campaign helped reduce household food waste by 19% from 2007 to 2012.

Food Waste

Cass-Clay Community Snapshot

July 2018

INTRODUCTION

At least **25% of all food in the United States goes to waste,** with some estimates as high as 40%.[1] Statistics like these have spurred individuals and organizations, including those in Cass County, ND and Clay County, MN, to focus on reducing food waste.

Cass and Clay Counties are seated in states with considerable agricultural presence, and the urban food landscape in Cass and Clay has transformed in the past ten years as more consumers have become aware of food system issues, like food waste. While communities in the area have made changes, there are some hurdles to forward progress.

The lack of 1) **a municipal site that accepts food waste for composting or anaerobic digestion** and 2) **a residential food waste collection program** are two substantial obstacles to addressing the local food waste problem. Cities around the country like Austin, TX and Minneapolis, MN have begun collecting food waste at curbsides or providing drop-off locations for this waste.

Although some systemic barriers remain, there have been recent positive changes to help educate consumers and address food waste issues.

INITIATIVES TO REDUCE FOOD WASTE IN CASS-CLAY

Community Education

Ad Council and Natural Resources Defense Council - Save the Food Campaign: these two national organizations are leading a public service campaign to combat food waste at the consumer level by trying to raise awareness and change behavior. The multi-year campaign has made its way to Fargo-Moorhead in the form of billboards, such as one featuring a milk carton with "BEST IF USED" printed on it instead of a "use by" date.
savethefood.com

Fargo South High School DECA students - Food Waste Campaign: three students in the DECA program, which prepares students to be leaders in fields like marketing and management, completed a food waste project during their junior and senior years of high school (2017-2018). To prepare for the campaign, they performed a few studies, such as giving food waste logs to 35 households to track food waste for a week, doing a week-long Snapchat study with students, and interviewing local businesses like Breadsmith, Hornbachers, and Great Plains Food Bank. They put together a small campaign by making cards with tips for reducing food waste tied to reusable bags to give out at Hornbachers. Afterward, they presented their findings and solutions to the Cass Clay Food Commission, Fargo Public Schools' Nutrition Services Director, the school board, and at the SchoolsAlive Conference.

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[1] Mooney C. Washington Post. The staggering environmental footprint of all the food that we just throw in the trash. Online. 2018, Apr 18. https://www.washingtonpost.com/news/energy-environment/wp/2018/04/18/americans-waste-about-a-quarter-of-the-food-they-buy-and-the-environmental-consequences-are-staggering/?utm_term=.52352293264e

SNAP-Ed: a federal program called Supplemental Nutrition Assistance Program (SNAP, formerly known as food stamps) has local educators to help participants learn how to meal plan, cook, and shop using their benefits. Recently, federal guidelines have changed to include food waste as a policy, systems, and environmental change strategy. This means that our local SNAP-Ed Educators can do work related to food waste as a part of their job.

Ugly Food of the North: a citizen-run organization with a goal to create a more sustainable Fargo-Moorhead food system through education, networking, and community organizing. They have hosted numerous events, such as community potlucks, where they ask attendees to make their dishes with imperfect (ugly) produce, conversations and panels about the local food system, documentary screenings, and many more. Their biggest initiative has been the Little Free Garden project, where they aim to foster communities committed to growing, sharing, and cultivating food in small, raised-bed gardens, designed to fit in residential spaces.
www.fmuglyfood.com

Washington Elementary and Concordia College - Hungry!: a food waste project with a local fourth grade classroom, extending to three classrooms this fall. Students are taught by Concordia College first-year students about food waste and other food related topics. Then for 20 days during the fall semester, the students record how much food, milk, or juice was not consumed during snack time and why the food or drink was not consumed. Students complete a pre-assessment and a final assessment to gauge what they learned about food waste. Trifolds and public presentations are prepared and their results are shared with their peers, families, and also at a large grocery store to the general public.

Food Retailers

Breweries: a number of local brewers have found ways to re-use their spent grains from the brewing process. Much of the spent grain from the breweries is used as animal feed which is a win-win for the brewery and for farmers, because without the partnership, the brewery would have to haul the grain away and the farmer would have to purchase feed for the cows.

- *Drekker Brewing Company*: most of their spent grains feed the dairy cows in NDSU's Animal Science Program, and these grains make up about 80% of the cows' yearly feed. A local small business also uses spent grains to make dog treats and food establishments like Nichole's Fine Pastry and Luna Fargo have used it to make granola and crumble topping.
- *Fargo Brewing Company*: most of their spent grains are picked up by a farmer to feed his cattle. A small portion goes toward the small business making dog treats.
- *Junkyard Brewing Company*: all their spent grains are picked up by regional cattle farmers.

Coffee Shops: Cass and Clay are following the national trend of consuming coffee with gusto and the local shops brew through many pounds of coffee each week. These used coffee grounds can be applied by local farmers and gardeners to the soil as fertilizer for acid-loving plants, so shops like 20 Below Coffee, Young Blood Coffee, Atomic Coffee, and Thunder Coffee all reduce waste by donating used grounds. (*A note for local farmers and gardeners*: all of the local coffee shops contacted about using grounds are willing to donating them - contact them if interested)

Grocery Retailers: grocery stores go through vast quantities of perishable food items. What they do with unsellable food can make a considerable impact on the local food system. Many grocery retailers in Cass-Clay donate some of their perishables, like produce and meat, to the local food pantry. (See below under *Great Plains Food Bank* for more information.)

- *Cash Wise*: donates as much of their perishables as possible to Great Plains Food Bank and a reclamation provider takes their non-perishables. Their parent company, Coborn's Inc., is working on further policy to capture more food waste.
- *Prairie Roots Food Co-op:* a local food co-operative that saves food from the landfill by setting out buckets of old produce, hot and cold bar remains, and deli scraps to be picked up by local farmers for animal feed. Additionally, they have an "ugly food" station where produce that is imperfect in some way, like bruised fruit, is sold at a discount.
- *Walmart*: their retail stores in the region donate produce and other perishables to Great Plains Food Bank and sell most other food waste to a composting company in Crookston, MN.

Governments and Nonprofits

Clay County Solid Waste Management - Anaerobic Digesters: Clay County is working on retrofitting Clay County Wastewater Treatment Plant's three 550,000 gallon anaerobic Digesters with the ability to break down food waste along with human waste. With the target of accepting food waste in mid-to-late 2019, the County hopes to add holding tanks to insert food waste and grinders to create comparable sized particles so the waste digests at similar rates. The County has checked with over 100 businesses in Fargo-Moorhead including colleges, hospitals, and restaurants to identify the amount of food waste that could be captured, which has so far been calculated at 6,000 pounds per day. The many benefits of the project are as follows:

- It would save businesses time and money, since the treatment plant is located in town as opposed to the landfill 20 miles out of town, and landfill tipping fees will likely continue to rise as landfill space becomes limited
- The methane produced from the process would be used to heat and power the wastewater treatment plant (with the help of a new generator)
- The biosolids produced are a highly desirable fertilizer source for area farmers

No plans are currently in the works to add the ability to process residential food waste, since it tends to be contaminated with other waste due to lack of education, but the County is open to a possible drop-off site for residential food waste in the future when the project is more mature.

GleaND: a volunteer powered network serving North Dakota and Clay County, Minnesota. Their goal is to capture excess produce from local growers and channel it through the local charitable feeding networks, like Great Plains Food Bank.
www.gleand.org

Great Plains Food Bank - Daily Bread: this local food bank has three Daily Bread trucks that go out Monday through Friday into Fargo-Moorhead, picking up mainly perishable foods (e.g. produce and meat), but also some non-perishables from local businesses like Hornbachers, Cashwise, Target, Walmart, coffee shops, and many more. This food then gets delivered directly to partner agencies like the New Life Center, Salvation Army, and Dorothy Day. What these organizations do not take gets returned to the food bank and is picked up or distributed to other North Dakota and Western Minnesota agencies.
www.greatplainsfoodbank.org

Master Gardeners - Veggies for the Pantry: a program through NDSU Extension which allows community members to bring their extra garden produce to weekly designated drop off sites, and Master Gardeners deliver the produce to the Emergency Food Pantry or Churches United.
www.ag.ndsu.edu/mastergardener/veggies

Red River Market: a farmers market in downtown Fargo that has a goal of zero waste produced at the market. Vendors can bring leftover food items to a designated area at the end of each market day and a food recovery non-profit picks it up for donation.
www.redriver.market

Businesses and Schools

Concordia College: this Moorhead university's Taste Not Waste (TNW) campaign includes performing plate waste (food left on plates post-meal) studies, hosting activities to educate students about reducing plate waste, and carrying out demonstrations that involve collecting food waste. The TNW campaign started in 2016, inspired by the USDA and EPA's goal for food waste reduction in the United States. Two Concordia professors, Dr. Meredith Wagner and Dr. Joan Kopperud, met with the university's president, Dr. William Craft, to propose a goal of 50% reduction in plate waste in their dining center by 2020, which led President Craft to issue a campus-wide goal of food waste reduction. Since then, TNW has been working to reach that goal by increasing awareness of food waste and suggesting ideas for action among key individuals and groups across campus. Since starting the TNW campaign in October of 2016, the campus has reduced plate waste by 38%.

The university has shown its commitment to sustainability and this extends to their Dining Services Department. The following are Dining Services' initiatives to reduce food waste:

- Encourage students to only take what they plan to eat. The dining hall went trayless in 2009 and immediately saw a 10 percent decrease in food waste.
- Collect meal data to continuously update the amount of food served and purchase food that can be used in different manners (like overripe bananas for banana bread).
- Every other week, Great Plains Food Bank picks up food donations from the campus. Last year the college donated around 1,400 pounds of food.

www.concordiacollege.edu/studentlife/dining-services/about-dining-services/sustainability-in-dining-services

Doubting Thomas Farms: a farm about 20 minutes north of Moorhead, MN that strives to reduce food waste in the community. They pick up compostable food waste from a few local businesses, including Swanson Health Products in downtown Fargo. Their largest food waste program is called Take Back Jack, which takes pumpkins for composting in the fall. In the past three years, Doubting Thomas has composted around 80 tons of pumpkins from the community.
www.doubtingthomasfarms.com

Hospitals: the healthcare industry provides vital services to our community and feeds community members who are sick and injured. When hospitals focus on systemic food waste reduction, it can have a sizeable impact on their food purchasing budgets, in addition to reducing the load at local landfills.

- *Essentia Health*: this local hospital uses menu planning software to plan and adjust production to reduce food waste. Their Food Service Director is working on developing food waste reduction policies.
- *Sanford Health:* this local hospital also uses menu planning software to plan and adjust production to reduce food waste. Unused food from Dining Services' back of house gets picked up by Great Plains Food Bank to be donated. Dining Services also has a food pulper they use daily, but without a local composting site, they have to throw the pulp away. If the anaerobic digester project (mentioned above under *Clay County*) moves forward, they would be able to have this pulp picked up and digested to further reduce their food waste.

Share Tables: a station where students can drop off unwanted food or drinks, like unopened pre-packaged food or drinks and whole fruits, for other students to eat. Food left over at the end of the day usually gets used for an after-school program or donated to a food bank or other non-profit. The practice saves food from going into the landfill and helps kids not go hungry.

- *Moorhead Public Schools*: the program started in the 2017-2018 school year. Five schools have a share table and it was zero cost to implement.
- *West Fargo Public Schools*: the program started in the 2016-2017 school year by Food Service Director Dana Reith after she witnessed the large amount of waste in the school cafeterias. It started with a pilot program in a few schools with the help of a Concordia College dietetics intern who helped get the program approved by the health inspector, research best practices, and train food service staff. As for cost, they purchased Coldmaster pans for each site ($100 each); these pans are frozen overnight then can hold cold products, like milk, for 4+ hours. One of the most common items taken from the table is milk, so these pans have been essential to supplementing meals for kids who are still hungry after eating their lunch. The program is currently in seven schools and they are hoping to increase the number of schools participating next year.

COMMUNITY ACTIONS

- Conduct a community-wide food waste assessment to create a measurable baseline
- Encourage local governments to prioritize food waste reduction as part of their comprehensive plans and as a policy for city functions
- Reach out to city and county officials to request that resources shift toward starting a municipal site that accepts food waste for composting or anaerobic digestion and, after the site is established, initiate a residential food waste collection program
- Educate consumers: local governments can provide resources about food product dating labels (sell-by, use-by, etc.), meal planning, food storage, how to use leftovers in new dishes, and backyard composting
- Educate businesses: local governments can provide resources, like technical assistance and waste tracking tools, to help businesses reduce waste
- Recognize businesses for their voluntary efforts to reduce food waste

RESOURCES

End Hunger - Food waste resources
http://endhunger.org/food-waste/

Environmental Law Institute - FOOD WASTE: City and State Strategies for Source Reduction
https://www.eli.org/vibrant-environment-blog/food-waste-city-and-state-strategies-source-reduction

Environmental Protection Agency - Food: Too Good to Waste
https://www.epa.gov/sustainable-management-food/food-too-good-waste-implementation-guide-and-toolkit

For more information, please contact Kim Lipetzky with the Fargo Cass Public Health Office at 701-241-8195 or klipetzky@fargond.gov