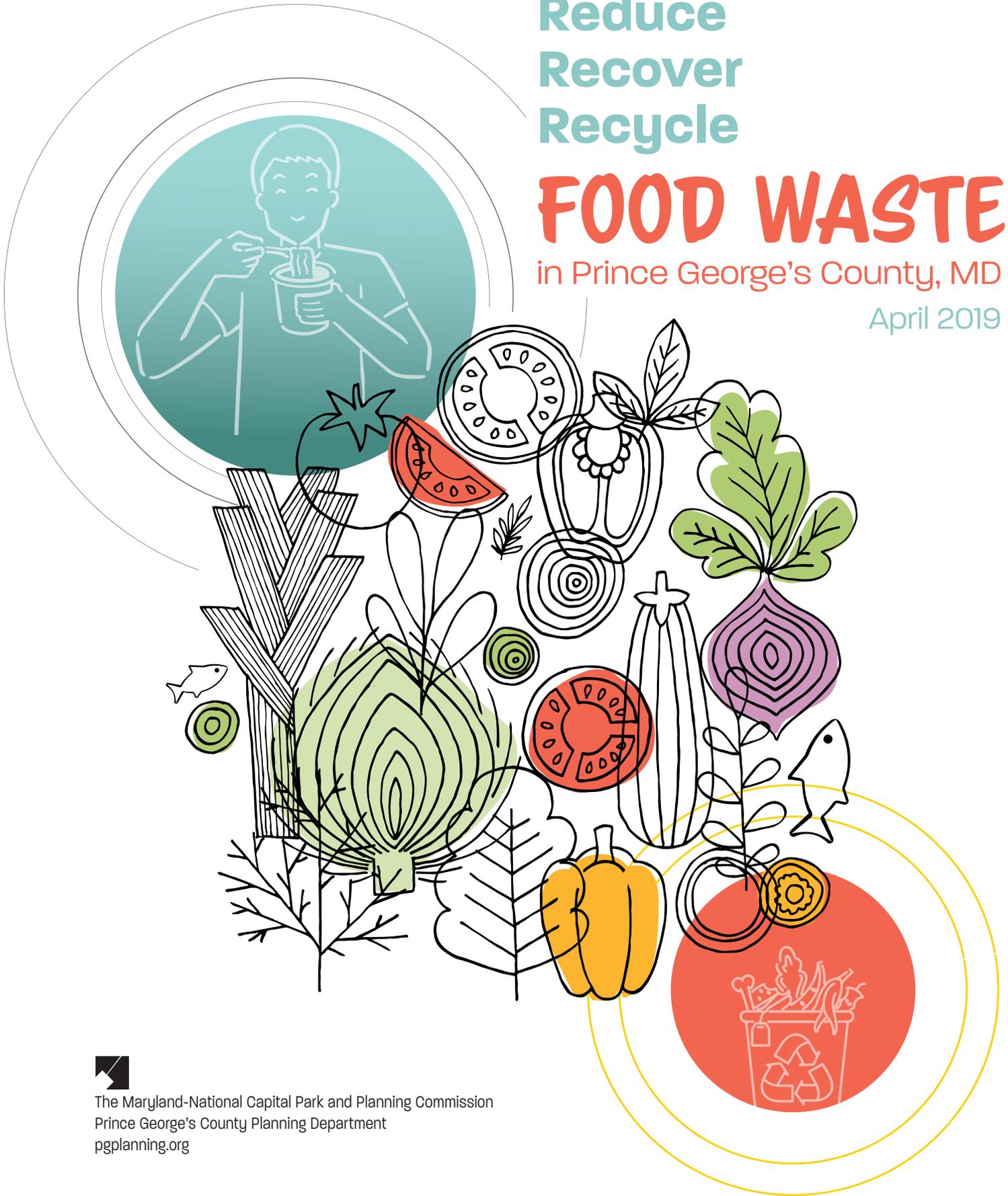


Reduce
Recover
Recycle

FOOD WASTE

in Prince George's County, MD

April 2019



Abstract

TITLE: Reduce, Recover, Recycle—Food Waste in Prince George's County, MD

AUTHOR: The Maryland-National Capital Park and Planning Commission

SUBJECT: Food Waste in Prince George's County, MD

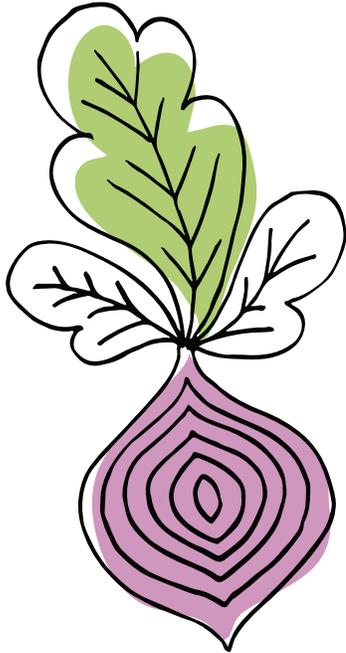
DATE: April 2019

SOURCE OF COPIES: The Maryland-National Capital Park and Planning Commission
Prince George's Planning Department
14741 Governor Oden Bowie Drive
Upper Marlboro, Maryland 20772

SERIES NUMBER: 969192405

NUMBER OF PAGES: 192

This study describes the problem of food waste; explains national and state efforts to reduce food waste; explores the behaviors and beliefs of Prince George's County residents, businesses, institutions, and organizations regarding food waste. It presents policy recommendations and strategies, supported by national promising practices, to reduce, recover, and recycle food waste in the County. By creating awareness, this study seeks to reduce food waste in the County. Reducing local food waste may help eliminate food insecurity, protect the environment, and boost the economy.



Reduce
Recover
Recycle

FOOD WASTE

in Prince George's County, MD

April 2019



**The Maryland-National Capital Park
and Planning Commission**

Prince George's County Planning Department
14741 Governor Oden Bowie Drive
Upper Marlboro, MD 20772

www.pgplanning.org

Prince George's County



Angela Alsobrooks,
County Executive

County Council

The County Council has three main responsibilities in the planning process: (1) setting policy, (2) plan approval, and (3) plan implementation. Applicable policies are incorporated into area plans, functional plans, and the general plan. The Council, after holding a hearing on the plan adopted by the Planning Board, may approve the plan as adopted, approve the plan with amendments based on the public record, or disapprove the plan and return it to the Planning Board for revision. Implementation is primarily through adoption of the annual Capital Improvement Program, the annual Budget, the water and sewer plan, and adoption of zoning map amendments.

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The Maryland-National Capital Park and Planning Commission (M-NCPPC) is a bicounty agency, created by the General Assembly of Maryland in 1927. The Commission's geographic authority extends to the great majority of Montgomery and Prince George's Counties: the Maryland-Washington Regional District (M-NCPPC planning jurisdiction) comprises 1,001 square miles, while the Metropolitan District (parks) comprises 919 square miles, in the two counties.

The Commission has three major functions:

- The preparation, adoption, and, from time to time, amendment or extension of the General Plan for the physical development of the Maryland-Washington Regional District.
- The acquisition, development, operation, and maintenance of a public park system.
- In Prince George's County only, the operation of the entire county public recreation program. The Commission operates in each county through a Planning Board appointed by and responsible to the County government. All local plans, recommendations on zoning amendments, administration of subdivision regulations, and general administration of parks are responsibilities of the Planning Boards.

The Prince George's County Planning Department:

- Our mission is to help preserve, protect and manage the County's resources by providing the highest quality planning services and growth management guidance and by facilitating effective intergovernmental and citizen involvement through education and technical assistance.
- Our vision is to be a model planning department of responsive and respected staff who provide superior planning and technical services and work cooperatively with decision makers, citizens, and other agencies to continuously improve development quality and the environment and act as a catalyst for positive change.

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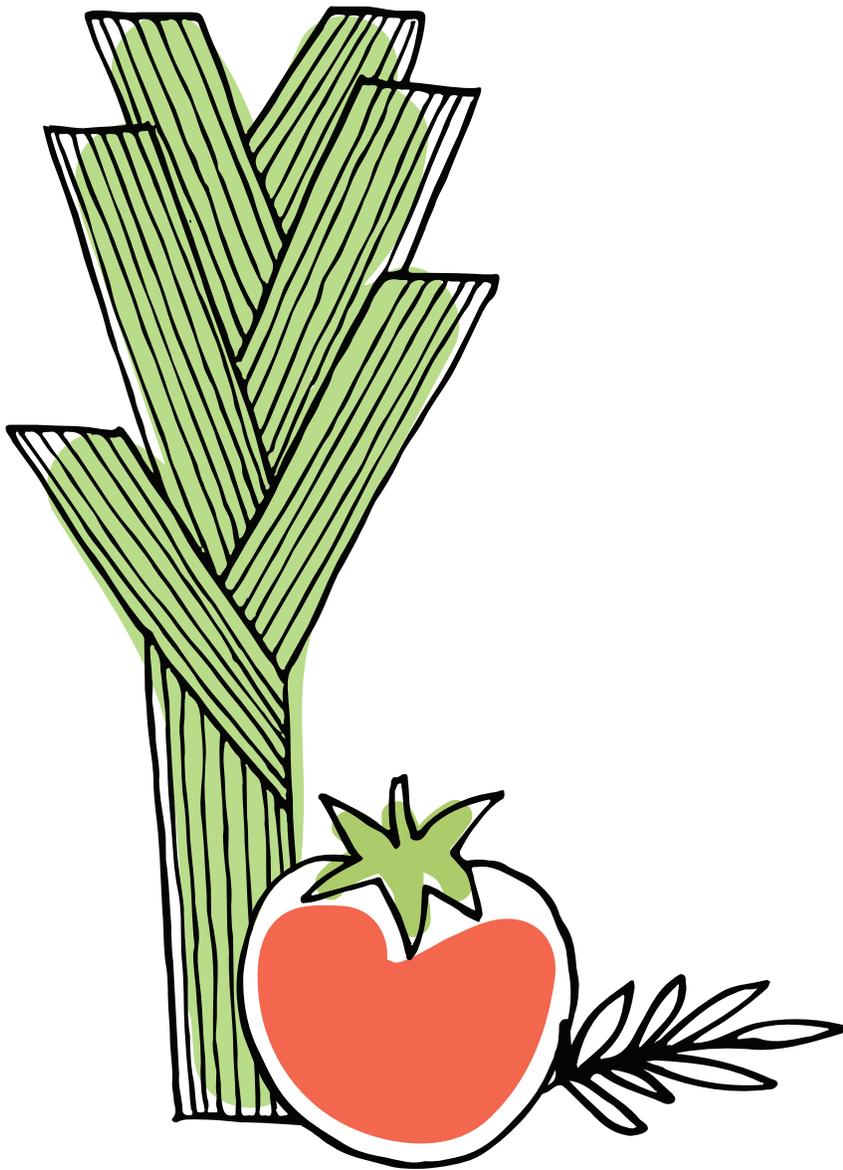


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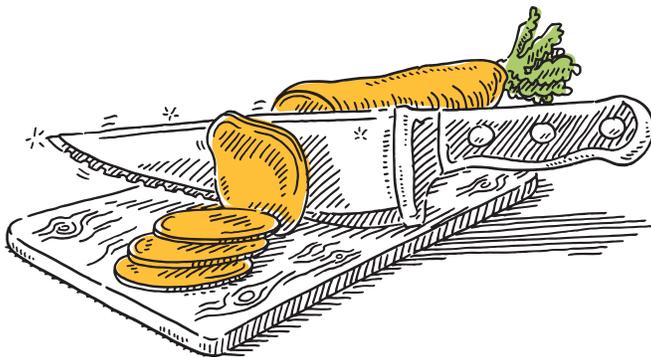
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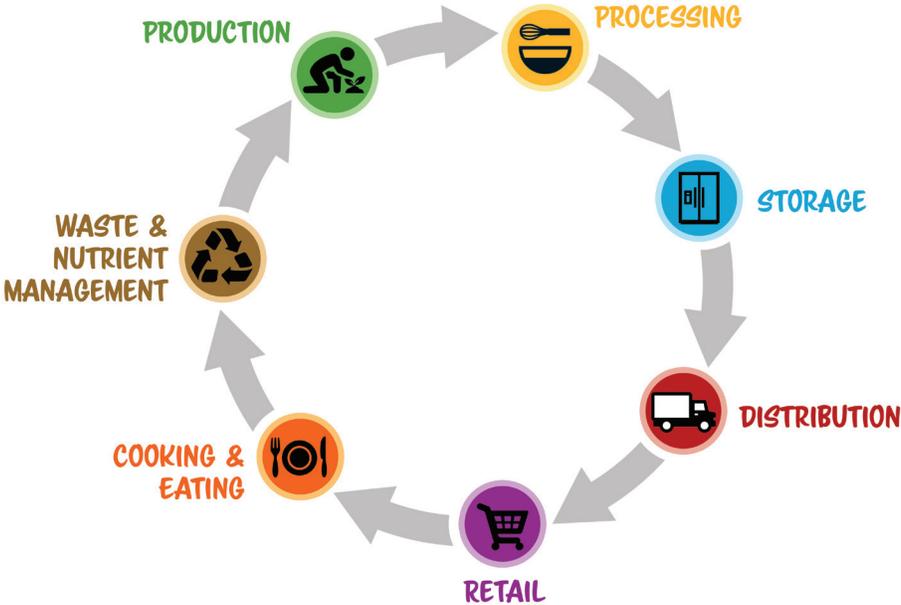


Introduction

Wasted food is a growing problem in the United States. A lot of effort goes into producing, processing, transporting, storing, and preparing food. An estimated 17 percent of the U.S. energy,¹ 45 percent of arable land,² and 80 percent of freshwater consumption is used to grow food.³ However, after dedicating these resources to growing food, an estimated 40 percent of the food in the United States goes uneaten.⁴ Food waste is not an isolated or incidental phenomenon; it is built into our food system. Food is wasted at every juncture in the food supply chain and by every actor in the food industry.

Food systems are frequently depicted as cyclical, linking activities from production to processing to storage and distribution to retail to consumption to waste and nutrient management (see Figure 1). But when it comes to waste, the cyclical, soil-to-soil depiction of a food system belies a more complex reality. Food waste occurs not only after cooking and eating, but at each stage in the system.

Figure 1. Food System



Of the 63 million tons of food wasted in the United States each year, 10.1 million tons are never harvested on the farm, and 52.4 million tons enter the municipal waste stream.⁵ Food waste constitutes 22 percent of both combusted and landfilled solid waste.⁶ In Prince George’s County, the U.S. Environmental Protection Agency (EPA) estimated that 113,090 tons of food waste was generated in 2015. More than half of it was residential food waste.⁷

1. Jonathan Bloom, *American Wasteland*. Cambridge, MA, De Capo Press, 2011, p.19.
2. Cynthia Nickerson, et. Al., Major Uses of Land in the United States, USDA Economic Research Service EIB-89, 2007.
3. EPA, Office of Research and Development, Safe and Sustainable Water Resources Research Program factsheet, August 2015.
4. The Natural Resources Defense Council, *Wasted: How America Is Losing up to 40 Percent of Its Food from Farm to Fork to Landfill*. Second edition. August 2017.
5. ReFED, *A Roadmap to Reduce U.S. Food Waste by 20 Percent*, 2016, p. 5.
6. U.S. Environmental Protection Agency, *Advancing Sustainable Materials Management: 2015 Fact Sheet*, July 2018.
7. Melissa Pennington, Path to 50% Food Waste Reduction in the Mid-Atlantic Region Workshop Overview, April 4, 2017.

When food goes to the landfill, along with food, resources required to produce it—land, fuel, water, agricultural chemicals, human labor, and any money spent along the way—are also wasted. “U.S. consumers, businesses, and farms spend \$218 billion a year, or 1.3 percent of the Gross Domestic Product (GDP), growing, processing, transporting, and disposing of food that is never eaten.”⁸ Americans dedicate to food waste about 21 percent of water use, 19 percent of fertilizer use, 18 percent of cropland, and 21 percent of landfill volume.⁹ The expense of wasting food at the consumer level is also staggering. The average family of four spends between \$1,350 and \$2,264 each year on food they throw away.¹⁰

Even after wasted food finds its way into the landfill, additional problems occur. When food waste in landfills begins to break down anaerobically, it generates methane, a greenhouse gas much more potent than carbon dioxide. Landfills are the third-largest source of methane emissions in the United States.¹¹

Amid this wasted food, one in seven Americans are food insecure without reliable access to sufficient, affordable, nutritious food.¹² The food insecurity rate is 14.4 percent in Prince George’s County.¹³ While food waste and hunger are separate problems, they are related. It is estimated that recovering 30 percent of food wasted in the United States would be enough to feed all the food insecure Americans.¹⁴

The social, economic, and environmental problem of food waste is slowly gaining national attention. Counties, states, and towns across the country are beginning to act—from initiating consumer education campaigns to enacting legislation for clearer date labels on food products to mandating food donation programs. More can, and is, being done. Action is needed to prevent food waste, recover surplus food to distribute to the food insecure, and recycle food scraps into animal feed, energy, or compost. Each of these actions creates opportunities to save money, conserve resources, feed hungry people, develop new businesses, and create jobs for skilled and unskilled labor.

This study describes the problem of food waste; explains national and state efforts to reduce food waste; explores the behaviors and beliefs of Prince George’s County residents, businesses, institutions, and organizations regarding food waste. It presents policy recommendations and strategies, supported by national promising practices, to reduce, recover, and recycle food waste in the County. By creating awareness, this study seeks to reduce food waste in the County. Reducing local food waste may help eliminate food insecurity, protect the environment, and boost the economy.



Source: ReFED, 2018 U.S. Food Waste Investment Report. <http://www.refed.com>.

8. ReFED, *2018 U.S. Food Waste Investment Report: Trends in Private, Public, and Philanthropic Capital*. Fall 2018, p. 5.

9. Ibid.

10. Jonathan Bloom, *American Wasteland*. Cambridge, MA, De Capo Press, 2011, pp. 24 and 318.

11. U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015*, 2017.

12. ReFED, *Roadmap*, p. 10.

13. Feeding America, Map the Food Gap. <http://map.feedingamerica.org>.

14. Harvard Food Law and Policy Clinic, Opportunities to Reduce Food Waste in the 2018 Farm Bill, May 2017.

FOOD WASTE IN THE U.S. IS...

EXCESSIVE

40%

OF ALL FOOD PRODUCED IN THE U.S. IS WASTED



133 BILLION POUNDS

Food wasted per year. That represents 1,249 calories per person, per day.

EXPENSIVE



\$161 BILLION

Uneaten food at retailers, restaurants, and homes costs \$161 billion annually



\$1,500

Per capita, this amounts to over \$1,500 for a family of four

ENVIRONMENTALLY HARMFUL



Food makes up 20% of landfill weight—the single largest municipal waste source



The methane released by food is a greenhouse gas 21 times more powerful than carbon dioxide

AN OPPORTUNITY



Diverting 15% of the food that currently goes to waste would be enough to cut the number of food insecure Americans in half



Food waste can be composted into sustainable soil additives or be used to generate electricity



Encouraging institutions to purchase so-called “ugly” produce would help farmers find new markets for healthy products that currently go to waste

*All statistics from U.S. Department of Agriculture and Environmental Protection Agency
www.pingree.house.gov/foodwaste

Courtesy of the Office of Congresswoman Chellie Pingree.



Executive Summary

Food waste is food that is not consumed by humans and discarded.

Food discarded while it is still edible is considered wasted food. Food that is no longer appropriate for human consumption, usually called food scraps, may be reusable in a variety of ways.

Food waste happens at every stage of the food supply chain, from farm to fork.

- During production, food loss occurs from natural causes, poor growing practices, and labor shortages. When farmers cannot find a market for their surplus, or if the produce does not have the perfect shape or size, edible crops are often left in the field to rot.
- Damaged and trimmed parts are discarded during processing and packing. Food is wasted because of storage flaws.
- Rejections for low-quality food, because of long travel or a failure to meet industry standards, cause the most waste during distribution.
- To satisfy customers, supermarkets overstock food items to fill shelves. When new shipments come, the stores throw away old food. Date labels are also a culprit. Even though date labels indicate quality, not safety, supermarkets discard food items shortly before the due date. Perfectly edible food is often found in supermarket dumpsters.
- In the kitchens of all types of restaurants, institutions, and homes, poor inventory management, over-purchasing, improper cutting and handling, and accidents may cause a significant amount of waste. Simple tricks that help save food and prevent food waste are foreign to many households. The biggest contributor to food waste at this stage is preparing excessive amounts of food.
- At restaurants, one of the biggest culprits of wasted food is portion sizes. Plate leftovers directly go in the dumpster. More food is wasted at buffet-style restaurants. Due to health regulations, once food is available to the consumer, it cannot be donated or repurposed for consumption. There is also high food waste at cafeterias at all kinds of institutions—schools and hospitals are the biggest generators.
- The largest food waste happens in homes. In aggregate, household food waste exceeds all other sources. Over-purchasing, impulse buying, not planning meals or making shopping lists, disliking food, and not using leftovers cause food waste. Confusion about the meaning of date labels is also a big contributor to household food waste. Consumers discard wholesome food when its “best by” date (an indicator of quality) has passed, fearing that they would get sick

Food waste has environmental, economic, and social impacts.

More than 60 million tons of food—or 40 percent of all food produced—are wasted every year in the United States. Discarded food, in addition to having environmental impacts, wastes the resources used to create that food and causes economic and social impacts.

- Food waste is most commonly sent to a landfill. More food reaches landfills than any other material, constituting 22 percent of municipal solid waste.¹ As food decomposes, it emits methane, a more potent greenhouse gas (GHG) than carbon dioxide. “Food scraps in landfills produce as much emissions as about 3.4 million vehicles and account for about 9 percent of the total GHG footprint of food waste.”² Total GHG emissions from the production stage to the disposal of all food equate to emissions of more than 37 million passenger vehicles, or 1 in 7 vehicles on the road.³
- Annually, nearly 4.2 trillion gallons of water are used to produce food that is wasted.⁴ Every time we throw away an apple, we waste 33 gallons of water, when we toss one large egg 52 gallons of water is wasted, and when we pour one cup of coffee in the sink, we are actually pouring 70 gallons of water.⁵ The U.S. food system consumes about 16 percent of U.S. energy.⁶ When food is wasted, a significant amount of energy is wasted too. About a quarter of our cropland, equivalent to the size of New Mexico, is used to grow food that is ultimately not eaten.⁷
- In the United States, it costs \$218 billion each year to grow, process, transport, and dispose of food that is never eaten.⁸ The cost of food waste is approximately \$450 per person each year.⁹
- While huge quantities of edible food are being wasted, millions of people suffer from food insecurity. One out of four food calories intended for human consumption is not ultimately consumed.¹⁰ In Prince George’s County, 128,650 residents do not have reliable access to sufficient, affordable, nutritious food.¹¹ If 30 percent of food waste is recovered, it would be enough food to feed all food insecure Americans.¹²

Federal government, national organizations, and the State of Maryland are trying to reduce food waste.

- Several federal laws help reduce food waste. For food donations, laws provide liability protection and tax deductions. The 2018 Farm Bill includes measures to prevent food waste, increase food recovery, and promote food waste recycling. Legislators have introduced food recovery and food date labeling acts.
- The U.S. Environmental Protection Agency (EPA) and U.S. Department of Agriculture (USDA) have launched many initiatives to reduce food waste. EPA’s Food Recovery Hierarchy prioritizes source reduction, followed by feeding hungry people, feeding animals, industrial uses, composting, and as a last resort, landfilling the food waste.

1. U.S. Environmental Protection Agency, *Advancing Sustainable Materials Management: 2015 Fact Sheet*, July 2018.

2. The Natural Resources Defense Council, *Wasted: How America Is Losing up to 40 Percent of Its Food from Farm to Fork to Landfill*. Second edition. August 2017, p. 13.

3. Ibid.

4. Z. Conrad, M.T. Niles, D.A. Neher, E.D. Roy, N.E. Tichenor, L. Jahns, “Relationship between food waste, diet quality, and environmental sustainability.” *PLoS ONE* 13(4): e0195405, April 18, 2018. <https://doi.org/10.1371/journal.pone.0195405>

5. Water Footprint Network. <http://waterfootprint.org/en/resources/interactive-tools/product-gallery/>

6. USDA ERS, *Fuel for Food: Energy Use in the U.S. Food System*, Amber Waves, September 1, 2010.

7. The Natural Resources Defense Council, *ibid*, p. 13.

8. ReFED, *2018 U.S. Food Waste Investment Report: Trends in Private, Public, and Philanthropic Capital*. Fall 2018, p. 5.

9. This number was calculated based on the ReFED estimates and published in The Natural Resources Defense Council, *ibid*, p. 48.

10. Lipinski, B. et al. “Reducing Food Loss and Waste.” Working Paper, Installment 2 of *Creating a Sustainable Food Future*. Washington, DC: World Resources Institute, 2013, p. 1.

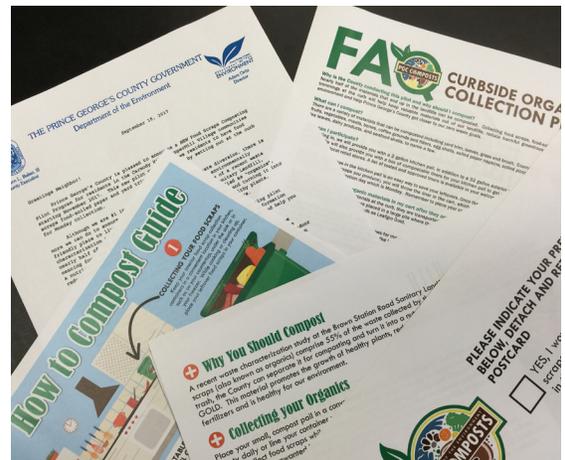
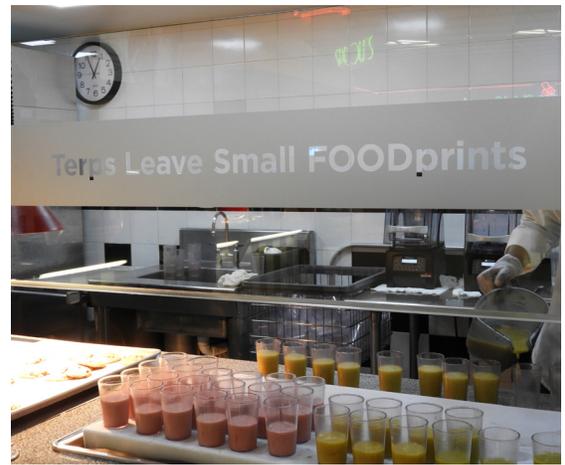
11. Feeding America, *Map the Food Gap*. <http://map.feedingamerica.org>.

12. The Natural Resources Defense Council, *ibid*.

- Of the many organizations working to find solutions to food waste, ReFED and the Natural Resource Defense Council (NRDC) are the most notable. ReFED's *A Roadmap to Reduce U.S. Food Waste by 20 Percent* provides 27 solutions for prevention, recovery, and recycling. NRDC developed 10 strategies to accomplish the federal government's food loss and waste reduction goal of 50 percent by 2030.
- Maryland has several laws related to food donations, composting, school food recovery programs, and tax credits. Maryland's sustainable materials management policy includes a voluntary 60 percent food scrap recycling goal for each county.

Prince George's County residents and businesses are willing to reduce food waste.

- A significant amount of food is wasted in Prince George's County. The County Department of the Environment (DoE) is working to sustainably manage food waste and plans to launch a residential curbside food scrap collection program, initially with 3,000 households and expand it to countywide in three years. Approximately, 48,000 tons of food waste is buried annually at the Brown Station Road Sanitary Landfill.¹³ With the October 2018 expansion, the Prince George's County Organics Composting Facility became the largest composting facility on the East Coast.
- A household food waste survey of more than 200 households showed that knowledge about food waste makes a difference in food discarding behaviors of residents. People aware of the negative impacts of wasting food are more careful about reducing food waste; when they need to discard food, they try to compost it.
- A striking 92 percent of survey respondents indicated that they are willing to do at least five out of eight potential actions presented to them to reduce food waste. More than two-thirds of the respondents are interested in learning tips to reduce food waste.
- Interviews with food waste generators revealed:
 - Farms always have surplus or inedible food due to the unpredictable nature of agriculture. Despite donations, feeding animals, and tilling crops back into the field, farmers still send food to the landfill.



13. Prince George's County Resource Recovery Master Plan (Draft), 2018.

Top photo courtesy of Maryland Environmental Service (MES), bottom photo courtesy of the Prince George's County DoE.

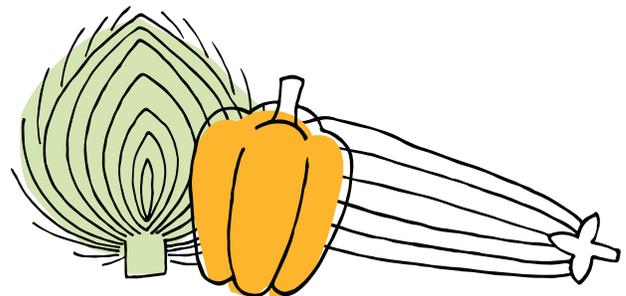
- › Processors and distributors generate massive amounts of food waste. Although they repurpose leftover ingredients, donate surplus food, and send food scraps to hog farms, they still send a significant amount of food waste to the landfill. The most striking finding is that still edible packaged products with past due dates, such as mixed greens in clamshells, go to the landfill fully packaged. Since distributors do not want to invest in a repackaging machine to separate food from its package, they end up not even complying with the recycling requirements and dump everything in their trash compactors. This practice results in filling the Brown Station landfill with recyclable and compostable materials.
- › Retailers are aware of the effects of wasting food on their bottom lines. All grocery stores have sustainability goals and strategies to reduce food waste. They are creative in finding solutions to food waste while satisfying customers' needs.
- › Food service providers are more conscious about the food waste problem and focus on reducing it. They track food waste using software and implement prevention methods.
- › Restaurants are careful about not wasting food, primarily because of economic concerns. Despite that, they are one of the major generators of both pre- and post-consumer food waste. Most do not donate food because they are not aware of federal and state liability protection laws. Most are willing to compost and reduce portion sizes if mandated, or incentives are provided.
- › Institutions are major food waste generators because of the volume of food served. All institutions apply strategies to minimize cost that also help minimize waste. Among the institutions interviewed, the University of Maryland (UMD) is the only one that donates food and sends food waste to the composting facility. Minor changes at UMD, which included switching to all-you-can-eat style unlimited access, led to less food waste and eliminated student food insecurity without increasing the food cost.
- › Prince George's County Public Schools do not have a systemwide policy for food waste. Due to the limited food preparation at school cafeterias, there is minimal kitchen waste, but students generate lots of plate waste. Some schools have share tables for students to take home uneaten unopened packaged food. Schools do not donate surplus food to nonprofits. There is school-based composting in a few schools. DoE is having preliminary discussions with some schools related to a food scrap collection/composting program. Food waste education is not integrated in the curriculum, but in some schools food waste is studied in elective courses or as special projects.
- › M-NCPPC venues can improve practices regarding food waste. Caterers handle food waste at rental venues, and it is not known whether they make an effort to reduce food waste. At Show Place Arena and Prince George's Sports and Learning Complex (Sportsplex), the food manager and the contractor, respectively, apply strategies to minimize cost and food waste. M-NCPPC staff and caterers at M-NCPPC facilities should be encouraged to send food scraps to the County's composting facility or to feed animals at M-NCPPC facilities. Donation of food to food banks should also be explored.
- Interviews with food waste mitigators highlighted several organizations that feed the hungry and help reduce food waste.
 - › **FOOD RECOVERY ORGANIZATIONS** rescue food at various stages of the food system. They recover unharvested or surplus products from farms or home gardens,

collect excess food from farmers' markets, or rescue unserved surplus meals from university cafeterias.

- › **CAPITAL AREA FOOD BANK (CAFB)** plays a big role in rescuing food that is otherwise thrown away, significantly contributing to minimize food waste.
- › **FOOD PANTRIES** primarily get food from CAFB, but also get donations of surplus food from local food businesses. By rescuing surplus food and giving it to the hungry, they help reduce the amount of food that goes to the landfill.
- › **FOOD SCRAP COLLECTORS AND COMPOSTERS** include not only businesses but municipalities with curbside food scrap collection programs. Although not numerous, there are regional food scrap collection and composting companies that serve County residents and businesses, collecting their food waste and turning it into valuable soil amendment.

County residents and businesses have suggestions to reduce food waste in the County.

- An overwhelming 93 percent of respondents to the household food waste survey suggested that Prince George's County should establish and/or expand programs to reduce food waste, including:
 - › Curbside food scrap collection
 - › Composting programs
 - › Education and awareness campaigns
 - › Coordinating donation and distribution of excess food to residents in need
 - › Encouraging source reduction
- Food waste reduction and recovery policies suggested by residents include:
 - › Providing incentives to restaurants for composting, donations, and serving smaller or offering multiple portion sizes
 - › Providing incentives to grocery stores for offering older food at a reduced price
 - › Banning organic materials at the landfill
 - › Incentivizing households and businesses to participate in food waste reduction programs
- Food waste generators and mitigators presented strikingly similar suggestions with residents. Their top suggestions include enacting:
 - › Countywide food waste collection program for composting
 - › Ban food waste in the landfill
 - › Incentives for composting
 - › Awareness education
 - › Incentives for donations
 - › Stimulus funds to farmers to reduce on-farm food loss
 - › Portion control regulations



—RECOMMENDATIONS—

REDUCE, RECOVER, RECYCLE

Food waste is not only a national issue, but a local issue as well. Every community should act in its own capacity to alleviate the problem of wasted food. The following recommendations on reducing, recovering, and recycling food waste are based on thorough research of national and international best practices, as well as ideas and solutions derived from household survey respondents and interviews with businesses.



Policy 1

Launch a food waste awareness campaign. Educate the public about the food waste problem and how each person can reduce it and save money.

Policy 2

Invite all entities across the food chain to a “food waste challenge” to encourage them to reduce food waste.

Policy 3

Educate the public about date labels and clarify that date labels indicate food quality, not food safety.

Policy 4

Support County farms, increase locally-grown food supply, and encourage local food consumption, which would significantly prevent food waste.

Policy 5

Encourage all businesses and institutions that generate food waste to perform an annual food waste audit.

Policy 6

Encourage food retail outlets to reconsider their policies, operational rules, and practices to prevent and reduce food waste.

Policy 7

Encourage restaurants to reconsider their practices to prevent and reduce food waste.

Policy 8

Reduce school food waste by using no-cost or low-cost smart strategies.

Policy 9

Lead by example and practice food waste reduction at M-NCPPC and County-owned and operated facilities.

continued on next page...

—RECOMMENDATIONS—

REDUCE, RECOVER, RECYCLE



RECOVER

Policy 1

Develop markets for products that would not have stayed in the food chain otherwise, which could also alleviate the challenge of access to healthy food in the County.

Policy 2

Encourage donation of surplus food.

Policy 3

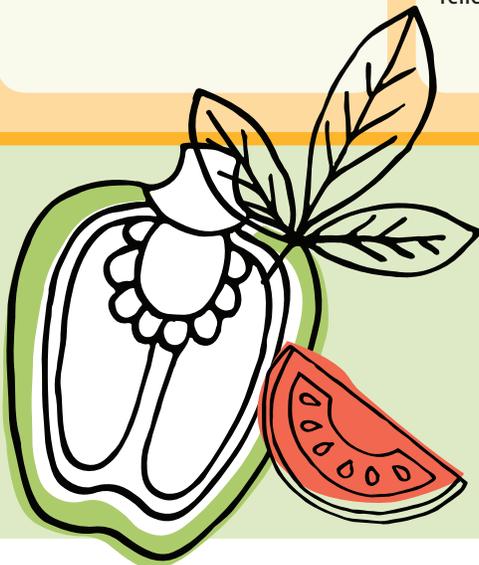
Facilitate collaboration of food recovery and anti-hunger organizations and help them develop partnerships with food donors, which would increase the efficiency and volume of food donations.

Policy 4

Establish a nonprofit food rescue organization.

Policy 5

Help establish a sustainable “food runner” enterprise specialized in delivering surplus food to hunger-relief organizations.



RECYCLE

Policy 1

Ban food waste at the Brown Station Road Sanitary Landfill in a tiered approach. Mandate residents and businesses separate their food waste and select alternative ways to reuse/recycle it following the EPA food waste hierarchy.

Policy 2

Encourage the use of food scraps as animal feed.

Policy 3

Support and explore ways to convert food waste to energy.

Policy 4

Establish a comprehensive composting program that includes all levels of composting.



What is food waste?

The simplest definition of food waste is food that is not consumed by humans and discarded. But food waste is not simple; it is a very complex phenomenon. It is not just “trash.” It may be a treasure if it is treated right, or it can be hazardous or deadly if it is incorrectly managed. Food waste has a very important role in our lives. We all create it, discard it, benefit from it, and suffer from its adverse effects.

Terminology

Scholars and groups use different terminology: Food wastage, food loss, food waste, wasted food, food surplus, surplus food, food discard, food scraps, biowaste, kitchen waste, and more. Multiple terms are used interchangeably, or even sometimes, the same term is used with different meanings, creating confusion.

Throughout the study, terms other than food waste are used to better describe the type of food waste mentioned. For example, “food loss” is used for uncontrollable and unavoidable food waste. “Wasted food” is used quite frequently to emphasize that what is trashed is in fact good, edible food. “Food scraps” is used to describe food waste that is not edible.



Categorization

Food waste may be categorized as “edible” and “inedible:”

Edible food waste is food that is not consumed and thrown away even though it is suitable for human consumption. It is usually called “wasted food” or “surplus food.”

Inedible food waste is food that is no longer appropriate for human consumption. It is usually called “food scraps” or “spoiled food.” Inedible food waste may be reusable.

It is important to make this distinction to avoid misunderstanding when food waste is recovered to feed the hungry. Only edible food waste, which is surplus food that is perfectly suitable for human consumption, is recovered to feed people. Usually, the terms “food recovery” or “food rescue” are used to describe this action.

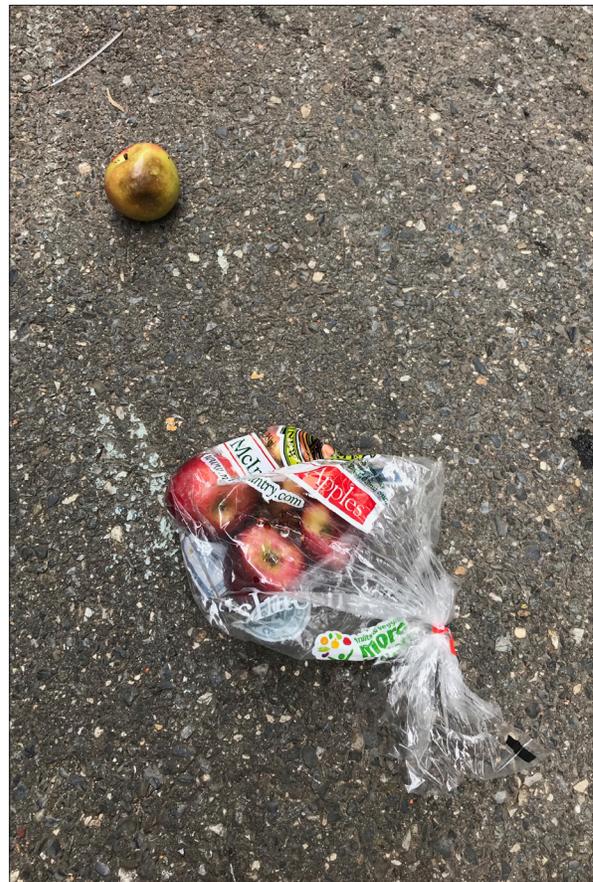
Inedible food waste may be used for animal feed or converted into a soil amendment like compost, energy, or other materials. The term “recovery” is also used for inedible food waste when it is diverted from a landfill.

Another categorization is done by how avoidable the food waste is:¹

Avoidable food waste is “food thrown away that was, at some point prior to disposal, edible.”

Unavoidable food waste is described as “waste arising from food that is not, and has not been, edible under normal circumstances.”

The terminology used in this categorization helps us understand how unnecessary some food waste is and emphasizes the potential for food waste prevention.



1. Waste & Resources Action Programme (WRAP), Household Food and Drink Waste in the UK, Final Report, November 2009, p. 4.

Where does food waste happen and what causes it?

Food moves from farms and ranches to people who will eat it, often referred to as farm to fork. During its journey, food goes through different stages that include production, processing and packaging, storage, distribution, retail, preparation and cooking, and consumption. Food waste happens at every stage of this supply chain. There are various reasons for wasting food, some avoidable and manageable and others are unavoidable.

Production

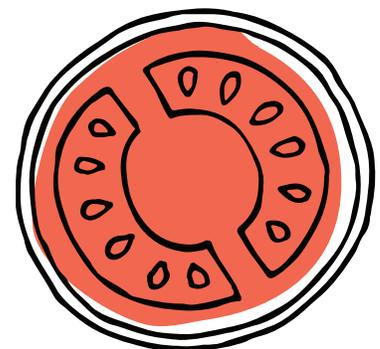
During production, there are some unavoidable losses due to harsh weather conditions and natural disasters. Hard-to-control diseases can be deadly for plants and livestock. Pest infestation and wildlife damage may also cause food waste if they cannot be controlled. Contamination may cause disposal of all products to prevent a foodborne disease outbreak. Sometimes even the perception of contamination is enough to scare consumers, and edible products are lost because of decreased demand. Unpredictable last-minute order cancellations may cause excess product, and if no one else will take the order, the food is discarded. This is food loss that happens beyond the farmers' control.



Food waste on the farm may happen because of insufficient skills and poor practices. Use of poor growing and animal husbandry techniques may yield poor-quality food that is not sellable. Crops may be damaged because of poor harvesting techniques. Lack of proper irrigation infrastructure and agricultural equipment may also contribute to food loss on the farms. When equipment malfunctions or accidents happen, crops may be damaged. Overproduction can result from bad planning, poor marketing, or deliberate overplanting to compensate for unpredictable conditions that may reduce the yield. When farmers cannot find a

market for their surplus, edible crops are left in the field to rot. Workers' shortcomings, such as sloppiness and rushed harvesting, cause damage or leave some crops unharvested. During a farm labor shortage, crops cannot be harvested and end up rotting in the fields. Food waste from these causes is avoidable but unintentional.

Avoidable and, unfortunately intentional food waste from unharvested crops happens when farmers choose not to harvest perfectly edible crops for several reasons. When the price for a crop is less than the cost of planting, harvesting, and transporting it, farmers do not bother harvesting it. Leaving edible crops in the fields also happens when products cannot meet the industry specifications. Wholesalers or retailers reject produce that does not have the perfect shape or size. They seek uniformity in size, shape, and color. Size is particularly important





to buyers, because they assume bigger produce is more appealing to the consumer even though it may not taste better. If this assumption is correct, consumer preferences are influenced by attractive displays of uniform produce in the supermarkets. Although the local and organic food movement is increasing appreciation for produce in all sizes and shapes, the majority of Americans prefer picture-perfect produce. Therefore, supermarkets only carry consistent and appealing produce. These standards also exist in the meat industry. When Purdue Farms on Maryland's Eastern Shore had to stop slaughtering operations because of a three-day blizzard, the birds grew larger than industry specifications. Thousands of chickens were destroyed.¹

The food industry asked the U.S. Department of Agriculture to establish grading standards. The resulting uniformity caused convergent consumer demand; partially an unintended consequence of this quality control methodology.

Rejected food by wholesalers and retailers can be diverted to secondary markets either for sale at lower-end markets or for canning, pickling, or processing to make other food products. However, not every farmer has a readily available secondary buyer. Hunger relief organizations and food recovery groups may rescue some of the unharvested or rejected food, but there may not be enough organizations to rescue everything. Some farmers do not know how to connect with such organizations and others do not want to make donations because they fear liability. In the absence of secondary markets and partnerships with food rescue organizations, most farmers just dump surplus food or plow it back into the ground. Hence, perfectly edible food is wasted.

On a much smaller scale, food waste also occurs at community gardens and home gardens because of natural causes, poor practices, and overproduction. Usually, overproduction does not cause much waste since people share their surplus produce with others. Hunger relief organizations also help link home gardeners to local hunger relief groups.

Processing and packing

Food is wasted while it is being processed and packed on farms and at processing facilities. Even during minimal processing, such as washing, peeling, cutting, slicing, and sorting, food may get damaged and trimmed parts are discarded. The scraps from this initial pruning are useable. Waste happens during all kinds of processing, including canning or juicing fruits or vegetables, smoking fish, and pasteurizing milk. At food manufacturing facilities where more complicated processing is done involving heavy machinery, cooking, and/or baking, a substantial amount of food waste is created. Food waste during processing stems from inefficient machinery and techniques; insufficient skills; equipment malfunction; accidents; improper handling, packing, and labeling; rigid industry specifications; and lack of creativity for unused parts. In the absence of proper infrastructure, partnerships, or efficient logistics, wasted food cannot be recovered or reused, and unavoidable food scraps cannot be always composted, sent to anaerobic digesters, or used as animal feed. Consequently, a substantial amount of food waste generated at this stage ends up in the landfill.

1. A Perdue representative revealed this fact at the Feeding America's 2018 Food Rescue Summit.

Storage

Proper storage is extremely important to keep food from damaging and spoiling, thus avoiding food waste. Every stage of the food chain involves storage. From post-harvest storage on farms to our homes, we try to correctly store food to keep it fresh and safe. Yet, a lot of food is wasted because of flaws during storage. In some cases, lack of proper infrastructure, such as inadequate storage space, or lack of proper equipment—refrigerators and freezers—cause food waste. Problems with temperature control, equipment malfunction, and power outages are other reasons for wasting food. Even if the food does not spoil, when it is not kept at a certain temperature, according to federal and local regulations, it is considered “unsafe” to consume and must be disposed of or redirected. Inefficient logistics and lack of partnerships contribute to waste when food is stored too long and donations cannot be made. At home, improper storage happens all the time. If appropriate air-tight containers or vacuum sealers to extend food’s life are not used, food quickly goes bad. Keeping perishable food, such as meat, for a long time in the refrigerator instead of freezing it results in spoilage. Often storage-related food waste ends up in the landfill.

Distribution

Food travels 1,500 miles on average in today’s farm-to-fork food system. During this journey, despite refrigeration, not all food products arrive at their destination in perfect condition. Besides the small percentage of damaged food in each truck, when trucks or their refrigerated units break down or accidents happens, the entire truck load is wasted. Because many fresh food products have a short life span, timeliness can determine if food is sold or wasted.

Rejections cause the most waste during the distribution stage. Delivery delays because of backups at ports of entry and loading docks may cause a breach of contract and food is rejected. When the food safely arrives at grocery distribution centers or wholesale warehouses, it goes through an inspection process to ensure quality. Inspectors randomly open cases, and if they see damage or the product does not meet the industry standards, they open a few more. If all opened cases are unsatisfactory, they reject the entire load. If the seller cannot find another purchaser or a food bank to immediately take the rejected food, it ends up in the landfill. Usually, there is a time constraint, because trucks have another load waiting for them. When the food is perishable, keeping it cool in the refrigerated truck costs money. In either case, it is faster and cheaper to take it to a landfill.

When food is accepted at the supermarket distribution center, it usually sits there for a few more days before being transported to individual stores. During this wait and subsequent transportation, more waste can happen from overhandling, disruption to the cold chain, a sudden change in demand, or some other reason.

Retail

At supermarkets, especially big chain and high-end stores, food is wasted in large quantities. While some waste happens from accidents, mishandling, inadequate staffing, ordering errors, or equipment malfunction, often it is a management decision. Despite extremely thin (average 1 to 2 percent²) profit margins, supermarkets are deliberately throwing away perfectly edible food.

2. Tiffany C. Wright, “What is the Profit Margin for a Supermarket?” *azcentral*. <https://yourbusiness.azcentral.com/profit-margin->

Although some supermarkets opt not to donate surplus food because they fear the liability, many others donate food to charities. However, even the stores that regularly donate have days when they cannot make donation arrangements for an unexpected surplus.

Supermarkets usually do not allow employees to take surplus food home, even the food slated for a dumpster. This policy is to avoid deliberate bad acts by employees, such as dropping fruits or keeping milk with an approaching expiration date in the back, so that they can benefit when these food items are pronounced not fit for sale. Because perfectly edible food can always be found in a supermarket dumpster, some people dumpster dive during afterhours to get good food for free. To prevent dumpster diving, some supermarkets keep their dumpsters behind locked gates and high fences, sometimes equipped with barbwire.



Photo courtesy of Rob Greenfield.

Because of these management decisions, perfectly edible food that could feed many hungry people is sent to the landfill. These practices are built into supermarket business models for a legitimate reason: customer satisfaction. Customers want to see fully stacked shelves, showing that the supermarket has an abundant amount of food to choose from. To prevent empty shelves, supermarkets overstock many items. Some of these items go bad or their dates expire before they are sold. Customers do not want to see any irregular shaped, bruised, or limp produce. According to a national survey, the quality of the produce department is the most important criterion for customers in choosing a supermarket.³ This finding was consistent with the food system study consumer survey conducted in Prince George's County in 2014.⁴ It is especially important for high-end supermarkets to have an attractive produce display. Apples are turned around on the shelf so that they do not get bruised, greens are splashed with cold water so that they do not look limp. But despite these efforts, produce may lose its cosmetic appeal, sometimes due to customer handling. These imperfect items are removed from the display, and if there is no donation arrangement at the time, or they cannot be used as ingredients for prepared food items, they are discarded.



Date labels are one of the culprits of wasted food. The confusion about what date labels mean is a major issue. Date labels “sell by,” “use by,” “best by,” and others are an indicator of taste and quality, not safety. Other than infant formula, there is no federal regulation to prevent supermarkets from selling anything past its due date, except for milk in Maryland.⁵ However, most supermarkets do not want to have any food items with past due labels on their shelves. They even remove these items a few days before the due date. If food with an

supermarket-17711.html

3. The U.S. Grocery Shopper Trends 2008 study mentioned in Jonathan Bloom's *American Wasteland*, Cambridge, MA, 2010, p. 154

4. M-NCPPC Prince George's County Planning Department, *Healthy Food for All Prince Georgians: An Assessment of Access to Healthy Food in Prince George's County*, Maryland, November 2015.

5. Md. HEALTH-GENERAL Code Ann. § 21-426.

expired date label cannot be donated, it goes to the landfill.

Packages that contain large quantities of fresh produce cause waste both at the grocery store and home. At the grocery store, if one potato in a five-pound bag becomes rotten, the whole bag is discarded. Similarly, pre-washed greens in large clamshell packages are tossed away when a couple of leaves look bad. Although some grocery stores repurpose these items for store-made salads, soups, and other ready-to-eat food or donate them to food pantries, a significant number of packaged produce ends up in the landfill.

Ready-to-eat food sold at supermarkets is wasted more than anything else. This is especially true for self-serve salad and hot-food bars. Supermarkets want to display full trays of food. Sometimes, they replace trays with the full ones before all food is consumed. What is left in the tray goes in the trash. Health regulations state that once food is made available to the consumer, it cannot be donated or repurposed for consumption. There are other food safety constraints, such as temperature and time. Food can only be in chafing dishes for a limited number of hours before its temperature drops below the required level set by regulations. Supermarkets usually remove the food before this critical time arrives. This is true for both self-serve food and behind-the-counter food; however, employee-handled food can be donated and repurposed. Unfortunately, not every supermarket reuses this food. Even if they do, it may not be all of it. Supermarkets are more hesitant about donating ready-to-eat food as it requires more work for them to pack and refrigerate the surplus food. Lack of partnerships with local soup kitchens makes it more difficult. Some supermarkets are also concerned about liability, because of lack of knowledge about the laws that protect them from liability.

Preparation/cooking

Food is wasted during the preparation stage in the kitchens of all types of restaurants, institutions, and homes. Lack of knowledge about how to properly cut, handle, and use ingredients; carelessness; and accidents may cause a significant amount of waste. High staff turnover and lack of proper training increase mishandling. A chef at an institution in Prince George's County noticed unusual amounts of tomato waste and watched how the kitchen employees cut tomatoes. They were chopping the tops off and discarding them. He asked them to put the discards in a bin. At the end of the week, there were 20 pounds of chopped tomato tops. He turned them into tomato sauce and showed the workers how to cut tomatoes correctly to avoid waste.⁶

Poor inventory management and purchasing larger than needed quantities of ingredients cause food waste. This problem is augmented at restaurants with extensive menus. If food items on hand cannot be used to create dishes, donated, or stored, they are discarded. Ordering mistakes and food safety concerns also contribute to food waste in the kitchen. Even if every precaution is taken not to waste food, there will still be some waste generated during preparation and cooking. Food scraps, including peels, pits, bones, and egg shells, are considered unavoidable waste and usually cannot be repurposed. However, there are ways, including composting and anaerobic digestion, to divert them from the landfill. If there is no option for diversion, everything ends up in the landfill.

In home kitchens, food is wasted in great quantities. Because people are frequently eating at restaurants, the number of people with good cooking skills is diminishing. Simple tricks that help save food and prevent food waste are foreign to many households. Lack of skills may also cause cooking accidents, and food may become inedible. Purchasing more ingredients

6. From an interview conducted for this study.

than needed for a specific dish and not knowing what to do with the excess ingredients force people to discard them. Only a handful of households compost food scraps. Use of a garbage disposal for food scraps is not a common behavior, and it is not good for the environment. Therefore, a considerable amount of food waste that is generated at home kitchens during food preparation goes to the landfill.

The biggest contributor to food waste at this stage is preparing excessive amounts of food. When food cannot be sold or consumed, it most likely ends up discarded. When ready-to-eat food is wasted, it is not only the ingredients that go in it but also the labor and energy to create it that are wasted.

Consumption

Food waste at the last stage of food's journey is the costliest. If the food is discarded at the consumption stage, we have wasted all the natural and human resources used to produce and bring food from farms to our forks. Huge amounts of water, fossil fuels, natural gas, and other energy sources are used by hundreds of workers at all stages to produce food for human consumption. In addition to the economic value of food that is wasted, its short- and long-term environmental impacts should be calculated and added to the overall cost.

While perfectly edible food is being discarded, millions of people are suffering from hunger. There are food insecure people in every county in the United States, including Prince George's County. Restaurants, caterers, and institutions that work with food rescue organizations, charities, and soup kitchens can donate leftover food to feed the hungry. If they do not have such partnerships or hesitate to make donations because of liability concerns, they usually discard the leftover food if they cannot repurpose it. Composting the wasted food will help divert it from the landfill, but it is not always possible for commercial operations; therefore, a considerable amount of food ends up in the landfill.

Food is consumed at various places, including restaurants, events, schools and other institutions, and homes. The causes of food waste at the consumption stage differ at each type of setting.

Restaurants



At restaurants, the biggest culprit of wasted food is portion sizes. Extremely large portions are not only generating food waste, but also creating health risks. Entrées are often large enough for two people, but some restaurants do not allow sharing. If taking the leftovers is not an option (i.e., during traveling or other plans after eating), people either overstuff themselves or leave the excess food on their plates. Restaurants can collect and send leftover food along with food scraps for composting or anaerobic digestion. If they are not capable of doing this, they have no choice but to put the plate waste in the trash.

Cafeterias and quick-service restaurants usually need a certain amount of cooked food available all the time. When there are not enough customers, the leftover food is usually wasted. All-you-can-eat style restaurants have a different problem. Responsible eaters get enough on their plates and get more later if they need more, and do not waste any food. But not everyone is

a responsible eater. Some people cannot predict how much they can eat and overfill their plates. Others will try unfamiliar foods and dislike them, leaving food on their plates to be discarded. If food has been offered on the buffet line to customers, it cannot be repurposed or donated. This is a problem because restaurants regularly replace half-empty trays with full ones, and food safety regulations for hot food display times require removal of trays within a certain time period. Usually, employees eat leftover food in trays, but they are not allowed to take leftovers home. If there is no composting option, they trash the remaining leftover food.

In the kitchen of any restaurant, at the end of the day, usually some unserved food is left over. If donations are not arranged or considered for liability reasons, the only other way to rescue food is to repurpose it. When lack of creativity to make dishes from leftovers or menu restrictions prevent repurposing, perfect meals are discarded. Even if leftovers are composted, it is still considered wasted food, because it is not used for its intended purpose.

Events

At Almost every event, food is left over because of no-shows. Food caterers, especially those that cater big events and conferences, usually prepare extra food to avoid not having enough for everyone. Food that has not been served to the consumer can be used or repurposed by the caterer or donated to a charity.



However, because of food safety regulations, food left in serving trays cannot be donated or repurposed and is tossed away.

Institutions

Food waste is generated in cafeterias at all kinds of institutions, but schools and hospitals are the biggest generators.

SCHOOLS

School food waste is a major problem. There are several reasons why too much food is wasted in schools. Students who are not allowed to choose from a variety of food items in the amount they want often do not finish the food they do not like. When trays are used, students tend to overfill their trays and leave behind uneaten or half-eaten food. Sometimes, students are not allotted enough time to eat lunch. A parent survey showed that one in seven students has less than 15 minutes to eat.⁷ Students spend more than half of their lunch time for traveling to the cafeteria, standing in line for food, and finding a place to sit. When the bell rings, uneaten food is dumped in the trash can. The time of lunch periods also contributes to wasting food. In some schools, lunch service begins as early as 10:30 a.m. when students are not yet hungry. Whatever the reason, when students do not finish the food served, leftover food ends up in the trash. Without an arrangement for sending food waste to a composting facility or anaerobic digester, school food waste goes to the landfill.

7. NPR, Robert Wood Johnson Foundation, and Harvard School of Public Health, *Education and Health in Schools: A Survey of Parents, Summary*, September 2013, p. 10.

HOSPITALS

In addition to typical cafeteria waste, a significant amount of perfectly edible food is wasted in hospitals to prevent the spread of infectious diseases. Any food that enters a patient's room, even unopened packaged food, goes into the trash if it is not consumed.

Homes

A big chunk of food waste happens at home. Although the amount of food waste generated in each household may be very little, the amount of aggregate household food waste exceeds all other sources. Homes generate 43 percent of all food waste in the United States.⁸ Many people are not aware of how much food is wasted in their household. Even if they are, they may not think about or be aware of the implications of food waste. Unless there is a conscious effort to reduce food waste, most households will continue to generate a considerable amount of it.

In homes, large amounts of food are wasted because of over purchasing. People tend to overestimate what they will consume and buy excessive amounts of food. Sometimes, the way the food is packaged encourages people to buy more than they need. Family packages at supermarkets and club-sizes at membership clubs like Costco offer huge amounts of food at cheaper prices. However, perishable food in big packages can go bad before it is consumed. Impulse buying is another culprit of food waste. Consumers are triggered by seeing a product, or influenced by advertisements, sales, or coupons and buy things they do not need. Unnecessary purchasing of food is also caused by not planning meals, not checking what is available at home before shopping, and not making a shopping list. Any food purchased that is not immediately needed is prone to being forgotten in the refrigerator or pantry, and when discovered, it is usually too old to eat.

Plate waste, which has a few root causes, often leads to discarded food. Sometimes, people buy unfamiliar food items out of curiosity to try and simply trash the item if it is not to their liking. Dislikes are a major cause of wasted food. When family meals are served, individuals—especially children—often leave food uneaten, as not all meals please everyone's palate. Plate waste also stems from large portions; when people cannot finish, food is discarded. Cooking excessive amounts may also cause food waste; eating leftovers is not always desirable. Unfortunately, households cannot donate leftover food to food banks or soup kitchens. Instead of freezing it for later use or creating new dishes with leftovers, some people simply discard the unwanted leftover food. Even if it goes to a compost bin, it is still waste of edible food.

Confusion about the meaning of date labels is another big contributor to household food waste. Most people think that if they eat any food that is past its “best by” or “use by” date, they will get sick. This belief results in consumers discarding wholesome food. These dates do not indicate the safety of food, but rather suggest that the product quality may not be the best after the date passes. Federal regulations do not require food product date labels, except for infant formula. The State of Maryland additionally requires “sell-by” date label for Grade A milk products.⁹ See Appendix 1. Food Product Dating for more information on date labels.



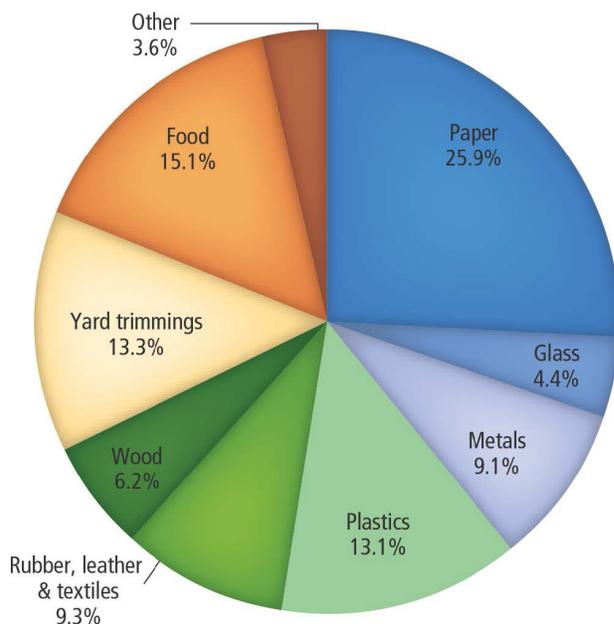
8. ReFED, *A Roadmap to Reduce U.S. Food Waste by 20 Percent*, 2016, p. 13.

9. Md. HEALTH-GENERAL Code Ann. § 21-426.

Why is food waste a problem?

Almost everyone discards food (edible or not). Because it is done routinely, most people are not even aware of how much food waste they generate. A recent study's findings show that the average person in the United States wasted about 422 grams—nearly one pound—of food every day between 2007 and 2014.¹ Collective food waste of individuals, together with the food industry's waste, creates a very significant amount of food waste daily in each community. U.S. food waste estimates differ depending on the source and the methodology used. The U.S. Department of Agriculture Economic Research Service (USDA ERS) estimated that in 2010, 133 billion pounds (67 million tons) of edible and available food supply at the retail and consumer levels went uneaten.² This was 31 percent of the food supply and an estimated value of \$162 billion.³ The 2015 U.S. Environmental Protection Agency (EPA) study on municipal solid waste estimated that in 2015, 40 million tons of food waste was generated, comprising 15.1 percent of total municipal solid waste (see Figure 2).⁴ ReFED's⁵ estimate of the U.S. food waste is 62.5 million tons per year, of which 52.4 million tons are sent to landfills and 10.1 million tons are left unharvested at farms.⁶ Just the management of these huge amounts of food waste is a major problem, but food waste has much broader and serious implications.

Figure 2. Percent of total municipal solid waste generation by material in 2015



Source: U.S. Environmental Protection Agency, Advancing Sustainable Materials Management: 2015 Fact Sheet, July 2018.

1. Z. Conrad, M.T. Niles, D.A. Neher, E.D. Roy, N.E. Tichenor, L. Jahns, "Relationship between food waste, diet quality, and environmental sustainability." PLoS ONE 13(4): e0195405, April 18, 2018. <https://doi.org/10.1371/journal.pone.0195405>
2. USDA Economic Research Service, The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States, February 2014, p. 11.
3. <https://www.usda.gov/foodwaste/faqs>
4. U.S. Environmental Protection Agency, Advancing Sustainable Materials Management: 2015 Fact Sheet, July 2018.
5. ReFED is a collaboration of over 50 business, nonprofit, foundation, and government leaders committed to reducing food waste in the United States. It was formed in 2015 to create a *Roadmap to Reduce U.S. Food Waste*, the first ever national economic study and action plan driven by multi-stakeholder group committed to tackling food waste at scale.
6. ReFED, *A Roadmap to Reduce U.S. Food Waste by 20 Percent*, 2016, p. 5.

By wasting food, we indirectly waste many other resources and cause environmental, economic, and social problems.

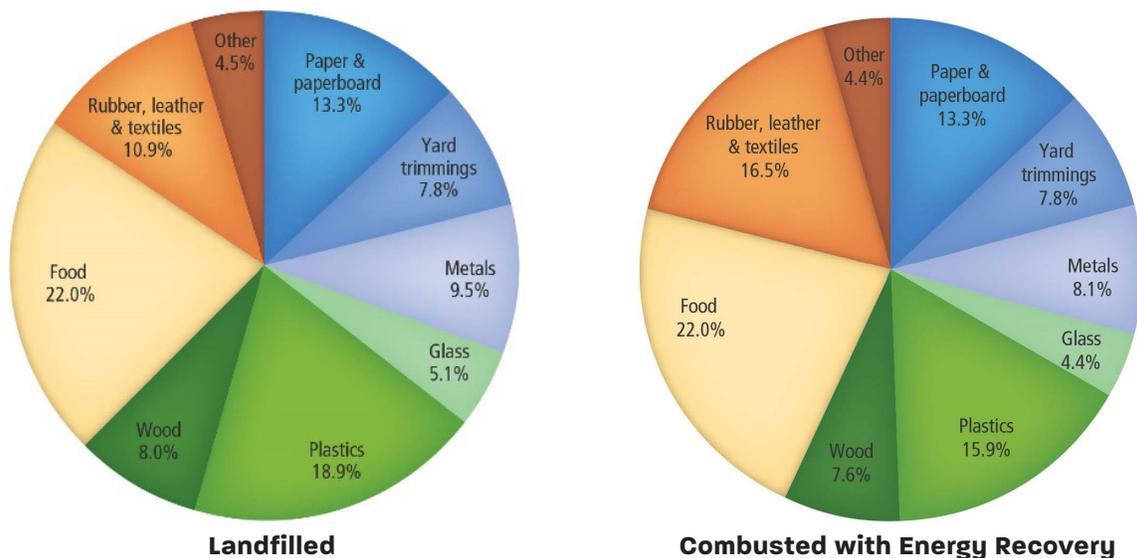
Environmental impacts of food waste

Uneaten food impacts the environment not only after it is discarded, but also at every stage of its production.

Pollutants and emissions contribute to climate change and create health issues

Disposal of food waste is done in many ways, but the most common way is putting the food in the trash. In the United States, only 5.3 percent of food waste is diverted from landfills and incinerators for composting.⁷ “The EPA estimates that more food reaches landfills and incinerators than any other single material in our everyday trash, constituting 22 percent of both combusted and landfilled municipal solid waste,”⁸ as shown in Figure 3.

Figure 3. Percent of municipal solid waste landfilled and combusted with energy recovery in the United States by material, 2015.



Source: EPA, Advancing Sustainable Materials Management: 2015 Fact Sheet, July 2018.

Incinerating food waste is an environmental and health hazard. “A waste incinerator is simply a high-temperature furnace that burns garbage.”⁹ “Incineration is the controlled combustion of solid waste at extremely high temperatures.”¹⁰ Some incinerators include energy extraction from the combustion process.¹¹ Even when energy is extracted from waste, the incineration process produces toxic pollutants, which are detrimental to human health.¹² Harmful air

7. U.S. Environmental Protection Agency, *ibid.*

8. *Ibid.*

9. Eco-Cycle, *Waste-Of-Energy*, September 2011, p. 4.

10. U.S. Environmental Protection Agency, Office of Resource Conservation and Recovery, *Food Waste Management Scoping Study*, April 2014, p. 8.

11. *Ibid.*

12. Salman Zafar, “Negative Impacts of Incineration-Based Waste-to-Energy Technology.” *Alternative Energy News*, September 2008.

pollutants from incinerators adversely affect air, water, and wildlife and contribute to climate change. These pollutants not only lower the quality of air we breathe, causing respiratory problems, but also poison our food by contaminating fish, livestock, and produce that are grown nearby.¹³

Burying food waste in landfills does not bury the problems of food waste. Food buried in landfills negatively impacts the environment for decades. In the United States, 76.3 percent of food waste ends up in landfills.¹⁴ As food decomposes in a landfill, it emits methane, a potent greenhouse gas (GHG) 28 to 34 times more effective than carbon dioxide at trapping heat in the atmosphere over a 100-year period. Over a 20-year period, methane has 84 to 86 times greater global warming potential than that of carbon dioxide.¹⁵ Landfills are the third-largest source of methane emissions in the United States.¹⁶ The Natural Resource Defense Council estimates that food waste is responsible for at least 11 percent of landfill-generated methane emissions.¹⁷ “Food scraps in landfills produce as much emissions as about 3.4 million vehicles and account for about 9 percent of the total GHG footprint of food waste.”¹⁸ “In addition to methane, landfills produce leachate (a mixture of liquid waste, organic degradation byproducts, and rainwater), which may contaminate groundwater if landfills are not properly maintained.”¹⁹

The total GHG footprint of food waste includes not only landfill gas emissions, but also GHG emissions from the production stage to the disposal of all food lost and wasted. “Food waste in the United States is responsible for at least 2.6 percent of all U.S. GHG emissions. That is equivalent to the emissions of more than 37 million passenger vehicles, or 1 in 7 vehicles on the road.”²⁰

Food supply chains cause adverse environmental impacts

Food supply chains, from production to distribution, have various negative environmental impacts.

“Growing crops and raising livestock are the primary causes of ecosystem loss and degradation.”²¹ Agriculture, especially corporate agribusinesses, causes air pollution from heavy machinery use. Agricultural practices, especially monocropping, may also cause soil erosion, nutrient depletion, on- and off-site pollution, deforestation, desertification, and biodiversity loss.²² Food production contributes to water pollution due to the seepage of nutrients, such as manure and fertilizers. It may also lead to sediment transport and deposition downstream.²³

13. Ibid.

14. U.S. Environmental Protection Agency, *ibid*, p. 8.

15. Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Table 8.7 on page 714.

16. U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015*, 2017, p. ES-15.

17. The Natural Resources Defense Council, *Wasted: How America Is Losing up to 40 Percent of Its Food from Farm to Fork to Landfill*. Second edition. August 2017, p. 13.

18. Ibid.

19. USDA Economic Research Service, *The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States*, Economic Information Bulletin, Number 121, February 2014, p. 3.

20. The Natural Resources Defense Council, *ibid*.

21. Searchinger, T. et al. 2013. “The Great Balancing Act.” Working Paper, Installment 1 of *Creating a Sustainable Food Future*. Washington, DC: World Resources Institute. Available online at <http://www.worldresourcesreport.org>.

22. Krista L Thyberg and David J. Tonjes, “Drivers of food waste and their implications for sustainable policy development.” *Resources, Conservation, and Recycling*, Volume 106, January 2016, pp. 110-123.

23 Ibid.

Use of fertilizer and pesticide is a common practice in growing food. About a quarter of all fertilizers used in the United States go into the food that is wasted.²⁴ Fertilizers have negative effects on atmospheric conditions, ecosystems, freshwater and marine systems, and human health.²⁵ When excess fertilizer leaves the field and enters bodies of water, those nutrients cause increased algae growth that leads to oxygen depletion and the death of fish and other aquatic organisms through the process, called eutrophication.²⁶ “Synthetic fertilizer production also consumes enormous amounts of energy.”²⁷ Nearly 780 million pounds of pesticides are used to produce wasted food.²⁸ “Pesticides have been linked to public health effects, development of pesticide resistance in pests, crop losses, bird mortality, groundwater contamination, and more.”²⁹

“Due to the highly diversified nature of the food industry, various food processing, handling, and packaging operations create wastes of different quality and quantity, which, if not treated, could lead to increasing disposal problems and severe pollution problems.”³⁰ During the processing, storing, and transporting of food, a large quantity of energy is used. Such energy use contributes to greenhouse gas (GHG) emissions, especially carbon dioxide emissions.³¹

Wasted resources

When food is wasted, so are the resources that go into producing, processing, transporting, storing, and cooking it. Huge amounts of natural resources are used to get food from seed to fork. Although the production stage requires the largest amount of resource consumption, the longer food remains in the food system, the greater its environmental impact because each stage uses additional resources.

WATER

Water—one of our most precious resources—plays a major role in food production. “We depend [on water] for our lives and our livelihoods, for healthy ecosystems, and a robust economy.”³² “Agriculture is a major user of ground and surface water in the United States, accounting for approximately 80 percent of the nation’s consumptive water use.”³³ Annually, nearly 4.2 trillion gallons of water are used to produce food that is wasted.³⁴ The water footprint



24. The Natural Resources Defense Council, *ibid.*

25. *Ibid.*

26. USDA Natural Resources Conservation Service, *Farmers keeping Nutrients on the Field, Out of Streams.*

27. The Natural Resources Defense Council, *ibid.*

28. Z. Conrad, M.T. Niles, D.A. Neher, E.D. Roy, N.E. Tichenor, L. Jahns, *ibid.*

29. *Ibid.*

30. G.Th. Kroger, “Impact of food processing on the environment—an overview.” *LWT-Food Science and technology*, Volume 28, Issue 6, July 1995, pp.547-552.

31. Fionnuala Murphy, Kevin McDonnell, and Colette C. Fagan, “Sustainability and Environmental Issues in Food Processing.” in *Food Processing: Principles and Applications*, Second Edition. Edited by Stephanie Clark, Stephanie Jung, and Buddhi Lamsal. Published 2014 by John Wiley & Sons, Ltd.

32. EPA, Office of Research and Development, *Safe and Sustainable Water Resources (SSWR) Research Program factsheet*, August 2015.

33. USDA Economic Research Service, *Irrigation and Water Use*, <https://www.ers.usda.gov/topics/farm-practices-management/irrigation-water-use/>

34. Z. Conrad, M.T. Niles, D.A. Neher, E.D. Roy, N.E. Tichenor, L. Jahns, *ibid.*

of specific food items gives a sense of the amount of water used to grow and prepare our daily food. The water footprint measures the direct and indirect amount of water consumed and polluted to produce each food item throughout its full production cycle from the supply chain to the end-user.³⁵ See Table 1.

Table 1. Water footprint of selected food items*

Product	Gallons/Pound**
Apple	99
Tomato	26
Beef	1847
Eggs	395
Lettuce	28
Chocolate	2,061
Rice	299
Potato	34
Potato chips	125
Bread from wheat	193
Butter	665
Chicken meat	518

Source: Water Footprint Network. <http://waterfootprint.org/en/resources/interactive-tools/product-gallery/>

* These are global averages; U.S. water footprints may be different.

**Values converted from liters per kilogram.

Every time we throw away an apple—an average 17 times a year,³⁶ we waste 33 gallons of water.³⁷ When we toss one large egg, it means we are pouring 52 gallons of water down the drain. When we pour one cup of coffee in the sink, we are wasting 70 gallons of water, and it is almost the same for one cup of milk.³⁸ When we throw away processed food, the water footprint is larger. As seen in Table 1, water use almost quadruples when turning potatoes into chips. People are likely unaware that by tossing the crumbled chips at the bottom of the bag, they are wasting several gallons of water.

35. Water Footprint Network. <http://waterfootprint.org/en/water-footprint/what-is-water-footprint/>

36. Divya Abhat, This Is How Much Water You Waste When You Throw Away Food. Smithsonian.com, November 16, 2015.

37. Water Footprint Network. <http://waterfootprint.org/en/resources/interactive-tools/product-gallery/>

38. Ibid.

WHAT'S UP WITH ALL THE WASTED FOOD?

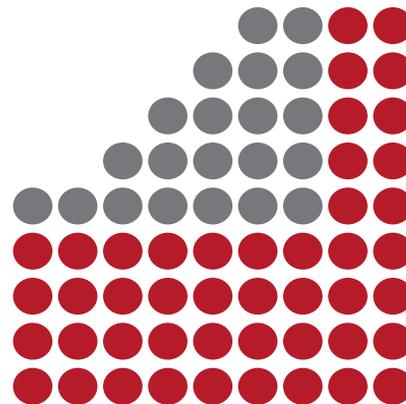
CONSIDER THE TOMATO...

31% of fresh tomatoes bought by U.S. households are thrown out—that's 21 tomatoes a year per person!

\$2.3
BILLION

Throwing out that many tomatoes costs us a bundle—
over \$2.3 billion a year.

If only it was just tomatoes...
the cost of all U.S. household food waste = \$166 BILLION!



WASTED FOOD = WASTED RESOURCES

U.S. FOOD WASTE ACCOUNTS FOR:



By making small shifts in how we shop, store, and prepare food, we can keep the valuable resources used to produce and distribute food from going to waste.

Sources: USDA Economic Research Service(ERS) Total and Per Capita Value of Food Loss in the United State (2012); USDA ERS , The Value of Retail- and Consumer-Level Fruit and Vegetable Losses in the United States (2011); Venkat, The Climate Change and Economic Impacts of Food Waste in the United States (2012); Hall et al, The Progressive Increase of Food Waste in America and Its Environmental Impacts (2009)



EPA-530-16-F-014-H
February 2016

ENERGY

“The U.S. food system accounted for 15.7 percent of total U.S. energy consumption in 2007.”³⁹ Every stage of the food system uses energy. The production and processing stages consume the most energy, followed by transportation, storage, and distribution. Even after food arrives at our homes, we use a significant amount of energy to refrigerate and cook it. In fact, food comes second to heating and cooling in an average American family’s energy use.⁴⁰ Energy, in any form, is not cheap. Consuming energy to produce, transport, store, and cook food that ends up in the trash is like burning piles of dollar bills.

LAND

About 28 percent of the world’s agricultural land, equivalent to 5.4 million square miles, is used to grow food that is wasted.⁴¹ This is larger than the land area of the entire United States. Within the United States, 18 and 28 percent of our cropland is used to grow food that is ultimately not eaten. It is at least the size of New Mexico.⁴² Land is a limited natural resource with several competing uses. As the world’s population increases, pressure to develop agricultural land also increases. On the other hand, there is demand for more farmland to feed the growing population. To meet the demand, we open natural areas to agricultural use, which may result in biodiversity loss, natural ecosystem loss, and overall ecological degradation.⁴³

Economic impacts of food waste

The Food and Agriculture Organization of the United Nations (FAO) calculated the annual economic costs of global food waste as \$1 trillion. FAO also calculated the externalities associated with the environmental impacts of food waste as \$700 billion a year and the social costs associated with natural resource degradation as \$900 billion a year.⁴⁴



39. USDA ERS, Fuel for Food: Energy Use in the U.S. Food System, Amber Waves, September 1, 2010.

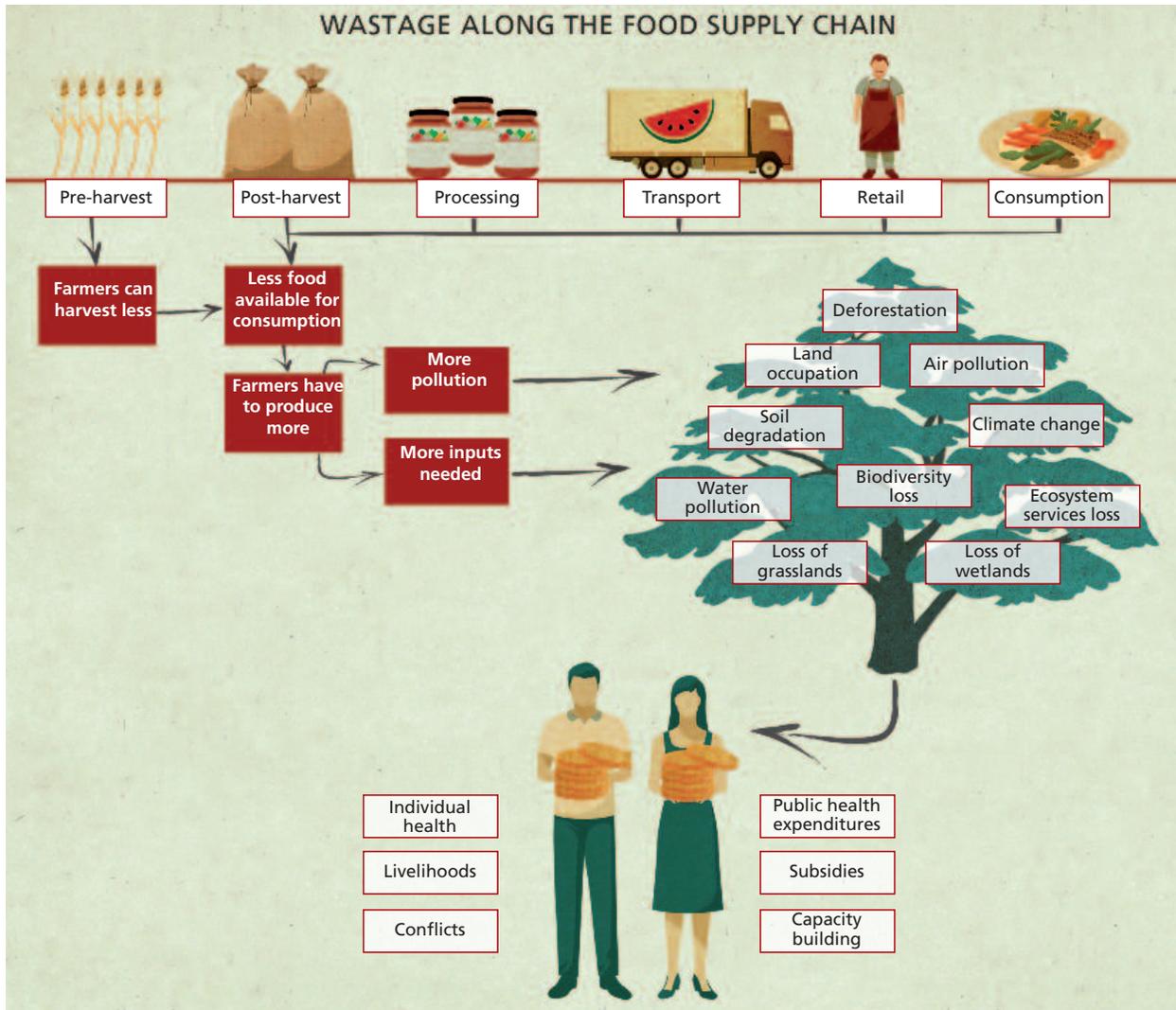
40. Jonathan Bloom, *American Wasteland*. Cambridge, MA, De Capo Press, 2011., pp. 19-20.

41. Food and Agriculture Organization of the United Nations, Food Wastage Footprint: Impact on Natural Resources, Summary Report, 2013, p. 37.

42. The Natural Resources Defense Council, *ibid*, p. 13.

43. Krista L Thyberg and David J. Tonjes, *ibid*.

44. Food and Agriculture Organization of the United Nations (FAO), Food Wastage Footprint: Full Cost Accounting. 2014.



Source: Food and Agriculture Organization of the United Nations (FAO), Food Wastage Footprint: Full Cost Accounting. 2014.

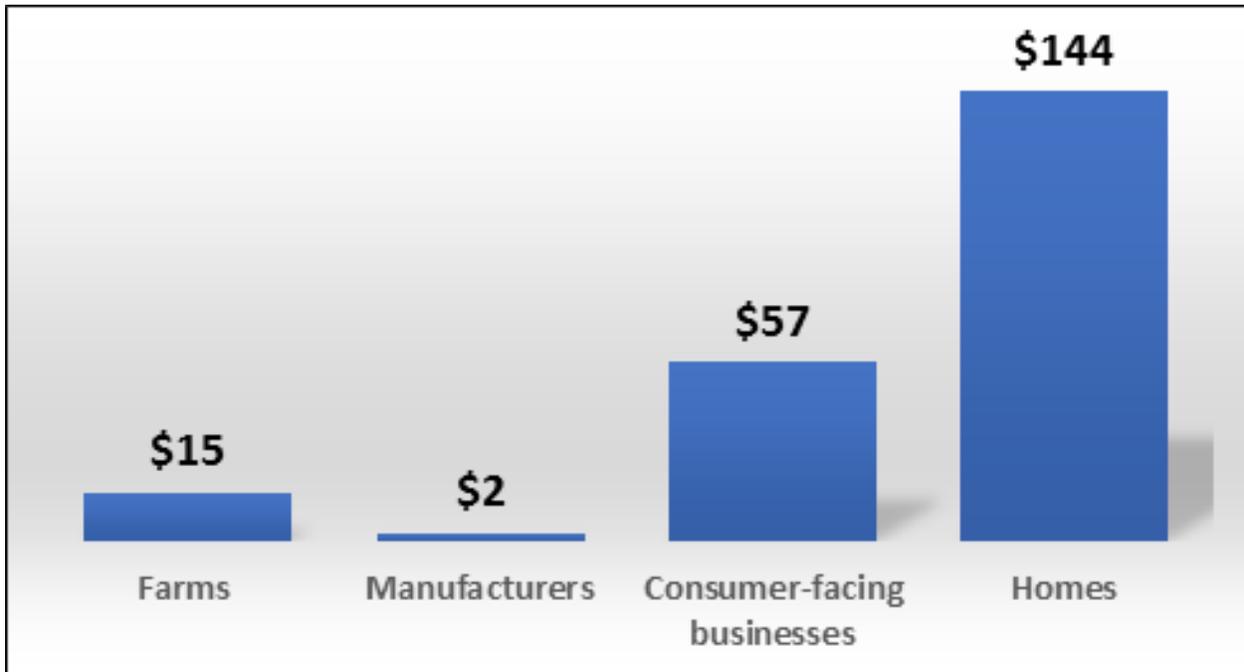
In the United States, it costs \$218 billion each year to grow, process, transport, and dispose of food that is never eaten. This is 1.3 percent of the Gross Domestic Product of the country.⁴⁵ The financial cost of food waste is the most for consumers because of the high volumes of uneaten food and higher retail prices. Figure 4 shows the cost of food waste for producers and consumers. The cost of food waste is approximately \$450 per person each year.⁴⁶ Another estimate is that an average family of four is spending \$2,264.60 annually on wasted food based on 25 percent loss rate (15 percent rate of waste yields to \$1,350).⁴⁷ Food waste has a significant impact on household budgets. Every time a spoiled banana is thrown in the trash or spoiled milk is poured in the drain, so is the money spent on them.

45. ReFED, *ibid.*, p. 10.

46. This number was calculated based on the ReFED estimates and published in The Natural Resources Defense Council, *ibid.*, p. 48.

47. Jonathan Bloom, *ibid.*, pp. 24 and 318. This estimate is calculated based on USDA's low-cost plan weekly food spending amount of \$174.20.

Figure 4. Annual cost of food waste in the United States (in billions)



Source: ReFED, *A Roadmap to Reduce U.S. Food Waste by 20 Percent*, 2016.

Waste happens throughout the food chain and causes price increases. For the most part, it is the consumers who pay for it. A federal report on food waste prepared by the General Accounting Service in 1977 clearly states: “Consumers ultimately bear the cost of losses in the form of higher prices. This is due to factoring anticipated loss into cost and hence, the pricing structure.”⁴⁸ Supermarkets include the cost of waste into their shrink budget, which also includes theft and damage. For restaurants, it is calculated as part of “food cost.”⁴⁹ Food waste is not a visible line item but is certainly included in all budgets. Only when it is eliminated or reduced, will the impact be noticeable.

Leanpath’s ValuWaste System is a tool for commercial kitchen operators to calculate the cost of food wasted in their kitchens. The system estimates pre-consumer kitchen waste, which is usually between 4 and 10 percent.⁵⁰ This waste, together with consumer discards, reduces the profit of consumer-facing businesses. Additionally, removing food waste, including collecting, hauling, and disposing fees, is expensive. Tipping fees at landfills are generally higher than composting facilities. When commercial kitchens send their waste for composting, their reason is more economics than environmental concerns.⁵¹

Social impacts of food waste

There is a paradox between food waste and hunger. While huge quantities of perfectly edible food is being wasted, millions of people suffer from food insecurity. Food insecurity means not always being able to access enough nutritious and safe food to support a healthy life because of limited or uncertain access to adequate food at any point throughout a year.⁵²

48. General Accounting Office, *Food Waste: An Opportunity to Improve Resource Use*. September 16, 1977, p. 46.

49. Jonathan Bloom, *ibid.*, p. 26.

50. *Ibid.*, pp. 28-29.

51. *Ibid.*, p. 30.

52. USDA ERS, Ranges of food security and insecurity. www.ers.usda.gov.

It is estimated that in the United States alone more than 60 million tons of edible food is wasted yearly, while more than 41 million Americans live in food-insecure households. As of 2016, 12.9 percent of people in the United States are estimated to be food insecure.⁵³ This percentage is 11.1 percent for Maryland, where 665,420 people are food insecure.⁵⁴ The food insecurity rate for Prince George's County residents is 14.4 percent, higher than both the state's and the nation's rates. There are 128,650 County residents who are food insecure.⁵⁵ "Numerous studies have shown that food insecurity increases the risk of a range of health and psychosocial problems among children, adolescents, and adults."⁵⁶ As a result, health care costs increase.

"When converted into calories, global food loss and waste amounts to approximately 24 percent of all food produced. Essentially, one out of every four food calories intended for people is not ultimately consumed."⁵⁷ According to the Johns Hopkins University researchers, food wasted at the retail and consumer levels in the U.S. in 2012 could provide 2,000 calories daily to 84 percent of the adult population.⁵⁸ Just the daily dietary fiber loss was "23 percent of the Recommended Dietary Allowance (RDA) for women. This is equivalent to the fiber RDA for 74 million adult women. Adult women in 2012 under-consumed dietary fiber by 8.9 gram/day, and the amount of wasted fiber is equivalent to this gap for 206.6 million adult women."⁵⁹

It is estimated that if the world's food waste could be halved, the rescued food would amount to enough food to feed one billion additional people in the world, which is more than the number of undernourished people.⁶⁰ Recovering and redistributing only 30 percent of food that goes to waste in the United States could provide enough food to feed all the food insecure Americans.⁶¹ The root of the problem is not the lack of food, but rather the inequity in food distribution. It is morally wrong to let millions of Americans go hungry when millions of tons of food are put in the trash. Even though equitable distribution may require social action and careful logistics, it is a moral imperative for everyone to be mindful about wasting food. The social cost of food waste can only be prevented through the awareness and actions of individuals. As the food waste expert Jonathan Bloom suggests, "[W]e should strive to avoid [food waste] as much as is humanly possible. We can be mindful of all that went into growing, shipping, and preparing our food and remember that there are those who go without enough to eat. Then, we should act accordingly."⁶²



53. Feeding America, Map the Food Gap. <http://map.feedingamerica.org>.

54. Ibid.

55. Ibid.

56. National Research Council, *A Framework for Assessing Effects of the Food System*. Washington, DC: The National Academies Press, 2015, p. 198.

57. Lipinski, B. et al. "Reducing Food Loss and Waste." Working Paper, Installment 2 of Creating a Sustainable Food Future. Washington, DC: World Resources Institute, 2013, p. 1.

58. M.L. Spiker, H.A.B. Hiza, S.M. Siddiqi, and R. Neff, "Wasted Food, Wasted Nutrients: Nutrient Loss from Wasted Food in the United States and Comparison to Gaps in Dietary Intake." *Journal of the Academy of Nutrition and Dietetics*, Volume 117, Issue 7, July 2017.

59. Ibid.

60. The Natural Resources Defense Council, *ibid.*, p. 12.

61. Harvard Food Law and Policy Clinic, Opportunities to Reduce Food Waste in the 2018 Farm Bill, May 2017.

62. Jonathan Bloom, *ibid.* p. 39.

National and State of Maryland's efforts to reduce food waste

Increased awareness of wasted food and its impact on the environment, economy, and society in the past decade urged the federal government and some organizations to do more research and develop solutions to reduce food waste.

Federal food waste policy

There are several federal laws related to food waste. The ones that help reduce food waste are mostly related to food donations. The federal government also regulates feeding food scraps to animals. The recently enacted Farm Bill includes broader provisions to reduce food loss and waste.

Food donations

Liability Protection

BILL EMERSON GOOD SAMARITAN FOOD DONATION ACT OF 1996

The Bill Emerson Good Samaritan Food Donation Act (Bill Emerson Act) provides a federal baseline of civil and criminal liability protections for those who donate apparently wholesome food to nonprofit organizations for ultimate distribution to needy individuals. Except in cases of gross negligence or intentional misconduct, those who make good faith donations and the nonprofit organizations that receive and distribute donated food are exempt from liability for injuries arising from the consumption of donated food. The 2018 Farm Bill amends the Bill Emerson Act to extend the same liability protection to “qualified direct donors”¹ who directly donate food to individuals in need. The Bill Emerson Act does not waive or otherwise modify any applicable federal, state, or local health and safety regulations.

Tax Incentives

INTERNAL REVENUE CODE 170(E)(3)

The Internal Revenue Code provides a tax deduction to businesses to encourage donations of apparently wholesome food to qualified nonprofit organizations serving the poor and needy. Businesses that meet certain criteria are eligible for an enhanced tax deduction that exceeds the property's basis for donated food. Businesses that are not eligible to claim enhanced deduction can still claim a general tax deduction for donating food in the amount of the property's basis.

1. Qualified direct donor means a retail food store, wholesaler, agricultural producer, restaurant, caterer, school food authority, or institution of higher education.

Donation Encouragement

FEDERAL FOOD DONATION ACT OF 2008

The purpose of the Federal Food Donation Act is to encourage executive agencies and their contractors, to the maximum extent practicable and safe, to donate excess food. The act requires all contracts above \$25,000 for the provision, service, or sale of food in the United States, or for the lease or rental of federal property to a private entity for events at which food is provided, to include a clause that encourages the donation of excess, apparently wholesome food to nonprofit organizations that assist food-insecure people. The act clarifies that the executive agency is not responsible for the costs and logistics of donating food, and both the executive agency and the contractor making donations have liability protections under the Bill Emerson Good Samaritan Food Donation Act.

Animal feed

The federal government regulates the use of food scraps in animal feed by setting requirements, based on the type of animals that may be fed food scraps and the kind of food scraps that may be fed to animals. The federal regulations on feeding food scraps to animals are found in the following legislation:

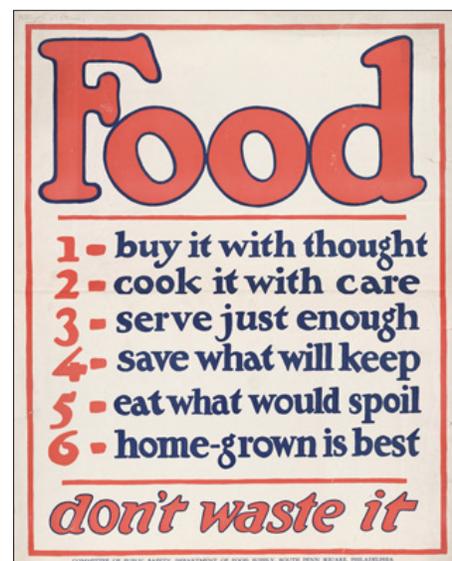
- Swine Health Protection Act
- Ruminant Feed Ban Rule
- Food Safety Modernization Act rules on preventive controls
- Food Drug & Cosmetic Act provisions regarding adulteration and misbranding

Under federal law, food scraps can generally be fed to animals, so long as they are heat-treated if they contain meat or animal products. States can maintain these federal standards or go above the federal floor to develop stricter laws on feeding leftovers to livestock.²

2018 Farm Bill³

The Agriculture Improvement Act of 2018 (2018 Farm Bill) includes measures to prevent food waste, increase food recovery, promote food waste recycling, and better coordinate food waste reduction efforts across the federal government. The 2018 Farm Bill is the first U.S. Farm Bill to provide dedicated programming, resources, and efforts to reduce food loss and waste. This shows that the Congress recognizes the importance of the food waste issue. Key provisions related to food waste include:⁴

- Funding for efforts to improve and extend the storage life of specialty crops that would prevent spoilage.
- Establishment of the Local Agriculture Market Program, which provides grants for new business opportunities and marketing strategies to reduce on-farm food waste.



Source: USDA

2. Harvard Food Law and Policy Clinic and University of Arkansas School of Law, Leftovers for Livestock: A Legal Guide for Using Food Scraps as Animal Feed, August 2016.

3. H.R. 2/S.3042-Agriculture Improvement Act of 2018, 115th Congress.

4. See Appendix 2 for more detail on these provisions.

- Clarification of liability protections for food donations and enabling certain donors to donate food directly to individuals in need.
- Funding to states to reduce food waste at the agricultural production, processing, or distribution levels through the donation of food.
- Creation of a new milk donation program aimed at encouraging milk producers and processors to donate surplus milk to food recovery organizations and reducing food waste.
- Funding to support pilot projects in at least 10 states to develop and implement municipal compost plans and food waste reduction plans.
- Funding to educate agricultural producers and stakeholders about aggregation of organic waste from multiple sources into a single biogas system.
- Establishment of Food Loss and Waste Liaison to coordinate federal programs aimed at measuring and reducing food loss and waste and conduct a study on food waste.

Proposed federal legislation

Three bills have been introduced in recent years to help reduce food waste but have not yet been enacted. Some provisions of these proposed bills were incorporated in the 2018 Farm Bill.

FOOD DATE LABELING ACT OF 2016⁵

This bill addresses the confusion over the meaning of various date labels by establishing a standardized labeling system that distinguishes between “best if used by” to indicate food quality and “expires on” to warn that food may be unsafe to eat after that date. The bill also ensures that food is allowed to be sold or donated after its quality date and requires federal agencies to provide consumer education on date labels.



FOOD RECOVERY ACT OF 2017⁶

This is a comprehensive bill to reduce food waste on all levels. It provides funding for a national awareness campaign about wasted food, reducing food waste at schools and farms, and installing composting and waste-to-energy facilities. It expands tax deductions for food donations, increases liability protection, requires federal food service contractors to donate surplus food, and standardizes date labeling on food. It also establishes a Food Recovery Liaison within USDA and directs USDA to do research to prevent food waste.

FOOD DONATION ACT OF 2017⁷

This bill amends the Bill Emerson Good Samaritan Food Donation Act to clarify some of the ambiguous terms, promote awareness of the act, and expand the liability protections for the donation of food.

5. H.R. 5298-Food Date Labeling Act of 2016, 114th Congress.

6. H.R. 3444-Food Recovery Act of 2017, 115th Congress.

7. H.R. 952-Food Donation Act of 2017, 115th Congress.

Federal government initiatives

Reducing food loss and waste has been a major concern of the federal government in the past decade. To address this concern, various initiatives have been launched primarily by USDA and EPA and to a certain extent, the U.S. Food and Drug Administration (FDA). Federal initiatives about food waste are listed below, and major ones are briefly described. More detailed information on federal government initiatives may be found in Appendix 3.

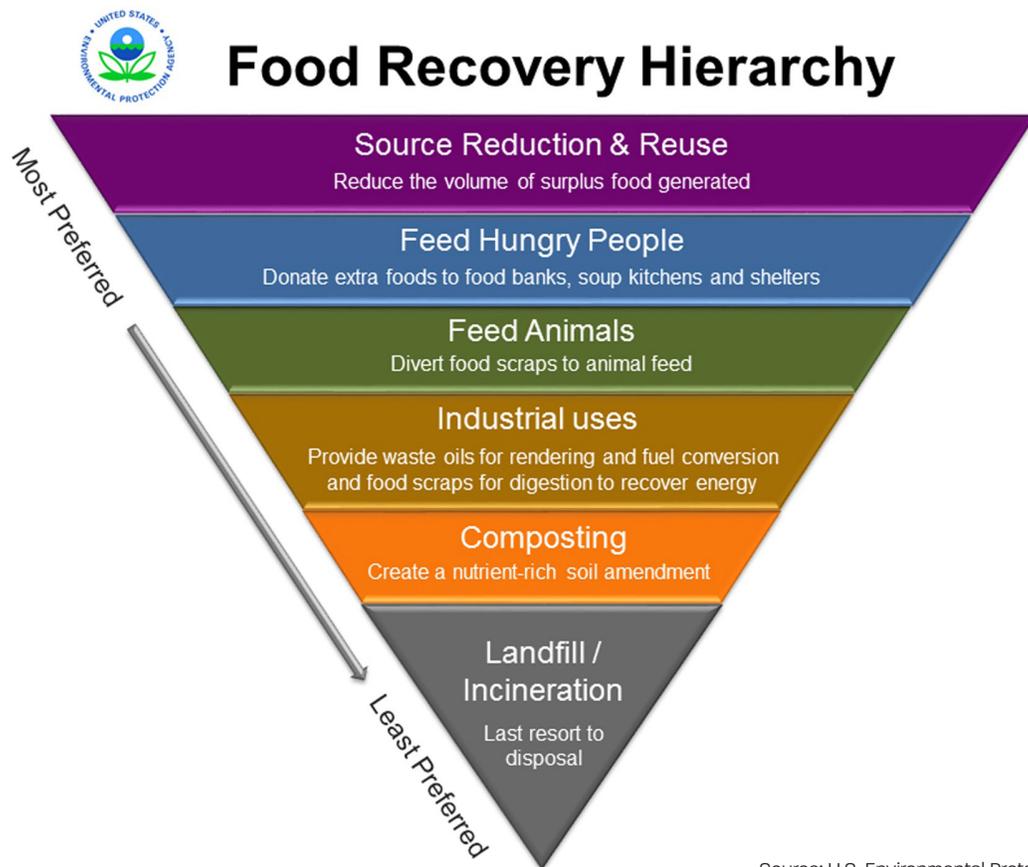
Food Recovery Challenge⁸

The Food Recovery Challenge was launched by the EPA in 2011 to help businesses and organizations track their food waste reduction activities.

Food Recovery Hierarchy

“The Food Recovery Hierarchy prioritizes actions organizations can take to prevent and divert wasted food. Each tier of the Food Recovery Hierarchy focuses on different management strategies for wasted food. The top levels of the hierarchy are the best ways to prevent and divert wasted food because they create the most benefits for the environment, society, and the economy.”⁹

Figure 6. EPA Food Recovery Hierarchy



Source: U.S. Environmental Protection Agency

8. U.S. Environmental Protection Agency, Sustainable Management of Food, Food Recovery Challenge (FRC) (<https://www.epa.gov/sustainable-management-food/food-recovery-challenge-frc>).

9. U.S. Environmental Protection Agency, Sustainable Management of Food, Food Recovery Hierarchy (<https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy>). U.S. Department of Agriculture, Food Loss and Waste (<https://www.usda.gov/foodlossandwaste>).

U.S. Food Waste Challenge¹⁰

The U.S. Department of Agriculture (USDA) and EPA in 2013 launched the U.S. Food Waste Challenge to raise awareness about food loss and waste and provide a platform to disseminate information on best practices. They called on entities across the food chain to join efforts to reduce, recover, and recycle food waste.

U.S. 2030 Food Loss and Waste Reduction Goal¹¹

In 2015, USDA and EPA announced a goal to reduce food waste going to landfills by 50 percent by 2030.

U.S. Food Loss and Waste 2030 Champions¹²

This USDA-EPA initiative was launched to motivate businesses and organizations to make a public commitment to reduce food loss and waste in their own operations to achieve the national goal.

Further with Food

EPA and USDA, in collaboration with 10 organizations and funding from the Rockefeller Foundation, launched the virtual resource center Further with Food (furtherwithfood.org). “Further with Food provides comprehensive information about food loss and waste in the United States and about solutions dedicated to reducing it.”¹³ Every part of the EPA’s Food Recovery Hierarchy is represented as are all segments of the economy. Anyone with information that warrants sharing on a national website is welcome to submit their materials for review and uploading.

Winning on Reducing Food Waste¹⁴

Launched in October 2018 by USDA, EPA, and FDA to improve coordination among federal agencies to better educate Americans on the impacts and importance of reducing food loss and waste.

Other USDA and EPA activities to reduce food loss and waste

Other USDA food loss and waste reduction activities include:

- Consumer education about food loss and waste.
- Recover or recycle food that cannot make the marketplace.
- Minimize food waste in the school meals program.
- Grant programs for food waste reduction, reuse, and recycle.
- Research and innovation for reducing food waste.

10. U.S. Department of Agriculture, Food Loss and Waste (<https://www.usda.gov/foodlossandwaste>).

11. U.S. Environmental Protection Agency, Sustainable Management of Food, United States 2030 Food Loss and Waste Reduction Goal (<https://www.epa.gov/sustainable-management-food/united-states-2030-food-loss-and-waste-reduction-goal>).

12. U.S. Department of Agriculture, Food Loss and Waste (<https://www.usda.gov/foodlossandwaste>).

13. <https://furtherwithfood.org/about-this-site/>

14. U.S. Department of Agriculture, Media, Press Release, Trump Administration Launches “Winning on Reducing Food Waste” Initiative.

Other EPA activities for preventing and diverting food waste include:

- Food: Too Good to Waste
- EPA Excess Food Opportunities Map
- Resources for assessing wasted food
- Tip sheets for food loss prevention
- Food Tips for K-12 Schools: Get Kids to Eat More and Waste Less
- The EPA website (www.epa.gov) has a wealth of information and additional resources, including:
 - › Reducing food waste at home
 - › Donating food
 - › Composting at home
 - › Waste Reduction Model (WARM)
 - › Managing and transforming waste streams
 - › Webinars on sustainable management of food

Initiatives by national organizations

There are numerous national organizations (nonprofits, alliances, educational or research institutions, and charities) working to reduce, recover, and recycle food waste in the United States. Some of these entities focus on research and policy development and create recommendations that can be broadly implemented. Some are industry alliances focusing on changing their practices to reduce food waste. Those that focus on food recovery are primarily hunger relief organizations. They are combining their main goal of feeding hungry people with reducing wasted food by recovering perfectly edible excess food to achieve their goals. There are also organizations that focus on food waste recovery, some of which are promoting composting, others focus on anaerobic digestion and biogas or biofuel.

Only a few major organizations' efforts in reducing food waste are briefly summarized below. The organizations covered here mostly work on research and policy development related to food waste. Examples from organizations that are actively involved in food recovery and recycling are also included. A more detailed description of some of the organizations may be found in Appendix 4.

ReFED¹⁵

ReFED is one of the nation's leading entities working on combating food waste. It is a collaboration of more than 50 private, nonprofit, and public sector leaders. ReFED was formed to create *A Roadmap to Reduce U.S. Food Waste by 20 Percent*.

A ROADMAP TO REDUCE U.S. FOOD WASTE BY 20 PERCENT (ROADMAP)¹⁶

The Roadmap was developed to identify the most cost-effective solutions to cut food waste. It shows 27 solutions identified by ReFED to achieve a 20 percent reduction of food waste within a decade. These solutions were grouped using the EPA Food Recovery Hierarchy, which prioritizes prevention first, then recovery, and finally recycling:

15. The name ReFED is derived from Rethink Food Waste through Economics and Data.

16. ReFED, *A Roadmap to Reduce U.S. Food Waste by 20 Percent*, 2016.



Prevention

1. Standardized date labeling
2. Packaging adjustments
3. Spoilage prevention packaging
4. Produce specifications (integrating the sale of “imperfect produce”)
5. Smaller plates
6. Trayless dining
7. Waste tracking and analytics
8. Cold chain management
9. Improved inventory management
10. Secondary resellers
11. Manufacturing line optimization
12. Consumer education campaigns



Recovery

13. Donation matching software
14. Donation storage and handling
15. Donation transportation
16. Value-added processing
17. Donation liability education
18. Standardized donation regulation
19. Donation tax incentives



Recycling

20. Centralized anaerobic digestion (AD)
21. Water resource recovery facility with AD
22. In-vessel composting
23. Commercial greywater
24. Community composting
25. Centralized composting
26. Animal feed
27. Home composting

Implementing the Roadmap is projected to divert 13 million tons from landfills and on-farm losses annually while generating 15,000 new jobs, double recovered food donations to nonprofits (1.8 billion meals per year), reduce up to 1.5 percent of freshwater use (1.6 trillion gallons per year), and avoid nearly 18 million tons of greenhouse gas emissions annually. Additionally, the Roadmap estimates \$1.9 billion annual business profit potential and \$5.6 billion annual consumer savings.

The Roadmap requires an \$18 billion investment to yield an expected \$100 billion in economic value over a decade. Policy adjustments, key technology and business-model innovations, and education are also needed to implement the Roadmap.

ReFED developed stakeholder-specific action guides for retail, foodservice, restaurant, and foundation leaders to drive food waste reduction. Other ReFED-developed reports and tools include:

- 2018 U.S. Food Waste Investment Report
- The Food Waste Innovator Database
- U.S. Food Waste Policy Finder

Natural Resource Defense Council (NRDC)¹⁷

NRDC is a nonprofit organization that conducts research and develops policy to make America's food system more efficient and less wasteful. Its 2012 report, *Wasted: How America is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*,¹⁸ sparked a national interest in reducing food waste. In 2017, NRDC released an updated version of the report¹⁹ showing America's progress and recommending what to do to reduce food waste. NRDC's food waste work focuses on two policy solutions: empowering cities to prevent, rescue, and recycle food waste and driving deferral action to reduce food waste. NRDC published numerous reports, issue briefs, and fact sheets on food waste.

After the federal government announced its food loss and waste reduction goal of 50 percent by 2030, NRDC developed 10 strategies to provide direction to governments, businesses, and the philanthropic sector for pursuing this ambitious goal:²⁰

1. Engage and educate consumers
2. Catalyze food-industry involvement
3. Collect and share better data
4. Measure and reduce farm losses
5. Standardize food expiration dates
6. Scale food-recovery capacity
7. Expand recycling of food scraps
8. Foster entrepreneurship and innovation
9. Mobilize public and private financing
10. Enhance coordination

In 2016, NRDC teamed up with the Ad Council to launch a national public service campaign, "Save the Food."²¹ The campaign focused on educating consumers, who collectively are the largest source of wasted food. The goal is to reduce the food waste at the consumer level while helping to save money, water, and energy.

17. www.nrdc.org

18. Dana Gunders, *Wasted: How America is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*, NRDC Issue Paper IP: 12-06-B, August 2012.

19. Dana Gunders and Jonathan Bloom, *Wasted: How America is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*, Second Edition, NRDC Report R: 17-05-A, August 2017.

20. National Call to Action! 10 Strategies for Achieving U.S. Food Waste Reduction Goals. NRDC Fact Sheet, FS-16-08-B, September 2016.

21. <https://savethefood.com/>

NRDC recently announced a new partnership with the City of Baltimore to tackle food waste. Baltimore, following Denver, has become the second city to be a part of NRDC's Food Matters project funded by the Rockefeller Foundation.²² As part of this effort, Baltimore released a Food Waste Recovery Strategy, to reduce food waste by 50 percent (residential food waste by 80 percent) by 2040.

Harvard Law School Food Law and Policy Clinic²³

The Food Law and Policy Clinic (FLPC), provides legal and policy guidance to federal, state, and local governments seeking solutions to a variety of food system related issues, including reducing waste of healthy, wholesome food. Additionally, FLPC performs research; conducts webinars; and publishes reports, legal guides, and fact sheets on topics related to food law and policy, including a dozen on food loss and waste. FLPC's research report on Maryland's food system, *A Review of Food System Policies in Maryland*,²⁴ has a section on recovering food with information and suggestions on liability protection, tax incentives, wasted food in schools, date labels and food safety, and food recovery infrastructure and awareness.

Food Waste Reduction Alliance²⁵

The Food Waste Reduction Alliance (FWRA) was collectively established in 2011 by the Grocery Manufacturers Association, the Food Marketing Institute, and the National Restaurant Association to reduce the volume of food waste sent to landfills. Working collaboratively across sectors, the FWRA seeks to reduce the amount of food waste generated, increase the amount of safe, nutritious food donated to those in need, and recycle unavoidable food waste, diverting it from landfills. To achieve these goals, FWRA focuses on measuring food waste, emerging solutions and best practices, policy, and communication and stakeholder outreach.

Feeding America²⁶

Feeding America is the nation's largest hunger-relief organization. It is a nationwide network of 200 food banks and 60,000 food pantries and meal programs that feeds 46 million people at risk of being hungry. It is also a major food rescue organization. Feeding America network members work with farmers, food manufacturers and distributors, and consumer-facing businesses to gather food before it goes to waste. Last year, they rescued 3.5 billion pounds of food. To maximize effectiveness, Feeding America developed ways to gauge demand from individual food banks, safely ship food long distances, and keep food fresh longer once it reaches a food bank.

Food Recovery Network²⁷

The Food Recovery Network (FRN) is the largest student-led movement against food waste and hunger in the United States. As a national network of college students, food businesses, and hunger-fighting nonprofits, FRN connects food-insecure communities with surplus food. The movement began at the University of Maryland, College Park in 2011 and has grown into

22. Elizabeth Balkan, Waste to Wealth: Baltimore Takes the Lead on Food Waste. NRDC Expert Blog. September 5, 2018. <https://www.nrdc.org/experts/elizabeth-balkan/waste-wealth-baltimore-takes-lead-food-waste>

23. www.chlpi.org/food-law-and-policy

24. Harvard Law School Food Law and Policy Clinic, *A Review of Food System Policies in Maryland*, September 2017.

25. <https://foodwastealliance.org>

26. www.feedingamerica.org

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

a national network of 230 chapters in 44 states. FRN has donated 3.4 million pounds of food that otherwise would have gone to waste. That is 2.7 million meals for those in need. FRN chapters recover food from campus cafeterias and donate them to its network partners. FRN network includes more than 300 partner agencies. These hunger-fighting nonprofits receive food from FRN and serve it to community members, free of charge. FRN launched a certification program, Food Recovery Certified (FRC) to recognize businesses that recover food at least once a month to fight hunger.

US Composting Council²⁸

The US Composting Council (USCC) is a national nonprofit organization dedicated to the development, expansion, and promotion of the composting industry. It is involved in research, public education, establishment of standards, promotion of best management practices, expansion of compost markets, and the enlistment of public support. USCC provides resources, educational materials, and training and professional networking for those affiliated with the compost manufacturing and organics recycling industry. USCC members include compost producers, marketers, generators of organic residues, policy makers, regulators, equipment manufacturers, product suppliers, academic institutions, public agencies, nonprofit groups, and consulting/engineering firms. *BioCycle* is the official magazine of USCC. They offer two certifications in composting.

Institute for Local Self-Reliance (ILSR)²⁹

ILSR is the leading national organization that promotes composting. It is an organization that empowers communities in many areas. Their Composting for Community program helps develop neighborhood composting enterprises. ILSR promotes community composting to create jobs, enhance soils, protect the climate, and reduce food waste. It provides research, resources, training, and guidance on best management practices, and helps with legal and policy issues. ILSR established Community Composter Coalition, a national network of community composters to learn from each other and encourage more composting sites.

State of Maryland's efforts

There have been several efforts to reduce food waste that goes into the landfill by the state government. Laws and regulations pertaining to food waste include:

Maryland Recycling Act

“In 1988, the Maryland Recycling Act (MRA) authorized the Department of the Environment (MDE) to reduce the disposal of solid waste in Maryland through management, education and regulation.”³⁰ MRA requires jurisdictions with populations of more than 150,000 to recycle 35 percent of their waste. Food waste counts toward the MRA recycling rate.³¹

Liability Protection for Food Donations³²

Maryland provides civil liability protection for food donors (including nonprofits, corporations, organizations, associations, and distributors) as long as no act or omission amounts to gross

28. <https://compostingcouncil.org>

29. <https://ilsr.org>

30. Maryland Department of the Environment, FAQ, What is the Maryland Recyclign Law? <https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Pages/faqs.aspx#1>

31. Ibid.

32. Harvard Law School Food Law and Policy Clinic, A Review of Food System Policies in Maryland, September 2017.

negligence or willful and wanton misconduct. Under the law,³³ Maryland's liability protections only apply when the food is given away for free to end recipients. Maryland's current liability protections do not extend beyond those provided in the federal Bill Emerson Good Samaritan Food Donation Act.

HB 817 (2011) Environment-Composting

This bill requires MDE to maintain information on its website to educate the public about composting to promote composting in the state. The bill also directs MDE, in consultation with the Maryland Department of Agriculture (MDA) and Maryland Environmental Service (MES), to study composting in the state and make recommendations to promote composting.

COMPOSTING WORKGROUP

MDE convened a Composting Workgroup that included representatives from MDA, MES, the composting industry, local governments, and other stakeholders as directed by the legislation. The workgroup identified regulatory and non-regulatory barriers to increasing composting in the state. Based on best practices, it also identified actions that should be taken to promote composting in Maryland. In January 2013, the workgroup released the Composting Workgroup Final Report,³⁴ which includes its findings and 15 recommendations to help reduce barriers to responsible composting.

HB 1440 (2013) Recycling-Composting Facilities

This bill requires MDE to adopt regulations to implement specified provisions, including establishing conditions on the operation and construction of composting facilities; establishes a permit system for composting facilities; and excludes specified materials from the definition of solid waste.

HB 983 (2016) Public Schools-Food Recovery Programs-Authorization

This bill grants county boards of education the authority to develop and implement food recovery programs for schools under their jurisdiction. County boards were also granted the authority to apply for recognition of their food recovery program under any food recovery certification program.

Executive Order 01.01.2017.13 Waste Reduction and Resource Recovery Plan for Maryland

Governor Hogan signed an executive order to replace the Zero Waste initiative with the Waste Reduction and Resource Recovery Plan for Maryland. The Executive Order:

- Adopts a sustainable materials management (SMM) policy for Maryland that aims to minimize the environmental impacts of the materials' use throughout the entire lifecycle.
- Emphasizes environmentally and economically sustainable methods to capture and reuse resources.
- Initiates a stakeholder consultation process to establish goals and to ensure tracking of complete materials management data.
- Builds new partnerships across state and local agencies for SMM to support innovative recycling and resource recovery businesses, promote methods of recovering energy

33. 8 M.D. Code, Cts. & Jud. Proc. § 5-634; M.D. Code, Health—Gen. § 21-322.

32. [https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/Publications/composting_workgroup_final_report_1-2013000%20\(1\).pdf](https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/Publications/composting_workgroup_final_report_1-2013000%20(1).pdf)

from waste, including anaerobic digestion, and conduct targeted outreach campaigns to reduce disposal of identified key recyclable materials.

MDE's draft recommendations to fulfill the goals and metrics portion of this Executive Order includes 60 percent voluntary food scrap recycling rate goal. In 2016, the food scrap recycling rate was 15 percent.³⁵

HB 171/SB 99 (2017) Department of the Environment Yard Waste and Food Residuals Diversion and Infrastructure Study

This bill requires MDE to study, review, explore, identify, and make recommendations regarding organic waste diversion and infrastructure in the state by consulting individuals and evaluating laws and regulations of other states.

Yard Waste, Food Residuals, and Other Organic Materials Diversion and Infrastructure Study Group

MDE established a study group composed of a variety of public and private stakeholders to meet the requirements of HB 171. The study group is still working on developing its final recommendations to be submitted in July 2019. In its interim report,³⁶ the study group summarized its work through June 2018, which includes review and discussion on:

- Maryland laws and regulations governing the diversion of organics.
- Existing infrastructure for composting, anaerobic digestion, and food donation.
- Number, geographic distribution, and estimated tons of generation for large generators of food scraps.
- Comparison of Maryland's infrastructure and quantities of organics diverted with those of selected states.
- Current process for permitting anaerobic digestion facilities.
- Laws and regulations governing the diversion of organic material in other states.

HB 472/SB 416 (2017) Income Tax Credit-Qualified Farms-Food Donation Pilot Program

This bill creates a pilot program to provide tax credits to qualified farms for eligible food donations, for tax years 2017 through 2019. Farms can receive a state income credit that is equal to 50 percent of the value of an eligible food donation or 75 percent of the value of donated certified organic produce, up to \$5,000. Qualified farms are farm businesses in six counties, including Prince George's County, and eligible food donations are any fresh farm products for human consumption. The total amount of the tax credit issued may not exceed \$250,000 per fiscal year. This new program incentivizes the donation of healthy, farm fresh food and reduces food waste.³⁷

Source Reduction Credit System³⁸

To help the state meet its annual waste diversion goal of 40 percent, Maryland created a source reduction credit system, which acts as an incentive to counties to boost their waste

35. MDE, Waste Reduction and Resource Recovery Plan Goals and Metrics Recommendations, September 2018.

36. MDE Yard Waste, Food Residuals, and Other Organic Materials Diversion and Infrastructure Study Group, Interim Report, September 2018.

37. Harvard Law School Food Law and Policy Clinic, A Review of Food System Policies in Maryland, September 2017.

38. MDE, Waste Diversion, Source Reduction https://mde.maryland.gov/programs/land/recyclingandoperationsprogram/pages/source_reduction.aspx

diversion rate by up to 5 percent. Maryland was the third state to offer a source reduction credit, after Minnesota and Oregon. Besides helping to reach the state’s waste diversion goal, increasing source reduction activities could save counties a significant amount of money. Activities include yard waste reduction (composting), public education programs, and research. Currently, food scraps activities are not included. However, elevating the status of food scraps activities in the source reduction checklist to provide credits is included in the draft recommendations of the Waste Reduction and Resource Recovery Plan.³⁹ In 2016, Prince George’s County received the full 5 percent credit.

Food Recovery Summits

On November 30, 2016, MDE held the first Maryland Food Recovery Summit. “[A]lmost 200 collaborators—including generators and users of food scraps, government agencies, nonprofits, and elected officials—[met] to share information, needs, and strategies to reduce wasted food in Maryland. The event came on the heels of several important national and regional discussions on food recovery and served as a first step to focusing and coordinating this growing interest in Maryland and the Mid-Atlantic.”⁴⁰ Several challenges and solutions were identified as well as short-term action items at the summit.

On October 24, 2018, MDE, in partnership with the Bowie State University and EPA Mid-Atlantic Region, held the Mid-Atlantic Food Recovery Summit as part of the Eighth Annual Food Day in Prince George’s County. Opportunities created by the food waste reduction goals, addressing gaps in surplus food donation, and building food recycling infrastructure in the Mid-Atlantic were the main discussion areas. There were also sessions on developing college and university food recovery programs, waste reduction in the hospitality industry, and food recovery in the agricultural sector.



Images courtesy of the Maryland Department of the Environment.

39. MDE, Waste Reduction and Resource Recovery Plan Goals and Metrics Recommendations, September 2018.

40. MDE, Maryland Food Recovery Summit Summary and Action Items, February 2017, p. 2.



Food waste in Prince George's County

A significant amount of food is wasted in Prince George's County. The U.S. Environmental Protection Agency (EPA) Region 3 estimated that in 2015, 113,090 tons of food was wasted in Prince George's County.¹ The breakdown of where the waste was generated showed that more than half of it was residential food waste (61,543 tons), followed by restaurants (26,595 tons), and supermarkets and grocery stores (14,702 tons).

To better understand where Prince George's County stands in terms of generating and preventing food waste, the Prince George's County Planning Department conducted a household survey and interviews with a variety of food waste generators and mitigators. The results of these interviews and survey provided valuable information about the County's food system and behaviors and beliefs of Prince George's County residents, businesses, institutions, and organizations regarding food waste.

Household food waste survey

Survey development and administration

The survey was designed to determine Prince George's County residents' awareness, knowledge, behaviors, attitudes, motivations, and willingness to learn and act related to food waste.² The survey also sought residents' ideas and suggestions regarding the County government's actions, programs, and policies to reduce food waste and recover wasted food. To enable comparisons, some of the questions were replicated from the first national consumer survey focused on wasted food that was conducted by researchers from the Johns Hopkins University Bloomberg School of Public Health in 2014.³

For the purpose of the survey, food waste was defined as edible food available for human consumption that was not consumed (wasted food) as well as nonedible parts of food such as peels, pits, bones, and eggs (food scraps).

The survey was administered online through SurveyMonkey. It was open to all Prince George's County residents 18 or older and was advertised on various agency and organization websites, including M-NCPPC Prince George's County Planning Department, Prince George's County Food Equity Council, and University of Maryland Extension.

More than 200 residents responded to the survey. Since no sampling method was used, the results of the survey cannot be considered representative of County residents. Survey respondents represented a third of the zip codes in the County; however, two-thirds of respondents lived in three zip codes. Similarly, the education level of respondents was biased: 60 percent have an advanced degree, 28 percent have a bachelor's degree, 10

1. Prince George's County was chosen as a case study at the "Path to 50% Food Waste Reduction in the Mid-Atlantic Region" workshop on April 4, 2017 as part of the BioCycle East Coast Conference in Howard County, Maryland.

2. Survey questionnaire is in Appendix 5.

3. Neff RA, Spiker ML, Truant PL (2015) Wasted Food: U.S. Consumers' Reported Awareness, Attitudes, and Behaviors. PLoS ONE 10(6): e0127881.

percent have some college education or an associate degree, and 2 percent have a high school degree. Two-thirds of the respondents were 45 years old or older, whereas 40 percent of County residents are in that age group. The percentage of respondents in the 25-44 age group was closer to the County's, but the 18-24 age group was significantly underrepresented.

Despite being non-representative of the County, the survey results were helpful to understand the behaviors, concerns, and needs of the residents. The issues raised and suggestions made by the respondents helped in developing policy recommendations.

Survey findings

The responses of the residents who participated in the household survey conveyed high awareness about food waste issues and concerted efforts to reduce food waste. This is not a surprise, because usually people participate in an open survey if they are interested in the subject. It is worth noting that there were also respondents with less awareness and some who did not show any effort to try to reduce food waste. The following are the major findings of the survey. Detailed survey results are in Appendix 6.

AWARENESS AND KNOWLEDGE

- Respondents were asked direct questions to assess their awareness and knowledge about food waste. Their responses to these questions were cross tabulated with other questions to determine how awareness and knowledge affect people's behaviors and attitudes.
- More than 90 percent of respondents stated that they are aware of the negative impacts of wasting food.
- Three-quarters of respondents have read, seen, or heard something about food waste in the past 12 months.

FOOD DISCARDING BEHAVIORS

- The majority of respondents stated that, with the exception of fresh fruits and vegetables, they never or rarely discard food.
- Although food is most frequently discarded by throwing it in the trash, it is significant to note that 10 percent of the respondents indicated never trashing food, and only 11 percent reported always trashing it.
- Backyard composting is the second-most used method to discard food. Although most of the respondents reported that they never or rarely compost, a significant number indicated that they compost their food waste always or most of the time. Composting is perhaps the best method to recycle inedible food scraps if it cannot be used as animal feed. The end product used as a soil amendment to produce food, completing the food system loop.
- Eighty percent of respondents reported having an in-sink garbage disposal, but only 12 percent of them indicated using it on a regular basis. Almost half of the respondents' conscious decision of never or rarely using it demonstrates their knowledge and environmental awareness, because food discarded in a garbage disposal pollutes the water system.

Comparison to awareness and knowledge: Respondents food discarding behaviors showed that knowledge makes a difference.

- **The highest percentage of people who have not read, seen, or heard anything about food waste in the past 12 months trash food waste most of the time. However, the highest percentage of people who have heard about food waste trash food some of the time.**
- **While 38 percent of the people who have heard about food waste never or rarely trash food, only 16 percent of those who have not heard anything about food waste never or rarely trash food.**
- **Backyard composting is done by 39 percent of people who have heard about food waste and 19 percent of those who have not heard anything about food waste.**

FOOD SHOPPING BEHAVIORS

- The reported food shopping behaviors of respondents are generally helpful in preventing excessive food buying and thereby reducing household food waste.
- The majority of respondents indicated that they plan meals, estimate necessary quantities needed before shopping, and use a shopping list.
- Less than 10 percent of respondents reported buying more food than they needed all or most of the time.
- In general, people's food shopping behaviors align with food spoilage in their households. In households where people plan what type and amount of food to buy before going shopping, food does not usually spoil before they consume it. Whereas, in households where planned food shopping is not usually the case, food usually spoils.

Comparison to the national survey: Food shopping behaviors of the County residents who participated in the survey were quite similar to the behaviors of the national survey respondents.

FOOD STORAGE/PRESERVATION BEHAVIORS

- Many respondents indicated that they try various ways to extend food's life, which helps reduce food waste.
- In addition to refrigeration and freezing, respondents reported using special containers, vacuum sealers, and other methods, including canning and dehydrating.
- Only 3 percent of the respondents indicated that they do not typically try to store food to keep it longer.

EATING BEHAVIORS

- The majority of respondents reported that they consume a variety of foods with expired date labels at least some of the time. The only exception is meat; more than three-quarters of respondents reported never or rarely eating meat with a past due date.
- Respondents overwhelmingly reported eating leftovers at home and bringing leftovers home when they eat out. There were no respondents who did not eat home-cooked leftovers, and only 10 percent reported not bringing leftovers home.

Comparison to awareness and knowledge: Respondents' reported eating behaviors reflect their awareness about wasting food. A higher percentage of people who always or most of the time eat food that has passed its due date has read, seen, or heard something about food waste in the past 12 months. Similarly, a higher percentage of people who never eat food with a past due date had not heard anything about food waste in the past 12 months.

REASONS FOR DISCARDING FOOD

- Responses show that the most common reason for discarding food is concern about food poisoning. The second-most common reason is food being spoiled before consumed, followed by not considering food being wasted because they compost it, and disliking older food.
- Among respondents who reported composting, 68 percent indicated that since they compost uneaten food, it is not considered wasted. Although composting is better than dumping food in the trash can, any edible food that goes in the compost pile is wasted food that could otherwise have fed a human or animal. Even food scraps that are inedible for humans can be fed to animals or used to create energy. Composting is also reusing wasted food, but in the EPA food waste hierarchy, it is the second to last option.

Comparison to the national survey: Concern about food poisoning was also the top reason for discarding food for the respondents of the national survey.

ATTITUDES ABOUT FOOD WASTE

- More than three-quarters of respondents indicated that when discarding food, they do not ignore economic and environmental impacts of food waste.
- Similarly, more than three-quarters of respondents reported that they believe households' individual actions make a difference, they work to reduce their households' food waste, and time is not an issue when it comes to preventing food waste.
- The majority of respondents indicated that portion sizes are too large at restaurants and other prepared-food establishments. Large portions are usually considered one of the causes of wasted food.

Comparison to awareness and knowledge: Awareness about food waste has an impact on people's food discarding behaviors.

- **The vast majority of people who are aware of the negative impacts of wasting food work to reduce their household's food waste compared to only a little more than a quarter of those who are not aware.**
- **While discarding food, the vast majority of those who are aware of the negative impacts of food waste think about both environmental and economic impacts of food waste compared to less than half of those who are not aware of the negative impacts of food waste.**

MOTIVATIONS TO REDUCE FOOD WASTE

- Respondents indicated that protecting the environment and prudently using resources are the most important motivations for reducing food waste.
- Saving money, efficiently managing their households, and making a difference through their actions were reported as important motivations.
- The least important motivation for the respondents is setting an example for children.

Comparison to the national survey: The respondents of the County survey and the national survey had very different motivations to reduce food waste. National respondents reported saving money as the most important motivation followed by setting an example for children; environmental concerns were the least important motivation. Environmental concerns and role modeling were almost in the reverse order for the respondents of the County survey, and saving money was ranked third-most important motivation.

POTENTIAL ACTIONS TO REDUCE FOOD WASTE

- Respondents were overwhelmingly enthusiastic about taking actions to reduce food waste. All respondents indicated that they would implement at least two of the potential actions presented in the questionnaire.
- More than 40 percent of respondents stated they would do all eight actions, and 26 percent said they would do seven of them. A striking 92 percent were willing to take at least five actions.
- Checking the stock of the refrigerator and pantry prior to food shopping; freezing food; making a shopping list; and using leftovers were checked by more than 90 percent of respondents. Three-quarters of respondents indicated that they would compost. Even the least favorable action of cooking the right amount of food was marked by 67 percent of respondents.
- People's enthusiasm to take some actions to reduce food waste is even more pronounced when their current actions are examined.
 - › Respondents who do not work to reduce their household's food waste are now willing to do at least three actions to reduce food waste. More than 60 percent of them are willing to take at least seven actions.
 - › Respondents who believe that their households' actions do not make much difference are willing to do at least two actions to reduce food waste, and 60 percent of them are willing to take at least seven actions.
 - › Respondents who do not have enough time to prevent food waste now are willing to do at least three actions to reduce food waste. Almost 60 percent of them are willing to take at least seven actions.

WILLINGNESS TO LEARN TIPS TO REDUCE FOOD WASTE

- More than two-thirds of respondents indicated that learning additional tips to reduce food waste would be useful, and a quarter of them said it may be useful.
- Most respondents are interested in learning about how to store and discard food. Close to a third of them are interested in learning how to buy and cook food.
- People's willingness to learn is a good sign that if education on food waste is provided, they likely implement what they learn.

SUGGESTIONS TO LOCAL GOVERNMENT ON FOOD WASTE PROGRAMS AND POLICIES

- Regardless of their awareness of the negative impacts of food waste, an overwhelming 93 percent of respondents suggested that Prince George's County should establish or expand programs to reduce food waste. Suggested programs include:
 - › Curbside food scrap collection—respondents overwhelmingly indicated their willingness to participate.
 - › Composting programs.
 - › Education and awareness campaigns.
 - › Coordinating donation and distribution of excess food to residents in need.
 - › Encouraging source reduction.
 - › Incentives.
 - › Information dissemination.
- Respondents suggested several food waste reduction and recovery policies, including:
 - › Incentivizing restaurants to reduce food waste by composting, donating food to needy, and serving smaller or two portion sizes.
 - › Incentivizing grocery stores to offer older but still good food at a reduced price and to stop prepackaging fresh produce.
 - › Banning organic materials at the landfill and mandating residential and commercial food scrap separation for composting.
 - › Incentivizing households and businesses to participate in food waste reduction programs.



Interviews with food waste generators and mitigators

Interview development and administration

Food waste generators were grouped under seven categories: producers/farms, processors/distributors, retailers, food service providers, restaurants, institutions, and the Maryland-National Capital Park and Planning Commission (M-NCPPC) venues. Food waste mitigators were grouped under three categories: food recovery organizations, food banks and pantries, and composters.

From each group, the Prince George's County Planning Department interviewed up to five businesses or organizations that are based in or provide services to Prince George's County. Although interview questions were prepared in advance, interviews were conducted in a more relaxed, conversational style. This style allowed people to voluntarily provide information that is important to their operations. During these conversations, most of the interview questions were answered without asking. Only the unanswered questions were asked at the end of each interview.

For each category, important findings are presented below. Interview summaries and brief descriptions of the businesses and organizations are in Appendix 7.

Food waste generators

PRODUCERS/FARMS

- Because of the unpredictable nature of agriculture, every farm has surplus or inedible food. Depending on the size and type of farm and their operation style, different methods are implemented to recover, reuse, or dispose of residual food. These methods include:
 - › Selling lower-grade produce at reduced prices at farmers' markets or to restaurants to be used in soups and sauces.
 - › Offering pick-your-own options and letting Community Supported Agriculture (CSA) members to take culls for free.
 - › Donating to the Capital Area Food Bank and local charities.
 - › Feeding farm animals.
 - › Spreading or tilling crops into the field or piling up culls and food trimmings to let them rot and use as a soil amendment. (This is not really composting.)
 - › Sending to the landfill.
- The farms that were interviewed do not do on-farm composting or send their residues to a composting facility. The amount of food they send to the landfill is not significant. Small farms do not have much waste since they are able to use the residues. It is more difficult for large farms to use all the inedible and surplus food, so they typically send food waste to the landfill.
- Barriers to reduce food waste at farms include farm labor shortage, which causes some crops to be left unharvested; lack of training, equipment, infrastructure, and land to do composting; and not having a dumpster to hold food scraps and trucks to deliver scraps to the composting facility.
- To reduce food waste or divert it from the landfill, some farmers are thinking about using software to perform more efficient production and send food waste to the composting facility.

FOOD PROCESSORS AND DISTRIBUTORS

- Food processors and distributors generate massive amounts of food waste that includes food scraps and trimmings; rotten, scarred, or contaminated food; overstocked food; and packaged food with past due dates.
- The methods they use to recover and dispose food waste vary due to company policies and the kind of waste they generate. These methods include:
 - › Reuse and repurpose surplus ingredients of a processed product.
 - › Regular generous donations of edible surplus food to food banks and a variety of charities.
 - › One large processor sends more than 100,000 pounds of food scraps a week to a hog farm.
 - › Among the processors interviewed, only the coffee processor sends its waste to the County’s composting facility. Fresh produce distributors do not send any waste to a composting facility.
 - › Food processors and distributors send a significant amount of food waste to the landfill. Food waste that ends up in the landfill includes perfectly edible surplus food that could not be donated because of logistics or capacity of the receiving end. Still edible packaged products with past due dates, such as mixed greens in clamshells, go to the landfill fully packaged.



- All processors and distributors implement similar strategies to extend food life and minimize waste. These strategies include:
 - › Predicting and ordering the right amount.
 - › Thoroughly inspecting the products before unloading the trucks to avoid unusable and unsellable food.
 - › Finding a buyer for below-grade products.
 - › Removing bad products and re-boxing good ones for sale.
 - › Quick turnaround to prevent food going bad.
 - › Making sure that the cold chain is working during transportation and at the warehouse.
 - › Training employees and drivers on how to handle, monitor, and take care of loads to minimize mishandling and accidents.
- Barriers to reduce food waste for processors and distributors include issues with employee training and turnover. They are willing to participate in programs to mitigate food waste and send food waste to the County's composting facility, however they are concerned about associated cost and logistics.

RETAILERS

- Grocery stores are well aware of the effects of wasting food on their bottom lines and pay attention to food waste reduction. Finding a balance between meeting customers' needs and reducing waste forces them to find creative solutions. Some of the methods used to reduce food waste at the retail scale include the following:
 - › The stores that prepare ready-to-eat food, repurpose leftover food in a creative way in prepared foods, such as using leftover rotisserie chicken in soups and salads.
 - › Partnering with food manufacturers and sending discarded fruits and veggies to be made into edible products, such as ice-cream.
 - › All grocery stores have donation programs. Their recipient partners and the types of food they donate differ, but their donations are always in high demand.
 - › Some grocery stores send their food waste to farm animals or feed manufacturers.
 - › Grocery stores get involved in composting in varying ways. Some give away food scraps to local farmers to turn them into compost. Some use private composters, and some send food scraps to the County's composting facility.
 - › Grocery stores send minimal amounts of food waste to the landfill. Usually, edible food goes to the landfill when donations cannot be accommodated due to recipients' capacity.
 - › Farmers' markets staff said that they do not have programs related to food waste. It is the individual vendor's responsibility to take care of all waste.
- All grocery stores have sustainability goals and strategies to reduce food waste. Some examples include:
 - › Employee training on food waste, including EPA's Food Recovery Hierarchy.

- › Ordering the right amount based on history, stocking, and rotating to sell everything before it goes bad or out of date.
 - › Reduced price program for damaged, distressed, or out of date food.
 - › Waste audits to reduce food waste, decrease composting, and increase donations.
 - › One national grocery chain’s zero-waste initiative with an 80 percent diversion goal is not yet in effect in Prince George’s County. However, the current diversion rate at the County store is already 74 percent.
- Barriers to reduce food waste at retail stores include customers’ understanding of date labels on packages and liability concerns for donations.

FOOD SERVICE PROVIDERS

- One major food service provider, Sodexo, was interviewed. Sodexo has many sites in Prince George’s County, all of which follow Sodexo’s overall food waste policies and guidance. Sodexo provides guidance or facilitates donations of overproduced and overpurchased food, feeding animals with food waste, and composting.
- Sodexo is a member of Food Waste Reduction Alliance and focuses on waste reduction, the only part of the puzzle they can control. The methods they use include:
 - › Implementing waste watch at all sites, even though it is not in their client contract. They use Leanpath, a food waste tracking and analytics software, to analyze causes of their food waste, so they can prevent it.
 - › Centralizing food purchases to prevent over-purchasing and finding local food producers to purchase surplus products.
 - › Sodexo trains everyone who prepares food at their sites.

RESTAURANTS

- Restaurants are one of the major generators of pre- and post-consumer food waste. More food waste is generated at buffets than other types of restaurants. To satisfy customer needs, restaurants keep buffet trays close to full all the time, and people take more food than they can eat, causing unnecessary waste. During special event buffets, when fewer people attend than originally planned, food is leftover.
- There are a lot of commonalities among restaurants in their operations and food waste-related practices despite their differences in size, type, and cuisine. Methods they use to recover and dispose of food waste include:
 - › Restaurants let employees eat leftover food from buffets.
 - › Most chefs are creative about using leftover ingredients or repurposing already prepared surplus food to make new dishes. Some restaurants do not repurpose food to ensure freshness and taste.
 - › Many restaurants are concerned about liability and, therefore, do not donate food. Most of them are not aware of the Bill Emerson Good Samaritan Act that protects food donors.
 - › Feeding animals with food waste is not a common method for restaurants, but it is done occasionally.
 - › There is no established practice for sending food scraps for composting. A couple of restaurants occasionally send their food scraps to a local farm for composting.

- › Restaurants send a significant amount of food waste to the landfill. This includes food scraps and leftover food. Because of health safety regulations, any food that is served to the customer and goes back uneaten cannot be donated and mostly goes into the trash. This includes untouched food and buffet leftovers.
- Restaurants are careful about not wasting food, primarily for economic concerns. They use various strategies to minimize food waste, including:
 - › Putting a system in place—keeping menus consistent, ordering and cooking the right amount, and batch cooking.
 - › Using software to track trends and understand patterns.
 - › Efficiently using ingredients.
 - › Watching plate waste and adjusting portion sizes accordingly.
- Restaurants are not willing to reduce main dish sizes or offer two portion sizes. They believe consumers like consistency and are willing to pay more for larger sizes, and that offering optional small portions are not economically feasible. However, they are all willing to reduce portion sizes if it becomes a requirement and all restaurants do the same thing.
- They are willing to participate in a food scrap collection program if it is mandatory or low-cost or no-cost to them, the County provides a separate dumpster, and pickups are frequent.

INSTITUTIONS⁴

- In all institutions, because of the volume of food served, a significant amount of food waste is generated regardless of efforts to minimize it. The following are the methods used to discard food waste:
 - › Generally, in all institutions, food scraps and peelings are used to make soup stocks. In most places, prepared but uncooked leftovers are repurposed, and in some places, unserved food items are reintroduced at the next meal.
 - › Other than the University of Maryland, College Park (UMD), institutions that were interviewed do not donate food. At UMD, already prepared but unserved food is taken by Food Recovery Network volunteers and donated to a church. Unused inventory items at UMD are donated to Capital Area Food Bank.
 - › No onsite composting is done at the institutions. UMD is the only institution that sends food waste to the composting facility.
 - › At the hospitals, all foods served to patients, even though untouched, goes into the trash to control the spread of infections. Except for UMD, most of the institutional food waste ends up in the landfill.
- All institutions apply certain strategies to minimize cost that also help minimize food waste. They include rotating menus, ordering no more than what is needed, reusing or repurposing leftovers and food scraps, batch cooking, providing correct portions, peeling and cutting produce the right way, and seeking customer feedback and adjusting menus or cooking style accordingly.

4. Institutions covered here include hospitals and universities.

Cafeteria Reform at the University of Maryland, College Park (UMD)

In August 2016, UMD changed the way food is served in its cafeterias. The change included switching to all-you-can-eat style unlimited access, elimination of carry-out containers and trays, switching to small size plates and bowls, and shrinking the standard portion sizes. As a result, a lot less food is wasted while food costs stayed the same. Students started eating healthier, and food insecurity among students was eliminated. Change also brought more appealing physical changes to the cafeteria with educational signs to create awareness about food waste.

Food waste audits conducted by students in 2017 and 2018 created awareness about how much food is being wasted. In 2017, on average, each diner generated 2.5 ounces of food waste per meal period. This amount was reduced to 1.6 ounces in 2018. In 2018, dining halls produced an average of 34.27 pounds of waste per hour during the food waste audits.



Food Waste Reduction Technical Assistance to Bowie State University (BSU)

In May 2018, BSU received technical assistance from the Maryland Department of the Environment through an EPA grant for food waste management, reduction, and diversion. The assessment revealed that annual food waste generation at BSU is 166 tons, which is 28 percent of all waste generated on campus. Although the food service contractor is implementing food reduction and diversion strategies at the cafeteria, compostable materials are disposed in the trash. Recommendations presented to BSU include establishing broad waste reduction and diversion goals, weighing and reporting disposal bound food waste over a period of time, testing small-scale, onsite composting, and developing an education strategy that includes student-led participation in waste reduction and diversion initiatives.⁵



PRINCE GEORGE'S COUNTY PUBLIC SCHOOLS (PGCPS)

- According to the County's Waste Characterization Study (WSC), conducted in 2015, 1,700 tons of food waste from PGCPS were being landfilled annually rather than composted.⁶ It is stated in the draft Prince George's County Resource Recovery Plan that, due to the switch to compostable trays since then, if WCS were conducted today, school-generated compostable materials would be closer to 4-5,000 tons.⁷
- PGCPS does not have a systemwide policy for food waste. The common way of discarding food waste is sending it to the landfill.

5. Maryland Department of the Environment, "Appendix A: Bowie State Opportunity Assessment Memo" in Food Waste Reduction Technical Assistance Final Report, prepared by MSW Consultants, October 2018.

6. Department of the Environment, Prince George's County Resource Recovery Master Plan (Draft), 2018, p. 38.

7. Ibid.

- The limited food preparation (mostly salads and fruits) at school cafeterias generates a minimum amount of pre-consumer food scraps. However, students generate lots of plate waste.
- Some schools have share tables where students leave unopened packaged food that they opt not to eat for other students to take home. However, at the end of the day, food left on the share tables is trashed. Schools do not donate food to nonprofit food rescue or hunger relief organizations.
- There is school-based composting in some schools. In Berwyn Heights Elementary School, fruits from cafeteria waste are composted. In Gwynn Park High School, where there is an agricultural education program, residuals from gardening are composted. At William S. Schmidt Outdoor Education Center, cafeteria food waste is composted.
- The Department of the Environment (DoE) is having preliminary discussions with schools and is willing to work with any school that wishes to implement a food scrap collection/ composting program. The Central High School has recently expressed an interest in food scrap composting.
- There is no education regarding recycling or food waste that is integrated in the curriculum. Some teachers provide education on these subjects. At the International School, an elective course was offered on food waste. Gwynn Park High School students did a capstone project on food waste and assessed the amount of food wasted in their school.

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION (M-NCPPC) VENUES

- M-NCPPC has multiple venues where food is served. These venues include historic rental properties, Show Place Arena, and Sports and Learning Complex (Sportsplex). Show Place Arena is the only M-NCPPC venue with an in-house food manager. Sportsplex has a food service contractor. Caterers hired by clients take care of food at other venues.
- M-NCPPC does not have a policy regarding food waste for private caterers that use its facilities. It is not known whether these individual caterers take steps to reduce food waste or not. The Department of Parks and Recreation is willing to evaluate contract terms for private caterers to ensure best food waste handling practices.
- Both the food manager at Show Place Arena and the food service contractor at Sportsplex use strategies to minimize cost and food waste. These strategies include training employees, ordering no more than what they need, cook in small batches, use small plates, and freeze and/or repurpose leftovers. They are also knowledgeable about what date labels mean, and hence use food with expired date if it is safe to use. Neither Show Place Arena nor Sportsplex donate leftover surplus food, nor do they compost or send food waste to a composting facility.
- M-NCPPC staff are prepared to explore separating food waste and sending it to the composting facility. M-NCPPC will also explore sending food trimmings to feed animals at M-NCPPC facilities.

Food waste mitigators

FOOD RECOVERY ORGANIZATIONS

- There are several organizations that actively work in Prince George's County whose common mission is to recover wasted food to feed hungry people. They rescue food at various stages of the food system. Below is a summary of the work these organizations are doing:

- › Using an online platform matching community and home gardeners with local food pantries and making arrangements to deliver excess harvest.
- › Linking farmers who have crops that are edible but not marketable with those who distribute food to the needy through the work of volunteer gleaners.
- › Rescuing aesthetically imperfect produce and other edible food that cannot make the market and delivering them to customers' doorsteps for less than grocery store prices.
- › Rescuing surplus food from farmers' markets and using it to make meals for elderly people who are in need.
- › Rescuing unserved surplus meals from university cafeterias and delivering them to charitable organizations to feed the hungry.

FOOD BANK AND PANTRIES

- Capital Area Food Bank (CAFB) is the only food bank that serves Prince George's County. It plays a big role in rescuing food that is otherwise thrown away. Therefore, it significantly contributes to minimizing food waste. Eighty percent of what CAFB gets is donated surplus food. Even a chunk of the purchased produce is rescued food. They encourage growers to harvest "ugly fruits and vegetables" and sell to CAFB for less than the market value.
- There are many food pantries in the County, most of them are affiliated with faith organizations. CAFB is the primary source of food for food pantries. They function as a distribution point for CAFB to deliver food to the people who are in need.
- Food pantries also get donations of surplus food from local food businesses. By rescuing surplus food and giving it to hungry people, they help reduce the amount of food that goes to the landfill.

FOOD SCRAP COLLECTORS AND COMPOSTERS

- Several municipalities have curbside food scrap collection programs. University Park was the first to initiate a program and is very successful with a more than 25 percent participation rate. Many residents who do not participate do their own backyard composting. Other municipalities are either at the pilot or beginning stages of their programs.
- A regional food scrap collection company has contracts with some County businesses to collect their food waste. They recently started a residential food waste collection in some communities inside the Beltway. A regional composting facility that provides food waste collection services also has customers in the County. Residents and businesses are willing to pay money for their food scraps to be collected. This shows that some County residents and businesses are aware of the negative effects of food waste and are doing their share to minimize it.

Food waste generators' and mitigators' suggestions to the County government to reduce food waste

Food waste generators and mitigators that were interviewed expressed their needs and articulated how the County government can help them to reduce food waste. Their suggestions were strikingly similar to the suggestions of the residents who took the household food waste survey. The top two suggestions were related to composting and

education. They came equally from generators and mitigators. The following is a summary of suggestions by category:

COMPOSTING

- Establish a countywide food waste collection program for composting. Provide compost bins, set up infrastructure, develop logistics for pickup, educate people, and encourage participation.
- Ban food waste in the landfill. Make composting mandatory for households and businesses.
- Provide financial incentives or tax credits for businesses to compost or send their food waste to a composting facility.
- Continue to expand the County's composting facility.
- Composting creates jobs. Incentives are needed to encourage people to get into the food waste collection or composting businesses. These may include providing access to available government-owned properties for composting, easing zoning and permitting requirements, and financial support for providing a community service.
- Tipping fees and compost prices at the Prince George's County Organics Composting Facility should be compatible with other places to keep private composting facilities in competition.

EDUCATION

- Educate people and make them care. Reach out to everyone in the County and send the message explaining why it is bad to waste food. The more people know, the less they waste.
- Educate consumers on expiration dates.
- Health inspections are an educational opportunity. Inspectors should use time in food service establishments as teachable moments, including the importance of reducing food waste.

DONATIONS

- Offer incentives/rewards to those who are donating food.
- Restaurants should be required or encouraged to have partnerships with food pantries and donate food. Give incentives to nonprofit organizations to partner with restaurants and donate surplus food to people in need.
- Provide liability protection and guidelines about donating different kinds of food.
- Educate food businesses about current tax incentives so that they will donate food.

OTHER SUGGESTIONS

- Provide stimulus money to farmers for things such as hoop houses and fencing that would help with production and reduce on-farm food loss.
- The County government could lobby for an agricultural guest worker program at the federal level. Labor shortage is a major issue for small farms. If they have labor, they can harvest more and food will not be wasted.
- Establish portion control regulations. The government should help with people's mindset by providing guidance and education on the amount of food that should be consumed based on health implications and side effects of eating too much.
- Health Department policies should be looked at again. If the rules are more sensible, food would not be wasted as much.

County's efforts to reduce food waste

Prince George's County Department of the Environment (DoE) is diligently working to reduce all waste in the County. They have been successfully diverting recyclables from the landfill. Over the past several calendar years, Prince George's County has held the number one position in the State of Maryland for recycling and waste diversion, with an average of 61 percent waste diversion. The state average is 47 percent.⁸

DoE launched a Zero Waste Initiative with a long-term goal of nearly eliminating the need for disposal of solid waste. The importance of zero waste is summarized in the County's recently published Zero Waste Initiative report:⁹

"In developing and supporting policies and programs that minimize waste, Prince George's County will reduce waste generation and maximize diversion of waste from the landfill through increased reuse, recycling, and composting.

"Moving towards zero waste has a number of important impacts on the County, its residents, and its businesses, particularly in terms of the unprecedented impact on the County's economy.

"Minimizing waste will have an obvious and positive impact on the environment."

Achieving zero waste includes food waste diversion and composting. According to data from the Waste Characterization Study, approximately 87,500 tons of compostable materials are buried at the Brown Station Road Sanitary Landfill annually, which includes 48,000 tons of food waste.¹⁰ The breakdown of the food waste by generator and food type are shown in Table 2.

Table 2. Food waste buried in the landfill in 2016 in the County (in tons)

	Residential	Commercial	Schools	Total
Vegetative Food	24,300	8,300	1,500	34,100
Non-Vegetative Food	10,700	3,000	200	13,900
Total	35,000	11,300	1,700	48,000

Source: Prince George's County Resource Recovery Master Plan.

Diverting these food scraps from the landfill to the composting facility will not only reduce the adverse impacts on the environment and use of landfill airspace but also creates top-quality compost to amend soils for better food production, closing the food system loop.

8. Maryland Department of the Environment, County Recyclables by Commodity in Tons for Calendar Year 2016. <https://mde.maryland.gov/programs/LAND/RecyclingandOperationsprogram/Documents/2016%20County%20Rates.pdf>

9. Department of the Environment Office of the Director, Zero Waste Initiatives for Prince George's County, April 5, 2018, p. 2. <https://www.princegeorgescountymd.gov/DocumentCenter/View/21910/Zero-Waste-Initiative-Final-April-5-2018a?bidid=>

10. Prince George's County Resource Recovery Master Plan (Draft), 2018.

Prince George's County Organics Composting Facility (OCF)

Prince George's County is the home of the largest composting facility on the East Coast. OCF (Western Branch Composting Facility) is located on 200 acres across from the WSSC Wastewater Treatment Plant in Upper Marlboro. It is operated by Maryland Environmental Service (MES), a County contractor.



Prince George's County Organics Composting Facility

Photo courtesy of the Maryland Environmental Service.

LEAFGRO™ is produced by blending yard trim. Processing time is seven to nine months in an open-windrow system. The windrows require mechanical turning using a Scarab machine and, when needed, water is added to the windrows.

create LeafGro Gold™. In 2014, the County increased the Gore® system from a three-heap pilot to four-heap continuous process. In 2016, it expanded to an eight-heap Gore® system, doubling its capacity. In October 2018, the County considerably expanded the food scrap composting operation by adding a 12-heap mega system with bunker walls to the existing eight-heap mobile system. With this expansion, it turned into a state-of-the-art facility and became the largest of its kind in the East Coast.

LEAFGRO GOLD™ is produced by blending food scraps (both vegetative and non-vegetative) with yard trim. The mix is placed over aerated channels on a concrete pad, wrapped in a Gore® cover, and processed for eight weeks. An additional two to four weeks are needed for curing.

of the food scrap input comes from in-County generators. The County is prioritizing in-County food scraps and actively recruiting major food waste generators.

This facility has been in operation for more than 28 years. Until 2013, only yard trim was composted using windrows system to create the final product, LeafGro™. Live Christmas trees were ground and cured into mulch. In May 2013, the County initiated a pilot program to compost food scraps utilizing Gore® cover technology to

Current food scrap input at OCF is 625 tons per week. This is an increase from 125 tons per week before the addition of the 12-heap mega system. Now, 32,500 tons of food scraps can be processed and turned into LeafGro Gold™ annually. Although this is an impressive amount, it is less than the potentially divertible food waste that goes into the Brown Station Road Sanitary Landfill. Currently, only half

To divert commercial generators' food scraps, an onsite de-packaging machine is needed. This will divert not only food scraps but also recyclable packaging that currently goes into the landfill. As the County expands the curbside food scrap collection countywide, another 12-heap bunker system will be needed to handle the County-generated food scraps.

OCF is a revenue generator for the County. Before the addition of the new system, the revenue from the tipping fee and compost sales was barely offsetting the cost to operate the facility. It is projected that the new expansion will provide a net gain of \$8.64 per ton with the current tipping fee of \$45. Even a small increase in tipping fee will add a considerable amount to the revenue.

This facility has considerable potential to grow because of the huge regional demand for composting facilities. Because of its size and the techniques used, OCF can handle all kinds of food waste and compost in a short time. Most composting facilities cannot handle non-vegetative food waste, which includes meat, fish, and dairy products. Currently, only a quarter of the 200 acres is paved for operational use. Within the 50 acres, there is still enough room for considerable expansion, largely due to the fact that the Gore® infrastructure decreases the composting time needed from a nine-month process to less than four months, total. Hence, the footprint needed for operations is reduced by at least 50 percent. While expansion can significantly increase revenue, it may only minimally increase the cost of operation, thus creating more profit.

Food scrap collection

DoE piloted a curbside collection of food scraps between December 2017 and November 2018, funded by an EPA grant. Approximately 200 participants from the targeted communities of Pepper Mill Village/Carmody Hills, Wilburn, parts of Fort Washington/Tantallon, and West Laurel participated in this pilot project. Participants were provided with a 32-gallon wheeled cart, a 1.5-gallon kitchen bin, a one-time supply of compostable liners, and informational material. For the purposes of the pilot, residents were asked to include only food and compostable food-related items in the cart for weekly collection. In June 2018, residents in West Laurel were asked to combine their food scrap with yard trim to allow OCF staff to test mix load ratios and recipes. All materials were transported to OCF for processing.

Upon the success of the pilot project, as part of the County Executive's Beautification initiatives, DoE will launch a residential curbside food scrap collection program, initially with 3,000 households. The program is expected to expand countywide in three years. Residents will be provided organics carts and kitchen pails and will be able to mix food scraps with yard trim. The County Executive proposed in her FY 2020 budget \$200,000 for food waste collection containers, which will allow the County to have a second pickup day for food and yard waste only.¹¹



Photos courtesy of the Prince George's County Department of the Environment.



11. Rachael Pacella, "Prince George's County Executive proposes \$3.5 billion fiscal 2020 budget." Capital Gazette, March 14, 2019.

In conclusion

The primary research findings show that:

- A lot of food waste is generated in the County.
- There is some awareness about the adverse impacts of food waste among residents as well as food related businesses, but it is not enough.
- There are some efforts to reduce residential and commercial food waste.
- Both residents and businesses are overwhelmingly willing to learn more about food waste and participate in programs to reduce and recover wasted food.
- Here is a brief summary of how the County is following the EPA's Food Recovery Hierarchy¹² to reduce food waste:

SOURCE REDUCTION: Although there are efforts to reduce food waste at homes, businesses, and institutions, much more can—and should—be done. Education is the key to make people understand and take responsibility to reduce wasting food.

FEEDING HUNGRY PEOPLE: Several organizations are doing a great job feeding hungry people with surplus food. Much more can be done by developing partnerships (with sources of wasted food), improving logistics, and having better collaboration among organizations, businesses, institutions, and the County government.

FEEDING ANIMALS: Only a fraction of food waste is used to feed animals. There are many opportunities to explore how to use food waste as animal feed.

INDUSTRIAL USES: There is no major use of food waste to create industrial byproducts in the County. The County would benefit greatly from an anaerobic digester to use WSSC solid waste and food waste to create alternative energy.

COMPOSTING: The County is doing a great job of turning food waste into a valuable soil amendment through composting. There is potential for expansion and additional revenue creation.

LANDFILL: Too much food is going into the landfill. It has a negative impact on the environment and the County's economy. Diverting food waste from the landfill will help the County achieve its zero-waste goal, extend the landfill's life, and generate additional revenue by composting it.



12. See Figure 5 on page 25.



COMPOST: Impacts More Than You Think

Composting is the aerobic decomposition of organic materials by microorganisms. It transforms raw materials—such as leaves, grass clippings, garden trimmings, food scraps, animal manure, and agricultural residues—into compost, a valuable earthy-smelling soil conditioner, teeming with life.

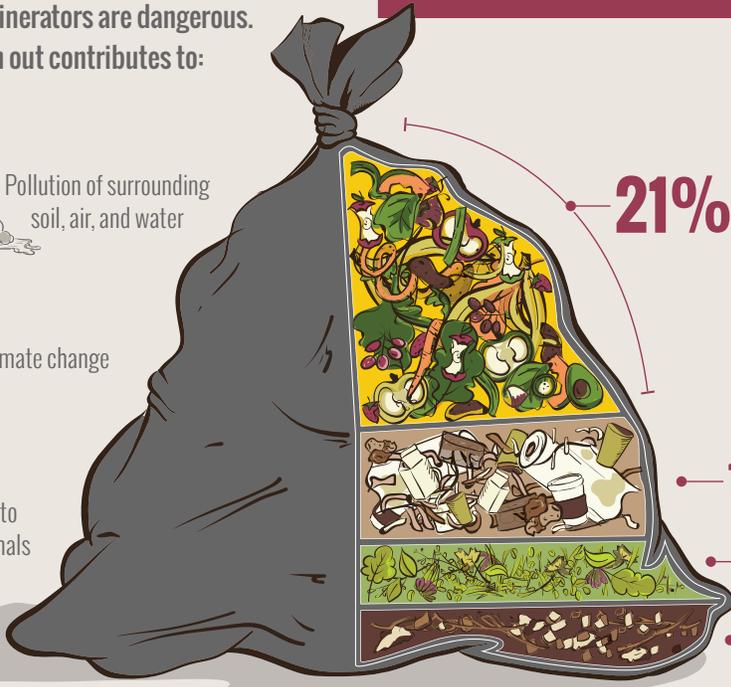
One Person's Trash is...
...another's black gold.

Every year, U.S. landfills and trash incinerators receive **167 MILLION TONS** of garbage.

Landfills and incinerators are dangerous. Every bag thrown out contributes to:

- Pollution of surrounding soil, air, and water
- Climate change
- Health hazards to humans and animals

> 50% of typical municipal garbage set out at the curb is compostable.



SOURCES:

Brenda Platt, Nora Goldstein, Craig Coker, and Sally Brown, *The State of Composting in the U.S.: What, Why, Where, & How*, Institute for Local Self-Reliance (ILSR), June 2015.
 US EPA, *Advancing Sustainable Materials Management: Facts and Figures 2013*, June 2015, pp. 12, 46.
 Brenda Platt, Eric Lombardi, and David Cipler, *Stop Trashing the Climate*, Institute for Local Self-Reliance (ILSR), 2008.
 Brenda Platt, Bobby Bell, and Cameron Harsh, *Pay Dirt: Composting in Maryland to Reduce Waste, Create Jobs & Protect the Bay*, Institute for Local Self-Reliance (ILSR), May 2013.
 Mike Ewall, *Trash Incineration Factsheet*, Energy Justice Network web page, <http://www.energyjustice.net>, accessed April 2016.



To learn more, visit: ilsr.org/compost-impacts

Source: Institute for Local Self-Reliance (www.ilsr.org), a national nonprofit organization working to strengthen local economies, and redirect waste into local recycling, composting, and reuse industries. Reprinted here with permission.

Policy recommendations strategies, and promising practices

Wasted food is a growing environmental, economic, and social problem in the United States. A lot of resources are wasted to produce food that ends up in the landfills, while one in seven people is food insecure. Prince George's County is not immune from this problem. A significant amount of food is wasted in the County, while more than 14 percent of residents are struggling to put food on the table. The federal and state initiatives to reduce food waste are not enough and cannot be successful unless local governments step in to implement them and develop policies relevant to their own communities.

This research study identified food waste-related issues in Prince George's County and how the County is following the EPA's Food Recovery Hierarchy to reduce food waste. Policy recommendations to address these issues are presented in this chapter and are organized by three major categories of the EPA's hierarchy: reduce, recover, and recycle.

Policy recommendations were developed based on thorough research on national and international best practices as well as the solution ideas presented by household survey respondents and businesses that were interviewed. For each policy recommendation, multiple strategies are proposed, and a sample of promising practices is presented. Promising practices contain information on specific food waste reduction, recovery, and recycling activities that have been successfully implemented in various communities and can potentially have success if implemented in Prince George's County.



Source: USDA-ARS

Reduce food waste by improving product development, storage, shopping/ordering, marketing, labeling, and cooking methods.

-USDA & EPA



Source reduction, reducing the volume of surplus food generated, is the first step in the EPA's Food Recovery Hierarchy. Similarly, prevention, stopping waste from occurring, is the first step in ReFED's Roadmap.

Historically, food waste prevention has been a part of the American culture. People consumed locally-produced food and appreciated farmers' hard work. Food production was not easy; food was scarce and expensive. They treasured the food they had and did not waste it. Today, American corporate agriculture and food manufacturers produce an abundance of cheap food. Most people do not know where their food is coming from. Instead of treasuring food, people readily trash it. This change in culture, along with people cooking and eating at home less often due to busy lifestyles, results in a more wasted food generation and less food waste prevention. Preventing food waste can only be accomplished by a change in people's behaviors, which can be triggered by raising awareness.



Reduce Policy 1

Launch a food waste awareness campaign. Educate the public about the food waste problem and how each person can reduce it and save money.

Strategies

- Create a Food Waste Awareness Task Force, which could be led by the Prince George's County Food Equity Council, that includes members from appropriate County agencies, nonprofit organizations, businesses, and residents who would manage the food waste awareness campaign and work as ambassadors for food waste prevention.
- Develop a campaign website to provide educational and informational resources and announce campaign activities and events. Also use this website as the main resource for all food waste reduction-, recovery-, and recycling-related information.
- Develop a logo and a mascot for food waste awareness.
- Use a local celebrity as a spokesperson of the campaign.
- Organize workshops, webinars, community events, and trainings to promote a culture of active food waste prevention, emphasizing that reducing food waste saves money.
- Educate the public about the environmental, economic, and social impacts of food waste.
- Raise awareness that food waste is a problem to which individual consumers contribute and that changing one's behavior is key to reducing the problem. Motivate residents to take easy and actionable steps to reduce food waste.
- Prepare a handbook on food waste, which includes tips on how to reduce food waste at home by taking easy steps,¹ and recipes and suggestions for repurposing leftovers.
- Use the website, TV, radio, social media, and printed materials to communicate the campaign's message and disseminate information about the benefits of reducing food waste, including tips to prevent and reduce food waste at all levels.
- Partner with consumer-facing food businesses and request them to display food waste-related messaging to customers.
- Announce one week of the year as "Food Waste Prevention Week." Increase activities during this week, adding more festive events and competitions.
- Develop and track impact metrics to see the effectiveness of the campaign. If needed, make adjustments and continue the campaign with targeted messaging.

1. See Appendix 8 for tips reducing food waste at home.

Promising Practices

AWARENESS CAMPAIGNS



Don't Waste Food SC (DWFSC) campaign “is a collaborative outreach campaign that brings together ambassadors from the public and private sectors dedicated to sharing knowledge, coordinating resources, and working together to reduce food waste in **South Carolina**”.² Campaign goals include increasing the

awareness of economic, environmental, and social impacts of wasted food; inspiring individuals, communities, restaurants, schools, and others to take action to reduce food waste through prevention, donation, and composting; and cutting food waste in half in South Carolina by 2030. The campaign has a logo and a website, which provides a wealth of information. It includes separate detailed guides for reducing food waste at home; restaurants and hospitality businesses; schools, colleges, and universities; and food retailers and manufacturers as well as other tips and resources.³

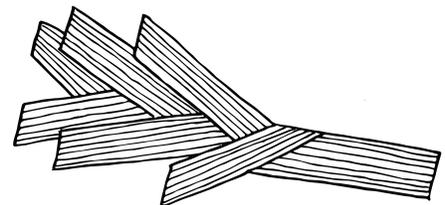


Get Food Smart TN is a food waste campaign of the **Tennessee** Department of Environment and Conservation (TDEC). The campaign “seeks to promote using food wisely and enhance the sustainability of Tennessee’s food resources.”⁴ “The initiative has an interactive website and a recognition program. It promotes the [EPA’s Food Recovery Challenge] (FRC) goals of food waste reduction to grocery suppliers, schools, businesses, and consumers.”⁵ The campaign has a logo and

educational flyers. TDEC grants fund projects that support FRC goals and raise awareness regarding the impact of food waste. TDEC staff makes educational presentations about food waste, recovery, and diversion at events, engaging a variety of audiences. They also assist with food waste audits in schools.⁶

GUIDEBOOK

City and County of Honolulu, HI, in partnership with EPA and local restaurants, prepared a guidebook/cookbook called **Food: Too Good to Waste**.⁷ It includes general information and statistics about food waste, smart food tips, recipes for leftovers from local chefs, donation information, and other resources. There is a survey at the end of the guide, and some restaurants offer coupons to those who complete the survey.



2. <https://sodhec.gov/environment/recycling-waste-reduction/dont-waste-food-sc>

3. Ibid.

4. <http://getfoodsmarttn.com/>

5. EPA Sustainable Management of Food, “Tennessee Department of Environment and Conservation” About the 2018 Food Recovery Challenge National Award Winners. <https://www.epa.gov/sustainable-management-food/about-2018-food-recovery-challenge-national-award-winners#TNDEC>

6. Ibid.

7. http://www.opala.org/solid_waste/pdfs/Food_Too_Good_to_Waste.pdf

Reduce Policy 2

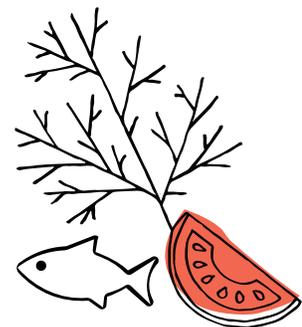
Invite all entities across the food chain to a “food waste challenge” to encourage them to reduce food waste.

Strategies

- Launch a countywide food waste challenge similar to the successful U.S. Food Waste Challenge.
- Develop guidelines and criteria for the challenge.
- Encourage participation by providing free publicity.
- Require participants to take the pledge to reduce food waste in their operations.
- Announce “champions” annually in an awards ceremony and publish their success stories on the County website.

Promising Practices

In 2013, Mayor Bloomberg initiated a **Food Waste Challenge in New York City, NY**. The challenge invited the city’s restaurants to help reduce landfilled food waste by committing to a 50 percent diversion goal by reducing it at the source, donating, or composting. The program required participants to quarterly track their waste generation to measure the reduction. Participating restaurants were offered technical assistance, promotion, and recognition.⁸ More than 100 restaurants participated, and in the first six months, they diverted more than 2,500 tons of food waste from landfills.⁹ In 2016, Mayor de Blasio launched the **Zero Waste Challenge**, which challenged large waste-generating businesses to cut food waste by 50 percent.¹⁰ From February to June 2016, participating 31 businesses diverted 24,500 tons of food waste by composting and 322 tons by donating to people in need.¹¹



8. PlaNYC, Mayor’s Food Waste Challenge for Restaurants. http://www.nyc.gov/html/sbs/downloads/pdf/neighborhood_development/nddblog/FWC_overview.pdf

9. More than 2,500 Tons of Food Waste Diverted From Landfills in Six Months of Food Waste Challenge. Mike Bloomberg, November 22, 2103. <https://www.mikebloomberg.com/news/more-than-2500-tons-of-food-waste-diverted-from-landfills-in-six-months-of-food-waste-challenge/>

10. Zero Waste Challenge. NYC Sustainability. <https://www1.nyc.gov/site/sustainability/initiatives/zero-waste-challenge.page>

11. “ONENYC: Mayor de Blasio’s Zero Waste Challenge Wraps Up With Thousands of Tons of Diverted From Landfills and Incineration. NYC, July 11, 2016. <https://www1.nyc.gov/office-of-the-mayor/news/604-16/onenyc-mayor-de-blasio-s-zero-waste-challenge-wraps-up-thousands-tons-waste-diverted>

Reduce Policy 3

Educate the public about date labels and clarify that date labels indicate food quality, not food safety.

The expiration dates on food products mislead consumers to believe food is not safe and must be discarded if it is past the due date. This belief results in consumers discarding safe wholesome food, causing a significant amount of food waste. A federal Food Date Labeling Act was introduced in 2016 to address confusion about the meaning of date labels and to standardize them, but it has not been enacted. Until a uniform date labeling is established, it is important to educate the public to avoid unnecessary food waste.

Strategies

- In consultation with the Prince George's County Health Department, using all media outlets, announce how food date labels can be misleading and clarify that they are not an indicator of food safety. Provide information on date labels and food safety.
- Prepare a simple eye-catching fact sheet and an infographic about food date labeling and food safety. Post it on the County website and social media.
- Provide other educational materials related to date labels and food safety, including tips on how to test whether food is safe to consume.
- Include date labeling information and education in the “food waste awareness” campaign.
- Provide mini-workshops and distribute the fact sheet at community events to educate the public.
- Educate school children on date labels and food safety as well as food waste.
- Provide fact sheets to SNAP and WIC recipients.
- Encourage food retail outlets and food pantries to post the infographic on date labels to educate their customers.
- Accept food with past due dates at food drives.

Promising Practices

GOVERNMENT WEBSITES

San Diego County, CA has an online Food Program Frequently Asked Questions (FAQs), which includes a question about the meaning of date labels and an explanation of the date labeling system in the county.¹²

Ohio Department of Agriculture, on its website, explains that date labels represent the manufacturers' quality assurance period, and with the exemption of baby food and infant formula, food products may be sold past their due date.¹³

The **Connecticut Department of Energy and Environmental Protection** has a legal fact sheet on date labeling laws, which mentions how date labels can be misleading to consumers causing wholesome food being needlessly thrown away.¹⁴

12. https://www.sandiegocounty.gov/content/sdc/deh/fhd/food/food_faq.html#sellbydates

13. <https://agri.ohio.gov/wps/portal/gov/oda/divisions/food-safety/labeling>

14. https://www.ct.gov/deep/lib/deep/waste_management_and_disposal/Solid_Waste_Management_Plan/Final_Harvard_Food_Fact_Sheets/FINAL_Date_Labeling_Fact_Sheet_for_Connecticut_Food_Donation.pdf

Reduce Policy 4

Support County farms, increase locally-grown food supply, and encourage local food consumption, which would significantly prevent food waste.

Research shows that local, small-scale food production and supply chains reduce pre-consumption food waste to only 5 percent compared to 30-50 percent of industrial systems.¹⁵ Reducing intermediaries and travel distance reduces the odds of spoilage, and food lasts longer for consumers. Consumers who purchase from local food networks waste one-tenth of those who use only conventional retail outlets waste. Community Supported Agriculture (CSA) systems waste 7 percent compared to 55 percent of the large-scale retail systems.¹⁶

Strategies

- Provide grants and interest-free or low-interest loans to farmers for infrastructure, such as deer fence and hoop houses to protect plants from wildlife and extend the growing season; storage; and on-farm processing facilities to avoid spoilage.
- Provide agriculture education and training and establish an internship program to develop the much-needed skilled farm labor for food production and harvesting.
- Lobby at the federal level for an agricultural guest worker program.
- Provide farmers technical assistance with use of technology (software) to increase productivity.
- Support farmers' markets and CSAs, and encourage farmers to provide recipes for vegetables they sell.
- Consider strategies provided for Policy 4 and Policy 5 in the *Healthy Food for All Prince Georgians*¹⁷ about encouraging local food consumption and increasing sustainable local food production, respectively.

Promising Practices

MARKETING SUPPORT

In 2014, **Baltimore, MD** launched the **Homegrown Baltimore Employee Wellness CSA Farmshare**, to include a CSA farmshare program in the unionized city employees' wellness benefits. Employees can be reimbursed up to \$250 of the cost of a CSA share, which is directly delivered from local farms to participating city offices. This program supports local farms and employee health. Any farm that meets the specified qualifications can participate in the program.¹⁸



15. Giulio Vulcano, *Food wastage. Systemic approach and structural prevention*. Full version. June 2018.

16. Ibid.

17. M-NCPPC Prince George's County Planning Department, *Healthy Food for All Prince Georgians: An Assessment of Access to Healthy Food in Prince George's County, Maryland*, November 2015.

18. City of Baltimore, Mayor Rawlings-Blake Launches Homegrown Baltimore Employee Wellness CSA Farmshare, Press release, March 20, 2019.

Reduce Policy 5

Encourage all businesses and institutions that generate food waste to perform an annual food waste audit.

The first step to reduce waste is to measure it. Measuring the amount of food waste and identifying where and why it is generated would allow businesses and institutions to take appropriate actions to reduce it.

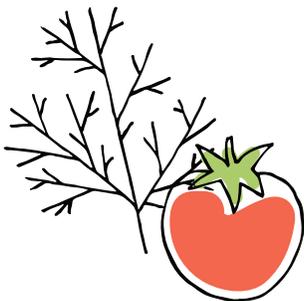
Strategies

- Create a manual or refer to existing online resources for how to conduct a food waste audit.
- Provide workshops on food waste assessment.
- Create a tracking template for keeping annual food waste audit data for each entity.
- Request waste audit results to be shared with the County DoE, so that valuable aggregate data for the County can be obtained. Sharing may be done anonymously by posting on the website to encourage more participation.
- Encourage those who perform food waste audits to develop solutions to reduce their food waste. Offer technical assistance in developing solutions.
- Prepare tip sheets, or refer to existing ones by EPA and other organizations, on how to reduce food waste.

Promising Practices

CITYWIDE FOOD WASTE AUDIT

The **City of Boulder, CO**, paid Boulder Food Rescue, a nonprofit food rescue organization, to conduct a food waste audit.¹⁹ The audit was conducted at 49 retailers and 20 restaurants in the city to understand their food waste, food donation, and composting practices.²⁰ The purpose of the audit was to determine how the city could reduce food waste and commit to a zero-waste goal. Through the waste audit, Boulder was able to identify the most opportune areas for further development of food recovery programs.²¹



19. Caleb Phillips, et.al., Boulder Food Rescue, City of Boulder: Food Waste Audit. February 3, 2016.

20. Harvard Food Law and Policy Clinic and Johns Hopkins Center for a Livable Future, *Good Laws Good Food: Putting Local Food Policy to Work for Our Communities*. 2nd edition. September 2017.

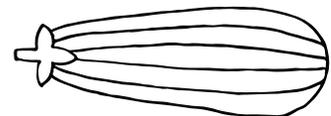
21. Harvard Food Law and Policy Clinic, *Keeping Food Out of the Landfill: Policy Ideas for States and Localities*, October 2016.

Reduce Policy 6

Encourage food retail outlets to reconsider their policies, operational rules, and practices to prevent and reduce food waste.

Strategies

- Encourage food retail outlets to:
 - › Collaborate with suppliers and share forecasts about future product needs to enable them to better plan production.
 - › Change their aesthetics specifications for fruits and vegetables to include all fresh and good tasting produce, regardless of its shape, size, or color, or include a separate “imperfect” produce line.
 - › Sell bulk food as much as possible, so consumers can buy the amount they need.
 - › Reduce the amount of packaged produce.
 - › Display fewer amounts of produce to prevent spoilage.
 - › Sell produce that is not perfect quality at a reduced price.
 - › Sell food that is close to or past its expiration date for a reduced price.
 - › Sell ready-to-eat food for a reduced price after a certain time of the day.
 - › Use or repurpose leftovers, excess food, and good parts of produce that may be damaged or is not appropriate for sale to prepare ready-to-eat food items.
 - › Train staff on food waste prevention strategies, including proper storage and handling of different food items.
 - › Offer customers information on best storage options, food safety tips, and sample recipes.
- Urge food retailers to follow the proposed actions in the Retail Food Waste Action Guide published by ReFED in 2018²² and EPA’s tip sheet “Food Loss Prevention Options for Grocery Stores.”²³



22. *The Retail Food Waste Action Guide*, developed by ReFED and Deloitte Consulting, LLP, is designed to help retail businesses understand the size of the food waste prize and provide industry-specific guidance on implementing food waste reduction solutions and recommendations. It is designed for sustainability directors and business function leaders in the U.S. retail industry responsible for creating and implementing food waste reduction strategies.

23. www.epa.gov/sites/production/files/2016-08/documents/food_loss_prevention_tips_grocerystores_august_2016.pdf

Promising Practices

FOOD DISPLAY

Stop and Shop supermarket chain made drastic changes the way they display food in its perishable departments in all 550 stores. They put out four salmon fillets instead of 10 or eight avocados instead of 24, stacked in a shallow basket with a faux layer to make it look deeper. It took more time to refill the displays, but less work to search for and remove bad products. They also reduced the variety of package sizes available for a particular product and offered loose produce items. These changes resulted in improved customer satisfaction, increased sales, and dramatically reduced food waste. The chain saved \$100 million a year, a savings they passed on to consumers by lowering prices.²⁴

REDUCED PRICE “IMPERFECT” FOOD

California grocery chain Andronico teamed up with FoodStar, a company that rescues unmarketable food, to get too-small Pink Lady apples and sell them from a special discount bin for a much-reduced price. Instead of becoming animal feed or trash, the apples were used for the purpose for which they were intended—to feed people.²⁵



24. Peter Lehner, Food Waste, Aisle 5: How Supermarkets Can Stop Squandering Food and Start Lowering Prices. NRDC Expert Blog, September 21, 2012.

25. Peter Lehner, How Farms, Restaurants, and Grocery Stores are Designing Food Waste Out of the System. NRDC Expert Blog, March 26, 2013.

Reduce Policy 7

Encourage restaurants to reconsider their practices to prevent and reduce food waste.

Consider requiring restaurants to reduce portion sizes or offer smaller portions as an alternative, which may help reduce obesity and food waste.

Strategies

- Encourage restaurants to:
 - › Use software to keep inventory and prevent over-purchasing.
 - › Adjust menus to reduce frequently wasted items.
 - › Ask customers whether they want complimentary items or sides before serving them.
 - › Train staff on food waste prevention strategies, including knife skills to reduce prep waste and cooking tips to avoid waste.
 - › Repurpose leftover kitchen food following food safety guidelines.
- Encourage restaurants that have buffets to:
 - › Go trayless and use small plates to discourage people from getting more food than they can eat.
 - › Use smaller chafing dishes
- Urge restaurants to follow the proposed action steps in the EPA's toolkit *Reducing Wasted Food & Packaging: A Guide for Food Service and Restaurants*²⁶ and the tip sheet "Food Loss Prevention Options for Restaurants,"²⁷ as well as the Restaurant Food Waste Action Guide published by ReFED in 2018.²⁸

26. www.epa.gov/sites/production/files/2015-08/documents/reducing_wasted_food_pkg_tool.pdf

27. www.epa.gov/sites/production/files/2016-08/documents/food_loss_prevention_options_restaurants_august_2016.pdf

28. The *Restaurant Food Waste Action Guide* is a how-to resource based on interviews with sustainability and operations teams at restaurants of varying sizes, a review of businesses' processes and operational data, and interviews with food recovery organizations and ReFED's Advisory Council. It is designed for restaurant sustainability directors, owners, and others in leadership roles in the U.S. restaurant industry who are involved in creating or monitoring food waste reduction strategies. It provides an overview of the national food waste challenge, presents opportunities for companies to address it while improving business outcomes, and identifies action-oriented solutions, tools, and best practices.

Promising Practices

PORTION SIZES

T.G.I. Friday's introduced its “Right Portion, Right Price” entrees after its research revealed that half of Americans wanted smaller portions. This line of entrees, which are one-third smaller and one-third cheaper than regular entrees, accounted for 15 percent of total orders within a year they were introduced. According to TGIF, customers’ total checks stayed about the same.²⁹

USING SOFTWARE

The University of South Dakota’s Sanford Medical Center saved \$100,000 and reduced food waste 43 percent by using Leanpath, a software system that monitors food waste in the kitchen and helps identify areas for waste reduction. The university was able to see where and how waste was occurring and adjusted food orders and trained staff to reduce food waste.³⁰

TRAINING WORKSHOPS

The **Oregon Department of Environmental Quality** partners with local organizations to provide training workshops to restaurant owners and staff on how to reduce food waste in restaurants. Workshops include learning tips about how to trim vegetables, better purchasing and menu planning, using leftovers, buying cosmetically imperfect produce, adjusting portion sizes, using low-waste ingredients, and reducing inventory of perishables.³¹



29. Ellen Simon, “Restaurants Are Shrinking Meal Sizes.” ABC News. <https://abcnews.go.com/Business/Economy/story?id=4798717&page=1#.UFDov7JISbo>

30. Peter Lehner, How Farms, Restaurants, and Grocery Stores are Designing Food Waste Out of the System. NRDC Expert Blog, March 26, 2013.

31. John Darling, “Reduce food waste, help the planet.” *Ashland Tidings*, February 19, 2019.

Reduce Policy 8

Reduce school food waste by using no-cost or low-cost smart strategies.

Strategies

- Schedule recess before lunch to reduce food waste by as much as 30 percent³² by increasing students' appetite and removing the excitement to go play outside.
- Create longer lunch periods to provide enough time for students to eat and reduce plate waste.³³
- Offer a variety of food choices to students to increase the likelihood that students select the foods and beverages they prefer, which increases consumption and reduces waste.
- Focus on palatability of foods since kids eat more when they like the taste of the food.
- Following the Smarter Lunchroom Movement,³⁴ explore changes in the cafeteria to encourage students to increase consumption.
 - Give entrees and vegetables creative age-targeted names.
 - Display fruits in attractive baskets.
- Use share tables in all schools to let students swap unwanted school meal items.
- Engage students in menu preparation by holding taste tests and check food acceptability by conducting surveys or creating a student advisory committee to provide feedback.
- Use different subjects in schools to teach students about food waste and its environmental, economic, and social impacts.
 - In science classes, study how food rots in the landfill and how compost is produced.
 - Create food waste-related posters in arts classes and post them in the cafeteria.
 - In social sciences, study the relationship of food insecurity and food waste and how to reduce both.
- Conduct a food waste audit to determine how much and what is being wasted and why. Get students involved. Based on the results, take necessary actions to reduce food waste.

32. EPA, Food Tips for K-12 Schools: Get Kids To Eat More and Waste Less.

33. According to EPA, extending lunch period from 20 to 30 minutes would reduce plate waste by nearly one-third. EPA, Food Loss Prevention Options for Grade Schools, EPA-530-F-16-019-A, August 2016.

34. <http://smarterlunchrooms.org>

Promising Practices

CREATIVE FOOD NAMING

At **Summit Park Elementary School in New City, NY**, creative food naming resulted in significantly reduced food waste and higher food consumption. The school's bagged carrots were renamed as "Crunchy Carrot Sticks," meatballs as "Meatball Dunkers," apples as "Crunchy Red Apples," white milk as "Mickey's Mighty Milk," orange slices as "Outrageous Oranges," fruit cups as "All-mixed-up Fruit Cup" and broccoli as "Tasty Tree Tops." Comparison of pre-and post-intervention showed the following percentage decreases in wasting these food items: apples (43 percent), bagged carrots (28 percent), broccoli (26 percent), fruit cups (11 percent), meatballs (19 percent), sliced orange (18 percent), white milk (18 percent).³⁵

VISIBILITY AND SELECTION OFFER

In **Montana**, offering versus serving and increasing visibility and convenience of selecting vegetables in five high schools resulted in a significant decrease in vegetable waste. Before this implementation, vegetable waste per tray was 41 percent. Post implementation vegetable waste reduced to 30 percent per tray.³⁶

RECESS BEFORE LUNCH

A study conducted at two elementary schools in **Washington state** showed that the school that had recess prior to lunch had 27.2 percent food waste, compared to 40.1 percent in a school that had recess after lunch. The study also found that when recess was scheduled before lunch, students consumed significantly more food and nutrients than when recess was scheduled after lunch.³⁷

35. Cornell University Cooperative Extension Rockland County, Mickey's Mighty Milk: Food Naming to Reduce Food Waste in an Elementary School Cafeteria. https://www.smarterlunchrooms.org/sites/default/files/documents/Steindorff_mickey%27s%20mighty%20milk%20creative%20naming%20SL%202018%20Z_0.pdf

36. Montana State University and Montana Team Nutrition, Smarter Lunchroom Strategies Decrease Vegetable Waste in Montana High School Cafeterias. https://www.smarterlunchrooms.org/sites/default/files/documents/Bark_SL%20strategies%20decrease%20vegetable%20waste%20Z.pdf

37. Ethan A. Bergman, et.al., "The Relationship of Meal and Recess Schedules to Plate Waste in Elementary Schools," *The Journal of Child Nutrition and Management*, Issue 2, Fall 2004.

REDUCING FOOD WASTE

WHAT SCHOOLS CAN DO TODAY



USDA's Economic Research Service estimates



Scheduling recess before lunch can **reduce plate waste by AS MUCH AS 30%**



Extending lunch periods from **20 TO 30** minutes reduced plate waste by nearly one-third



SMARTER LUNCHROOM STRATEGIES,

such as how foods are named and where they are placed in the cafeteria, can facilitate healthy choices and increase fruit and vegetable consumption by

UP TO 70%



SCHOOLS ACROSS THE COUNTRY ARE STEPPING UP TO THE CHALLENGE WITH INNOVATIVE NEW STRATEGIES, SUCH AS:

- Allowing students to keep a lunch or breakfast food item for consumption later in the school day
- Using techniques listed on the **Smarter Lunchrooms Self-Assessment Score Card** to help reduce food waste
- Setting up a table for kids to place items they are not going to consume (packaged or pre-portioned items)
- Letting kids self-serve
- Composting food waste for school gardens
- Collaborating with local farmers on composting or food-scrap projects
- Collecting excess wholesome food after mealtimes to donate to charitable organizations
- Sign up for the **U.S. Food Waste Challenge** to share your story on how you are reducing, recovering, or recycling food waste

Reduce Policy 9

Lead by example and practice food waste reduction at M-NCPPC and County-owned and operated facilities.

Strategies

- Develop guidelines and educational material about how to reduce food waste at government facilities.
- Offer training to all employees and contractors to instill food waste awareness and teach them how simple changes in their behaviors may lead to big results on reducing the amount of food waste generated.
- During Food Waste Prevention Week, organize events at County agencies to increase food waste awareness and urge employees to participate in food waste reduction activities.
- Perform food waste audits at government facilities and involve employees.
- Publicize the successful food waste reduction activities by County agencies.
- Encourage the public to follow in the County's footsteps and reduce their food waste.

Promising Practices

GOVERNMENT CAFETERIAS

To prevent food waste, the **USDA headquarters** cafeteria reduces prices before closing time to encourage employees to buy food to take home. This practice reduces the amount of food that is discarded at the end of the day.³⁸



³⁸. <https://www.usda.gov/foodwaste/activities>

Recover food waste by connecting potential food donors to hunger relief organizations like food banks and food pantries.

-USDA & EPA



When source reduction fails and excess food becomes available, the best option is to keep it in the human food chain. In this way, its original purpose is conserved, and the use of additional resources to grow more food is prevented.

Recovering surplus food to feed food-insecure people solves more than one problem. Food is rescued, people who are in need have an opportunity to get free or affordable food, and all the resources used to grow and prepare that food are not wasted. Opportunities and creative ways to accomplish food recovery are constantly being developed around the nation.

Food recovery can be an excellent tool for Prince George's County to tackle the challenge of accessing healthy food in underserved communities. Recovering perfectly edible wholesome surplus food and redistributing it in healthy food priority areas is one way of eliminating food inequity. Too much good food is being discarded in the County, while too many residents are food insecure or cannot access healthy and affordable food for various reasons, including the unequitable spatial distribution of food retail stores.³⁹ Food recovery would not only help reduce food insecurity but also divert food waste from the Brown Station Landfill.



³⁹. See M-NCPPC, Prince George's County Planning Department, *Healthy Food for All Prince Georgians: An Assessment of Access to Healthy Food in Prince George's County*, Maryland, November 2015.

Recover Policy 1

Develop markets for products that would not have stayed in the food chain otherwise, which could also alleviate the challenge of access to healthy food in the County.

Strategies

- Establish a year-round indoor/outdoor farmers' market-style retail marketplace where food that could not make the regular markets or surplus unsold food is sold for a reduced price. This "second chance" market would not only rescue food that would otherwise be discarded, but also provide affordable healthy food for residents and create jobs and entrepreneurship opportunities.
 - › Select a location within a healthy food priority area.
 - › Partner with farmers, food processors and distributors, grocery stores, institutions, and restaurants to coordinate food recovery and transportation of recovered food to the market.
 - › Train and prepare workforce for entrepreneurship and job opportunities at the "second chance" market and gig jobs for food delivery in the donation space.
 - › Provide financial and technical assistance to the vendors.
 - › Advertise the "second chance" market as a positive and valuable addition to the County, which is a win-win-win situation to reduce food waste, decrease food insecurity, and create jobs.
 - › Make sure WIC and SNAP are accepted at the "second chance" market.
 - › If successful, repeat these markets at other healthy food priority areas.
- Help establish a food hub where surplus food, including "imperfect" produce, is sold for a significantly discounted price to mobile markets that exclusively serve healthy food priority areas.
 - › Start as a pilot project; expand if successful.
 - › Amend food truck legislation to allow roaming mobile markets in healthy food priority areas.
 - › Allow mobile markets to carry other food items at a different price point.
 - › Mobile markets must accept SNAP and WIC.
- Recruit "social supermarkets" where recovered surplus food is sold for below-market prices and provide incentives to attract them to the County.
- Encourage farmers to harvest "imperfect" produce and provide assistance to market it to retailers, restaurants, and value-added processors and sell it at the "second chance" market and regular farmers' markets.
- Encourage grocery stores to consider offering a reduced-price "imperfect" produce line.
- Encourage grocery stores to sell expired, but still good, food at a reduced price instead of discarding them.

Promising Practices

MARKETPLACE FOR SURPLUS FOOD

Haymarket in **Boston, MA** is an outdoor vendors market where large varieties of fruits and vegetables are sold for prices as much as 75 percent lower than the supermarket prices.⁴⁰ It attracts diverse customers from every ethnic group and income level. The market is operated by the Haymarket Pushcart Association. Its approximately 50 licensed vendors obtain produce from wholesale distribution terminals when food prices are reduced to make room for new shipments arriving over the weekend. The market is open every Friday and Saturday. Because vendors are not allowed to sell after 7 p.m., on Saturdays nearing the closing deadline, unsold produce gets marked down even more.⁴¹



SOCIAL SUPERMARKET

Daily Table, located in **Dorchester, MA and Roxbury, MA**, is a nonprofit retail store that offers a variety of tasty, convenient, and affordable foods. The former president of Trader Joe's, Doug Rauch, founded Daily Table following the "social supermarkets" model popular in Europe. In this model, excess wholesome food is recovered to provide affordable, healthy food for the food insecure. Daily Table offers fresh produce, bread, dairy, and grocery items as well as ready-to-cook and prepared meals at modest prices. SNAP is accepted as well. Many items are prepared fresh daily in their kitchen onsite. Their healthy meal options are priced to compete with the fast-food alternatives in the neighborhood. To make sure their prepared meals and groceries are healthy, they established a Daily Table Nutrition Task Force, composed of representatives from the top-notch medical and public health institutions in Boston, who developed nutrition guidelines that they follow. Daily Table claims to be the healthiest food store in America. Working with a large network of growers, manufacturers, distributors, supermarkets, restaurants, and other suppliers who donate their excess, healthy food enables them to sell good and nutritious food for substantially below market prices. They consider themselves the T.J. Maxx or Marshalls for food; they sell overstocked quality items in a first-rate retail setting at truly affordable prices. Daily Table also offers free nutrition and cooking classes. Each store created 30 jobs; all were hired from the communities where stores are located. They also created a Community Advisory Council whose members serve as ambassadors and advisors.⁴²

IMPERFECT PRODUCE SALES

Sales of "ugly" or "imperfect" produce at supermarkets are increasing around the world. In 2014, to fight against food waste, **Intermarché**, the third-largest supermarket chain in **France**, launched an "inglorious fruits and vegetables" campaign. It started selling misshaped but fresh produce at a 30 percent discount. As a result, the store traffic increased 24 percent.⁴³ Following Intermarché, **Loblaws**, the largest food retailer in **Canada**, launched a similar campaign in 2015 to curb the country's food waste problem.⁴⁴ In the **United States**, **Kroger** recently announced its plans to introduce an "ugly produce" brand called Pickuliar Picks, with a tagline "imperfect but perfectly delicious." The imperfect produce brand is part of Kroger's Zero Hunger/Zero Waste program launched in September 2017. Through this initiative, it aims to eliminate hunger in the communities it serves and food waste companywide by 2025.⁴⁵

40. "Haymarket: Boston's Historic Market," Boston Discovery Guide. <https://www.boston-discovery-guide.com/haymarket-boston.html>

41. "Haymarket – Boston," Wikipedia.

42. Daily Table web site: <https://dailytable.org>

43. "In Europe, Ugly Sells in the Produce Aisle," The Salt, NPR, Inc., December 9, 2014.

44. Natasha Geiling, "Canada's Largest Food Retailer to sell Ugly Produce at Low Prices to Cut Food Waste" THINKPROGRESS, March 17, 2015.

45. Russell Redman, "'Ugly' produce brand on the way from Kroger," Supermarket News, October 29, 2018.

Recover Policy 2

Encourage donation of surplus food.

As a part of the food waste awareness campaign, use a variety of methods to encourage businesses and residents to donate their surplus food to appropriate recipients, as defined by law.

Strategies

- Educate people about liability protection for food donation. Prepare informational brochures about federal and state liability protection laws, include food safety regulations as well. Post them on the County website and social media.
- Make donors aware of the federal tax incentives for food donations. Offer additional tax credits at the local level.
- Lobby for state legislation to allow nonprofits to sell donated food to cover transportation and handling expenses and still be covered by liability protection laws.
- Lead by example by requiring the donation of excess edible food at County and M-NCPPC events and all events held in County and M-NCPPC facilities.
- Identify convenient drop-off locations throughout the County for residents to donate their excess packaged food items and let anti-hunger organizations pick them up for distribution to people in need.
- Encourage the Prince George's County Public Schools to develop a surplus food donation program as a part of share table, summer feeding, and community feeding programs. Use these programs to educate students and their parents about food waste reduction and hunger.
- Encourage gleaning of unharvested food. Connect farmers and gleaners.



Promising Practices

FOOD DONATION ACTION PLAN

County of San Diego, CA, in collaboration with food system and food donation organizations and stakeholders, developed a *Food Donation Action Plan for the San Diego Region*.⁴⁶ The action plan includes basic information and data about food waste and donations, needs assessment, and recommendations on food safety, infrastructure, food distribution materials, outreach, volunteers, trainings to improve pantry operations, and further research.

GUIDE TO FOOD DONATIONS

Washington County, OR, has an informational flyer explaining why, what, and how businesses should donate surplus food and outlining liability protections under Oregon Good Samaritan laws and federal Bill Emerson Food Donation Act.⁴⁷ **New York City, NY**, created a three-step guide to businesses on how to develop a food donation policy, identify healthy foods to donate, and where to donate. It also provides information about federal and state donation liability protections, tax deductions, and food safety.⁴⁸

GOVERNMENT POLICIES

“In 2010, **Los Angeles, CA**, adopted a policy that requires all city departments and elected officials to donate surplus food to area food banks and other food rescue organizations.”⁴⁹ “In 2016, **Tennessee** passed a resolution encouraging all state agencies and their contractors to donate excess food to local nonprofit organizations.”⁵⁰

SCHOOL FOOD DONATION

Food Rescue, a national food recovery organization based in Indiana, established a **K-12 Food Rescue** program to eliminate school food waste. Food Rescue has connected more than 700 schools in more than a dozen states with food pantries since 2007, resulting in more than a million meals annually being diverted from landfills and fed to children and families in need. Their Student Led Entrepreneur Initiative provides the platform for students to take the lead on ending the disposal of unopened and unpeeled food items that they choose not to eat. The K-12 Food Rescue program is a food waste diversion program promoted to students. While the donation piece is the obvious avenue used to keep the food out of the landfill, kids are not encouraged to donate food, rather be good stewards of the environment by not feeding landfills. Food Rescue’s free online tracking tool helps track the impact of the program on the environment and hunger relief. K-12 Food Rescue programs are a joint cooperative venture between local schools, local food pantries/qualified agencies, and local health departments. The success of a K-12 Food Rescue program is dependent upon these three entities working together, rather than separately.⁵¹

46. County of San Diego, Food Donation Action Plan for the San Diego Region, June 2018.

47. Washington County Department of Health and Human Services, Donate surplus food from your business. https://www.co.washington.or.us/hhs/swr/recycleatwork/upload/food-donation-flyer-2_2014.pdf

48. New York City Department of Health and Hygiene, Human Resources Administration, and Mayor’s Obesity Task Force, Simple Steps to Donate Your Healthy Surplus: A Guide for Food Donations. <https://www1.nyc.gov/assets/doh/downloads/pdf/public/food-donor-resource-guide.pdf>

49. Harvard Food Law and Policy Clinic, Keeping Food Out of the Landfill: Policy Ideas for States and Localities, October 2016., p. 77.

50. Ibid.

51. www.foodrescue.net

Recover Policy 3

Facilitate collaboration of food recovery and anti-hunger organizations and help them develop partnerships with food donors, which would increase the efficiency and volume of food donations.

Strategies

- The County government should take the lead to facilitate the efforts of numerous organizations to recover and/or provide food to residents in need. Usually, these are duplicated efforts using limited resources. Because of the lack of capacity, they cannot recover large amounts of perfectly edible surplus food generated in the County, which usually ends up wasted.
- Empower these organizations by joining their forces, connect them with potential food donors, help them with developing logistics, and acknowledge them for providing this much needed service to the food-insecure residents in the County.
- Identify gaps in the current system that cannot be corrected without centralized logistical support. This is support that would minimize the need for expensive infrastructure like food bank warehouses and large distribution systems where efficiency can meet the needs instead.
- Convene a series of workshops with different food-sector businesses that donate or help donate food with hunger-relief and anti-hunger organizations. Identify any roadblocks that interfere with efficient donations and achieving zero-food waste in the County.

Promising Practices

COORDINATING DONATIONS

Food Donation Connection (FDC) serves as the liaison between restaurants interested in donating food and local hunger relief agencies. FDC helps restaurants develop and implement programs designed to provide an alternative to discarding surplus wholesome food. FDC administers food donation programs using an efficient communication and reporting network. The donating process is based on donors receiving an economic benefit through tax savings in addition to involvement with community and corporate goodwill. Funding comes from a small portion of the donor partners' incremental tax savings that is earned from properly saving and donating their surplus food. Program responsibilities include linking donor locations with food rescue groups or those feeding the needy, assisting in the development of product quality and handling standards, tax valuation, donation reporting and ongoing monitoring, and follow-up to ensure program implementation and growth. Since 1992, FDC coordinated the donation of more than 550 million pounds of quality prepared food from food service providers located in 18 countries, including the United States. In 2017, 1,400 business entities donated 50 million pounds of prepared surplus food to 11,000 hunger relief organizations.⁵²

52. www.foodtodonate.com

Recover Policy 4

Establish a nonprofit food rescue organization.

Strategies

- Recruit food businesses that volunteer to donate their surplus food.
- Identify potential recipients, including local pantries, soup kitchens, and shelters. Be sure to include recipients that can take prepared and perishable foods.
- Recruit “food runners” who can transport food. Train them on how to safely handle food.
- Exploit and expand an existing U.S. EPA database of potential donors, recipients, and food runners and establish a network system.
- Using software, identify available surplus food and immediately find recipients and food runners to get the food from the donor and promptly deliver it to the recipient.

Promising Practices



Community Food Rescue (CFR), a program of Manna Food Center, is the coordinated food recovery network of **Montgomery County, MD**.

CFR grew out of the vision of the Montgomery County Council. In 2012, the County Council adopted and funded the Montgomery County Food Council's action plan to create a coordinated, collaborative food recovery network. CFR uses innovative technology, a food matching app called ChowMatch, to match perfectly good food that local businesses would have thrown away to food assistance

organizations that serve food insecure people. Reducing food waste also helps to achieve Montgomery County's recycling goal of 70 percent by 2020. CFR has extensive resources on its website, including food safety guidelines for food donors, food runners, and recipients.⁵³ CFR is a proud member of the Food Council's Recovery and Access Working Group that continues to support and advise them. Community Food Rescue is generously supported by Montgomery County, Burness, the Mead Foundation, and other private funders.

412 Food Rescue in **Pittsburgh, PA**, is a nonprofit rapid response organization with a reverse logistics model that uses technology to aggregate and intelligently match food donors and beneficiaries. It was founded as a direct response to the disconnect between food waste, hunger, and environmental sustainability. It aims to fight hunger and promote sustainability by redirecting good food from landfills to people. Leveraging technology, civic engagement, and public-private partnerships, 412 Food Rescue designed a new transport and distribution model that effectively responds to the opportunity of retail food surplus. 412 Food Rescue's technology platform, also known as “Food Rescue Hero,” is an end-to-end system that matches food donations to the appropriate nonprofits, coordinates a last-mile transportation network of volunteers, trains volunteers on food safety, and tracks data and analytics—measuring impact on hunger and the environment. 412 Food Rescue's process minimizes the impact of food recovery on donors' operations, allowing them to maximize their impact on their communities, reducing their waste management costs, and lowering their carbon footprint.⁵⁴

53. <https://www.communityfoodrescue.org/>

54. <https://412foodrescue.org/>

Recover Policy 5

Help establish a sustainable “food runner” enterprise specialized in delivering surplus food to hunger-relief organizations.

Transportation of surplus food, especially cooked meals, is the biggest challenge in food recovery. It must be done immediately to maintain food safety. Donors usually are not and do not want to get involved in the delivery of the food they donate. Most of the recipient nonprofit organizations do not have the capacity or resources to pick up the food immediately upon getting notification. Many organizations rely on volunteers, but volunteers are not always easily available. While hungry people are eagerly waiting for food, perfectly edible surplus food is frequently discarded because of lack of readily available “food runners.”

A feasibility study⁵⁵ shows that a food runner business model, similar to Uber or Lyft, could help fill this service gap well. “A successful food runner business would serve to reduce the amount of wasted food, provide more food for hunger relief, leverage the financial resources of philanthropic institutions, reduce food insecurity through new jobs, and be self-sustaining.”⁵⁶ A food runner company would contribute to the County’s economic development by creating jobs. It would help reduce food waste by providing consistent and reliable service not only to hunger relief organizations but also donor businesses by finding outlets for their surplus food. Food runners may also deliver food that could not make the regular marketplace to resellers at outlets such as the “second chance” market recommended in Recover Policy 1.

Strategies

- Recruit entrepreneurs to launch a food runner enterprise.
- Provide a grant or low-interest loan for business start-ups.
- Encourage the food runner company to purchase some vehicles so that people who do not have a car can also get a job as a food runner.
- Consider selling reliable surplus government cars for a low-price to the food runner company.
- Help recruit potential food runners and train them on food safety and proper food handling and delivery.
- Advertise the food runner company to both food businesses and hunger relief organizations.
- Connect food runners to the “second chance” market.

55. Thomas O'Donnell, Uplift Solutions, Inc., Food Runner: A Surplus Food Delivery Enterprise Providing Food to Hunger relief Organizations and Other Businesses. October 2017.

56. Ibid.

Promising Practices

Hungry Harvest, based in **Baltimore, MD**, and growing nationwide, is a company that rescues surplus food and delivers to consumers. Their drivers, called “Delivery Heroes,” are independent contractors. They earn a per-stop commission between \$2-\$10, based on the density of the route and distance traveled, averaging \$23-\$27 per hour. It appears they earn an average of 57 percent more per hour than Uber or Lyft drivers. They may also get a weekly free box of produce if they work a specified number of hours.⁵⁷

DoorDash is a national delivery company that primarily delivers food from restaurants to customers. DoorDash guarantees a minimum payment to its contracted drivers, called Dashers, per trip. Delivery pay is at least \$1 plus 100 percent of tip. If the sum is less than the guaranteed amount, Door Dash provides a pay boost, based on factors such as complexity of the order or the distance traveled, to reach the guaranteed amount.⁵⁸



57. <https://www.hungryharvest.net/drivers>

58. <https://www.doordash.com/>

Recycle food waste to feed animals or to create compost, bioenergy, and natural fertilizers.

-USDA & EPA



Recycling food waste for other uses, including animal feed, energy, and compost, helps keep food waste out of landfills. In addition, by recycling food scraps, we conserve resources that would otherwise be used to produce these items. Turning food waste into energy also contributes to the alternative energy creation efforts.

If wasted food is not fit for human consumption, the next best option is to divert it for animal feed. If it cannot be used for feeding animals, then recycling options for industrial use should be considered. Options for this include byproduct recycling and anaerobic digestion, which both allow processing food waste into energy or nutrients. Composting, a process that speeds up the natural decomposition of organic materials, is the most commonly used method to recycle food scraps to create a nutrient-rich soil amendment. Compost is added to the soil to help growing food, closing the food system loop. In addition to improving the soil and enhancing beneficial microbes that help reduce plant diseases and pests, compost enhances rainfall penetration, which reduces water runoff and soil erosion.⁵⁹



59. USDA Food Waste Challenge, Recycling. <https://www.usda.gov/oce/foodwaste/resources/recycle.htm>

Recycle Policy 1

Ban food waste at the Brown Station Road Sanitary Landfill in a tiered approach. Mandate residents and businesses separate their food waste and select alternative ways to reuse/recycle it following the EPA food waste hierarchy.

Strategies

- Mandatory food waste separation and a landfill ban should be phased in. It may start with large food waste generators and slowly include others.
- During the phase-in period, providing incentives would encourage people to separate their food waste and prepare them for the new practice. Incentives should be prioritized based on the EPA food waste hierarchy, with bigger incentives for food donations and lesser incentives for composting.
- Consider using “Pay-As-You-Throw” (PAYT) method until the full ban is implemented. Under PAYT, people pay for their regular trash collection by volume or weight. This system incentivizes trash reduction and the diversion of recyclable and compostable materials.
- For restaurants and grocery stores, provide special food scrap dumpsters at a reduced price.
- For large food waste generators, provide low-interest loans for waste compactors.
- Lead by example by starting the food scrap separation at County and M-NCPPC facilities where food is served or sold.



Brown Station Road Sanitary Landfill

Promising Practices

ORGANIC BANS

Five states and several jurisdictions have food waste bans or mandatory food waste recycling laws. **Connecticut, Massachusetts, Rhode Island, and Vermont** enacted organic waste ban laws, and **California** has a recycling law that requires either composting or anaerobically digesting organic waste. Vermont is the only state that extends coverage to households, including them at the end of the phase-in period in 2020. Other state laws apply to industrial, commercial, and institutional food service sectors, but restaurants are excluded in Connecticut. Food donations and economic development increased in states that have passed organic waste bans. In Vermont, there was 60 percent increase in food rescue, and in Massachusetts, more than 500 jobs were created within two years.⁶⁰

New York City, NY; Austin, TX; San Francisco, CA; Seattle, WA; and Boulder, CO, are among the jurisdictions that passed similar laws. Although these laws are structurally similar, they take many different forms in terms of entities covered and how much food waste generated or how far an entity is located from recycling facilities.⁶¹ Only San Francisco includes residential food waste in its mandatory composting law.

PAY-AS-YOU-THROW (PAYT)

Natick, MA, has been using PAYT system for about 15 years. They started it when the town faced a budget crisis. Trash disposal cost was a big chunk of their budget, so they started charging per bag. Two sizes of special trash bags are sold at grocery stores, and if the trash is not in one of these bags, it is not picked up. There is no fee for recycling. Upon implementation of this system, trash tonnage decreased by 30 percent, recycling increased by a similar amount, and the town saved \$1.5 million a year.⁶²

Locally, the **Town of New Windsor in Carroll County, MD**, initiated a pilot PAYT program, called Fair Trash Reduction (FuTuRe), in November 2018. The town started seeing success right away with a 44 percent decrease in solid waste and almost doubling the recycling rate in the first month. The participation rate is about 98-99 percent.⁶³

60. Harvard Food Law and Policy Clinic and Johns Hopkins Center for a Livable Future, Good Laws, *Good Food: Putting Local Food Policy to work in Our Communities*, September 2017.

61. Ibid.

62. Danielle Niles, "Pay as You Throw Trash Programs Becoming More Popular in Massachusetts," WBZ-TV, October 17, 2014. <http://boston.cbslocal.com/2014/10/17/many-mass-communities-using-pay-as-you-throw-programs>

63. Emily Chappell, "Nearly two months in, New Windsor pay-as-you-throw trash program sees drop in solid waste and rise in recycling," Carrol County Times, January 2, 2019.

Recycle Policy 2

Encourage use of food scraps as animal feed.

Strategies

- Provide guidance, technical assistance, and education on laws and regulations about feeding food scraps to animals, safe and proper handling, and benefits of this practice.
- Create a blog on the County website to link large food scrap generators with animal farmers and feed manufacturers.
- Encourage large food waste generators to send their food scraps to animal farms or feed manufacturers.
- Encourage farmers to feed their animals with food scraps as much as possible.
- Encourage food service operators and contractors that serve food at M-NCPPC facilities to send their food scraps to appropriate M-NCPPC facilities to feed the animals.
- Encourage rendering of animal byproducts for animal feed or other industrial products.
- Encourage large meat waste generators to send their waste to manufacturers for rendering.

Promising Practices

GUIDANCE AND EDUCATION

The **New Mexico Recycling Coalition** prepared a resource guide for restaurants, which includes guidelines on feeding food waste to animals. It summarizes applicable state and federal laws and regulations, benefits and challenges of the practice, contact persons for further information, and links and resources on the subject.⁶⁴

PARTNERSHIP WITH LOCAL FARMS

In **Gardner, MA**, Gardner Ale House, a brew pub and restaurant, received a grant from the Massachusetts Department of Environmental Protection to divert their food waste. The restaurant partnered with a local pig farm to send spent barley malt from its brewing operations, which is 15 percent of the restaurant's waste, three times a week to feed the animals.⁶⁵



64. N.M. Recycling Coalition, *Managing Food Waste in NM Restaurants*, November 2014.

65. Harvard Food Law and Policy Clinic, *Keeping Food Out of the Landfill: Policy Ideas for States and Localities*, October 2016.

Recycle Policy 3

Support and explore ways to convert food waste to energy.

Strategies

- Partner with the Washington Suburban Sanitary Commission (WSSC) to establish an anaerobic digestion⁶⁶ system at the Western Branch Water Treatment Plant that combines wastewater and food waste to generate renewable energy.
- Establish a biofuel production facility from cooking oil. Support private biofuel facilities.
- Encourage private anaerobic digestors (AD) to convert food waste into energy. Provide incentives, such as low-interest loans or tax credits, to businesses and farms that build ADs.
- Make necessary changes to the Zoning Ordinance to allow appropriate size ADs in commercial and industrial zones and on farms and urban farms.
- Provide incentives to residents who use a home biogas system (mini AD) to turn their food waste into renewable energy.

Biogas Systems The Basics

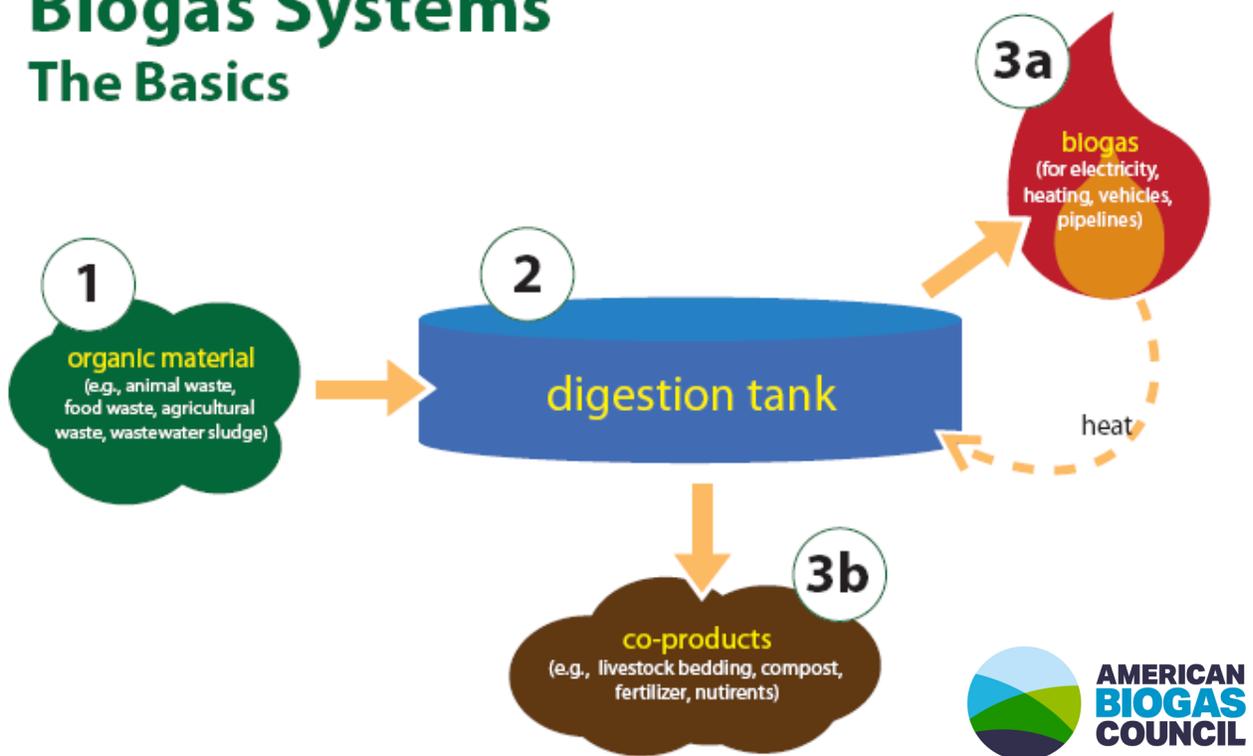


Image courtesy of American Biogas Council.

66. Anaerobic digestion is a food waste management system. By breaking down organic waste, including food waste, an anaerobic digester (AD) generates biogas. Biogas can be used to generate electricity and can be substituted for traditional natural gas. The AD process also creates useful byproducts like pathogen-free fertilizer and compost. (American Biogas Council).

Promising Practices

ANAEROBIC DIGESTORS

In the past 15 years, the **East Bay Municipal Utility District's (EBMUD)** wastewater treatment plant in **Oakland, CA**, has been converting food scraps into renewable energy. “EBMUD serves approximately 650,000 people in an 88-square-mile area along the east shore of the San Francisco Bay.”⁶⁷ It converts up to 40 tons of restaurant food scraps to electrical power daily.⁶⁸ EBMUD uses the anaerobic digestion process to convert these food scraps into renewable energy called biogas. (See Appendix 9 for the anaerobic digestion process to recycle food waste.) “Biodegradable wastes in sewage, food scraps and grease from local restaurants, plus waste streams from wineries and poultry farms are mixed together in large tanks and “digested” by microorganisms. The biogas emitted by the microorganisms is captured and used to generate renewable energy to power the wastewater treatment plant. In 2012, EBMUD became the first wastewater treatment plant in North America to produce more renewable energy onsite than is needed to run the facility.”⁶⁹ Excess renewable energy is sold back to the electrical grid to reduce greenhouse gas emissions. Biogas production enables EBMUD to save approximately \$3 million each year.⁷⁰

An anaerobic digester in **Johnston, RI**, designed to process food waste started to operate in winter 2018-2019. The \$18.9-million facility has capacity to process 250 tons organics daily. It accepts large-scale shipments of liquid and solid organic waste from food manufacturers, schools, and grocery stores. Up to 3.2 megawatts of electrical output can be generated using biogas for plant operations or feeding the grid.⁷¹

BIOFUEL

In **New York City, NY**, some companies collect used cooking oil (yellow grease) from restaurants and process it into biodiesel. Since the city requires heating fuel to contain 2 percent biodiesel and the restaurants to separate yellow grease from regular trash and not to pour it down the drain, entrepreneurs saw it as an opportunity.⁷² By getting into this business, they “are helping the city achieve several PlaNYC goals: transforming waste into a valuable commodity, stimulating the local economy, and reducing air pollution and greenhouse gas emissions.”⁷³

67. EPA, Food Waste to Energy: How Six Water Resource Recovery Facilities are Boosting Biogas Production and the Bottom Line, EPA 600/R-14/240, September 2014.

68. EBMUD, Food Scrap Recycling. <https://www.ebmud.com/wastewater/recycling-water-and-energy/food-scraps-recycling/>

69. EBMUD, Recycling Water and Energy. <https://www.ebmud.com/wastewater/recycling-water-and-energy/>

70. Ibid.

71. “Anaerobic Digest,” BioCycle, February 2019, Vol. 60, No. 2.

72. PlaNYC: A Greener, Greater New York, Update April 2011, p. 141.

73. Ibid.

Recycle Policy 4

Establish a comprehensive composting program that includes all levels of composting.

Strategies

- Educate residents and businesses about the benefits of composting and the use of compost via a variety of ways and tools. Combine this education with overall food waste awareness campaign.
- Establish partnerships with various entities involved in composting and collaborate with them to develop logistics for collecting and composting food scraps.
- Establish a grant or loan program to fund infrastructure and support composting activities in the County.
- Initiate a food scrap drop-off for composting. Identify convenient locations to place collection bins or dumpsters. Partner with grocery stores and farmers' markets to include them as drop-off sites.
- Prior to expanding the residential curbside food scrap collection program countywide, plan for extensive outreach and education to residents. Make sure to announce that compost bins are more secure than regular trash containers to keep vermin away.
- Expand the Prince George's County Organics Composting Facility (OCF) to accommodate all in-County food waste and more. Currently, only one-quarter of the land is used, so there is room for expansion.
- Purchase a de-packaging machine at OCF so large amounts of packaged food waste from commercial generators can be separated for composting. This will also allow packaging materials to be sent for recycling, diverting a significant amount of waste from the Brown Station Road Sanitary Landfill.
- Encourage schools to send their food waste to the OCF.
- Market LeafGro™ and LeafGro Gold™ extensively using various marketing tools, including social media. Explore ways to bag LeafGro Gold™ to allow residents to purchase small amounts.
- Encourage community composting.⁷⁴ Provide technical assistance to municipalities to establish their composting operations. Provide low-interest loans for composting infrastructure, such as in-vessel composting system as well as compost bins for residents and businesses.
- Encourage large food waste generators to establish onsite composting operations and provide technical and financial assistance. Provide technical and financial assistance to farms that develop small-scale composting operations and accept food scraps from nearby commercial and residential generators.

74. See Appendix 10 for the benefits of community composting.

Strategies

- Encourage backyard composting. Partner with ILSR to provide training to residents.
- Promote composting as an entrepreneurial opportunity. Provide composting education at the Prince George's Community College.
- Identify appropriate government surplus properties for composting operations and rent them to entities interested in establishing community or industrial-size composting facilities.
- Initiate a school-based composting program to teach students how to compost and use the finished compost in school gardens.



In-vessel composting



Promising practices

FOOD SCRAP DROP-OFF

The **District of Columbia's** Department of Public Works offers a free food waste drop-off program for city residents. There are drop-off sites at designated farmers' markets in all eight wards. Food waste is sent to a local composting site create compost.⁷⁵

COMMUNITY COMPOSTING

"The **New York City** Department of Sanitation's (DSNY) Bureau of Waste Prevention, Reuse, and Recycling (BWPRR) created the **NYC Compost Project** in 1993 to build public understanding and support for local composting initiatives."⁷⁶ Today, in New York City, there are more than 200 community composting sites and close to a dozen mid-size composting operations. They use a variety of methods, including tumblers, three-bin systems, and windrows. At one location, they use an in-vessel composting system.⁷⁷ Because of its size and significantly lower cost compared to centralized composting programs, the NYC Compost Project has been supported by every administration over the years.⁷⁸ The NYC Compost Project originally started as a partnership between BWPRR and the City of New York's four botanical gardens and focused on outreach, education, and technical assistance. Over time, this educational program has expanded to include a much larger operational component. As interest in neighborhood-based composting grew, BWPRR launched the **Local Organics Recovery Program (LORP)** in 2012 to provide residents more opportunities to drop off food scraps and compost them locally. BWPRR partners with nonprofit organizations that have experience in food scrap composting to run LORP. The program's certified Master Composters also volunteer along with NYC Compost Project staff to assist residents with community composting operations.⁷⁹ In addition to a growing number of backyard and community garden composting, in the past decade, the medium-scale community composting sector has grown considerably. This is both because of increased awareness about food waste and a greater demand for compost by emerging urban farms. LORP established neighborhood-based food scrap drop-off sites at farmers' markets, libraries, specialty food markets, and even at subway stations.⁸⁰ BWPRR admits that community composting cannot be the only solution to food waste management, but they acknowledge its important role. They are aware that there are residents who want their food waste composted in their own neighborhood to be used for greening projects or growing food in a local community garden.⁸¹

SUPPORT TO FARM COMPOSTING OPERATIONS

Massachusetts provides a model for using small-scale farms to support its organic waste ban. Farms with composting operations that receive less than 105 tons per week of vegetative and food material are exempt from permitting requirements. This exemption plays a significant role to ensure the important role farm-based composters play in achieving the state's organic diversion goals.⁸²

75. D.C. Department of Public Works, Food Waste Drop-Off. <https://dpw.dc.gov/foodwastedropoff>

76. Nora Goldstein, "Community Composting in New York City," *BioCycle*, November 2013, Vol. 54, No.11.

77. *Ibid.*

78. *Ibid.*

79. *Ibid.*

80. *Ibid.*

81. *Ibid.*

82. Zoe Neale, "Assessing Organics Processing Capacity in Massachusetts," *BioCycle*, October 2014, Vol. 55, No. 9.

SCHOOL COMPOSTING PROGRAM

In **San Francisco, CA**, the Department of the Environment has a **Food to Flowers! Lunchroom Composting** program. They offer 30-minute compost monitor trainings to students to monitor and help their peers sort properly in the lunchroom. They train school staff on how to properly compost and recycle at school and role modeling proper behavior to the students. In addition to trainings, the department provides aprons, curriculum, signs for carts, and classroom materials and organizes dynamic assemblies featuring their mascot Phoebe the Phoenix.⁸³



83. SF Environment, Food to Flowers! Lunchroom Composting. <https://sfenvironment.org/food-to-flowers-lunchroom-composting>



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Appendix 1. Food Product Dating



United States Department of Agriculture

Food Safety Information

Food Product Dating

"Best if Used By" is a type of date you might find on a meat, poultry, or egg product label. Are dates required on these food products? Does it mean the product will be unsafe to use after that date? Here is some background information answering these and other questions about product dating.

What is Food Product Dating?

Two types of product dating may be shown on a product label. "Open Dating" is a calendar date applied to a food product by the manufacturer or retailer. The calendar date provides consumers with information on the estimated period of time for which the product will be of best quality and to help the store determine how long to display the product for sale. "Closed Dating" is a code that consists of a series of letters and/or numbers applied by manufacturers to identify the date and time of production.

Does Federal Law Require Dating?

Except for infant formula, product dating is not required by Federal regulations.

For meat, poultry, and egg products under the jurisdiction of the Food Safety and Inspection Service (FSIS), dates may be voluntarily applied provided they are labeled in a manner that is truthful and not misleading and in compliance with FSIS regulations¹. To comply, a calendar date must express both the month and day of the month. In the case of shelf-stable and frozen products, the year must also be displayed. Additionally, immediately adjacent to the date must be a phrase explaining the meaning of that date such as "Best if Used By."

Are Dates for Food Safety or Quality?

Manufacturers provide dating to help consumers and retailers decide when food is of best quality. Except for infant formula, dates are not an indicator of the product's safety and are not required by Federal law.

How do Manufacturers Determine Quality Dates?

Factors including the length of time and the temperature at which a food is held during distribution and offered for sale, the characteristics of the food, and the type of packaging will affect how long a product will be of optimum quality. Manufacturers and retailers will consider these factors when determining the date for which the product will be of best quality.

For example, sausage formulated with certain ingredients used to preserve the quality of the product or fresh beef packaged in a modified atmosphere packaging system that helps ensure that the product will stay fresh for as long as possible. These products will typically maintain product quality for a longer period of time because of how the products are formulated or packaged.

The quality of perishable products may deteriorate after the date passes, however, such products should still be safe if handled properly. Consumers must evaluate the quality of the product prior to its consumption to determine if the product shows signs of spoilage.

What Types of Food are Dated?

Open dating is found on most foods including meat, poultry, egg and dairy products. "Closed or coded dates" are a series of letters and/or numbers and typically appear on shelf-stable products such as cans and boxes of food.

What Date-Labeling Phrases are Used?

There are no uniform or universally accepted descriptions used on food labels for open dating in the United States. As a result, there are a wide variety of phrases used on labels to describe quality dates.

Examples of commonly used phrases:

- A **"Best if Used By/Before"** indicates when a product will be of best flavor or quality. It is not a purchase or safety date.
- A **"Sell-By"** date tells the store how long to display the product for sale for inventory management. It is not a safety date.
- A **"Use-By"** date is the last date recommended for the use of the product while at peak quality. It is not a safety date except for when used on infant formula as described below.

¹ 9 CFR 317.8 and 381.129

Food Product Dating

What Date-Labeling Phrase does FSIS Recommend?

USDA estimates food loss and waste at 30 percent of the food supply lost or wasted at the retail and consumer levels². One source of food waste arises from consumers or retailers throwing away wholesome food because of confusion about the meaning of dates displayed on the label. To reduce consumer confusion and wasted food, FSIS recommends that food manufacturers and retailers that apply product dating use a "Best if Used By" date. Research shows that this phrase conveys to consumers that the product will be of best quality if used by the calendar date shown. Foods not exhibiting signs of spoilage should be wholesome and may be sold, purchased, donated and consumed beyond the labeled "Best if Used By" date.

Safety After Date Passes

With an exception of infant formula (described below), if the date passes during home storage, a product should still be safe and wholesome if handled properly until the time spoilage is evident ([Chill Refrigerate Promptly](#)). Spoiled foods will develop an off odor, flavor or texture due to naturally occurring spoilage bacteria. If a food has developed such spoilage characteristics, it should not be eaten.

Microorganisms such as molds, yeasts, and bacteria can multiply and cause food to spoil. Viruses are not capable of growing in food and do not cause spoilage. There are two types of bacteria that can be found on food: pathogenic bacteria, which cause foodborne illness, and spoilage bacteria, which cause foods to deteriorate and develop unpleasant characteristics such as an undesirable taste or odor making the food not wholesome, but do not cause illness. When spoilage bacteria have nutrients (food), moisture, time, and favorable temperatures, these conditions will allow the bacteria to grow rapidly and affect the quality of the food. Food spoilage can occur much faster if it is not stored or handled properly. A change in the color of meat or poultry is not an indicator of spoilage ([The Color of Meat and Poultry](#)).

Can Food be Donated After the Date Passes?

Yes. The quality of perishable products may deteriorate after the date passes but the products should still be wholesome if not exhibiting signs of spoilage. Food banks, other charitable organizations, and consumers should evaluate the quality of the product prior to its distribution and consumption to determine whether there are noticeable changes in wholesomeness ([Food Donation Safety Tips](#)).

² <http://www.usda.gov/oc/foodwaste/sources.htm>

Dating Infant Formula

Federal regulations require a "Use-By" date on the product label of infant formula under inspection of the U.S. Food and Drug Administration (FDA). Consumption by this date ensures the formula contains not less than the quantity of each nutrient as described on the label. Formula must maintain an acceptable quality to pass through an ordinary bottle nipple.

The "Use-By" date is selected by the manufacturer, packer or distributor of the product on the basis of product analysis throughout its shelf life, tests, or other information. It is also based on the conditions of handling, storage, preparation, and use printed on the label. Do not buy or use baby formula after its "Use-By" date.

What Do Can Codes Mean?

Packing codes are a type of closed dating which enable the tracking of product in interstate commerce. These codes also enable manufacturers to rotate their stock and locate their products in the event of a recall.

Codes appear as a series of letters and/or numbers and refer to the date the product was canned. The codes are not meant for the consumer to interpret as a "Best if Used By" date.

Cans must exhibit a code or the date of canning. Cans may also display "open" or calendar dates. Usually these are "Best if Used By" dates for peak quality. Discard cans that are dented, rusted, or swollen. High-acid canned foods (e.g. tomatoes and fruits) will keep their best quality for 12 to 18 months. Whereas, low-acid canned foods (e.g. meats and vegetables) will keep for two to five years. Additional information on food canning and the handling of canned foods may be found at [Shelf-Stable Food Safety](#).

Dates on Egg Cartons

Use of either a "Sell-By" or "Expiration" (EXP) date is not a federal regulation, but may be required, as defined by the egg laws in the state where the eggs are marketed. Some state egg laws do not allow the use of a "sell-by" date.

Many eggs reach stores only a few days after the hen lays them. Egg cartons with the USDA grade shield on them must display the "pack date" (the day that the eggs were washed, graded, and placed in the carton). This number is a three-digit code that represents the consecutive day of the year starting with January 1 as 001 and ending with December 31 as 365. When a "sell-by" date appears on a carton bearing the USDA grade shield, the code date may not exceed 30 days from the date of pack.

After purchasing eggs, it is recommended to refrigerate them in their original carton and place them in the coldest part of the refrigerator, not in the door due to loss of coolness from repeated opening of the door.

Bar Codes

A Universal Product Code (UPC) is a type of barcode that appears on packages as black lines of varying widths above a series of numbers. They are not required by regulation but manufacturers print them on most product labels because scanners at supermarkets can "read" them quickly to record the price at checkout. UPC codes are also used by stores and manufacturers for inventory purposes and marketing information. When read by a computer, a UPC can reveal such specific information as the manufacturer's name, product name, size of product and price. The numbers are not used to identify recalled products.

A Stock Keeping Unit (SKU) code is a number assigned to a product by a company or retailer for stock-keeping purposes and internal operations. A particular product may have different SKUs if sold by different companies or retailers.

Date Labeling and Impact on Food Waste

Confusion over the meaning of dates applied to food products can result in consumers discarding wholesome food.

In an effort to reduce food waste, it is important that consumers understand that the dates applied to food are for quality and not for safety. Food products are safe to consume past the date on the label, and regardless of the date, consumers should evaluate the quality of the food product prior to its consumption.

Proper Handling of Food

If foods are mishandled, before or after the date on the package, bacteria, including pathogenic bacteria that can cause foodborne illness, can quickly multiply. For example, if cold chicken salad is taken to a picnic and left out at temperatures higher than 40°F (4.4°C) for more than two hours (one hour if temperatures are 90 °F (32.2 °C) or higher), the product should not be consumed. Other examples of potential mishandling are meat and poultry products that have been defrosted improperly or handled by people who don't practice good sanitation. Make sure to follow the handling and preparation instructions on the label to ensure top quality and safety. Additional information on safe food handling practices in the home can be found at [Check Your Steps: Food Safe Families](#) and [The Big Thaw](#).

Food Safety Questions?

Call the USDA Meat & Poultry Hotline toll-free at **1-888-MPHotline (1-888-674-6854)**

The Hotline is open year-round and can be reached from 10 a.m. to 4 p.m. (Eastern Time) Monday through Friday.

E-mail questions to MPHotline@usda.gov.

Consumers with food safety questions can also "Ask Karen", the FSIS virtual representative. Available 24/7 at [AskKaren.gov](#).

Appendix 2. Food Waste Provisions Included in the 2018 Farm Bill

The Agriculture Improvement Act of 2018 (Farm Bill) includes several provisions to reduce food loss and waste, expand food donations, encourage food waste recycling, and coordinate food loss and waste reduction efforts.

FOOD WASTE PREVENTION PROVISIONS

Spoilage Prevention

Amendment to the Specialty Crop Research Initiative to include funding for efforts to better understand systems that improve and extend the storage life of specialty crops.

Local Agriculture Market Program

Establishment of the Local Agriculture Market Program, which provides grants for a range of eligible activities including the promotion of new business opportunities and marketing strategies to reduce on-farm food waste.

FOOD DONATION PROVISIONS

Food Donation Standards for Liability Protections

Clarifies liability protections for food donations and extends them to donations made by a “qualified direct donor”¹ directly to individuals in need. USDA must provide guidance to promote awareness of these protections and encourage state agencies and emergency feeding organizations to share the guidance with qualified direct donors.

Support for Food Recovery Infrastructure

Amendment to The Emergency Food Assistance Program (TEFAP) to provide funding to states for projects that reduce food waste at the agricultural production, processing, or distribution level through the donation of food. USDA must provide guidance on best practices to reduce food waste among donated food commodities for TEFAP.

Milk Donation Program

Creation of a Milk Donation Program for the purposes of encouraging dairy farmers and dairy processors to donate Class I fluid milk products to nonprofit organizations that distribute donated milk, providing nutrition assistance to individuals in low-income groups and reducing food waste.

FOOD WASTE RECYCLING PROVISIONS

Increasing Community Compost and Reducing Food Waste

Creation of a grant program in the new Urban Agriculture section for pilot projects in at least 10 states to develop and implement municipal compost plans and food waste reduction plans. Eligible projects will increase access to compost for agricultural producers, encourage waste management and permaculture business development, reduce municipal food waste, and divert food waste from landfills, among others.

Carbon Utilization and Biogas Education Program

Establishment of competitive grants for entities that provide education to agricultural producers and stakeholders about opportunities for aggregation of organic waste from multiple sources into a single biogas system.

1. Qualified direct donor means a retail food store, wholesaler, agricultural producer, restaurant, caterer, school food authority, or institution of higher education.

COORDINATION OF FOOD LOSS AND WASTE REDUCTION EFFORTS

Food Loss and Waste Reduction Liaison

Establishment of a Food Loss and Waste Reduction Liaison to coordinate federal food loss and waste reduction efforts; support and promote federal programs to measure and reduce the incidence of food loss and waste and increase food recovery; serve as a resource for food waste reduction and food recovery organizations; raise awareness of existing liability protections for food donation; and make recommendations for expanding innovative food recovery models and reducing food loss and waste.

Study on Food Waste

The Food Loss and Waste Reduction Liaison is charged with working with USDA to conduct a study evaluating and determining methods to measure food waste, standards for the volume of food waste, factors that contribute to food waste, and the cost and volume of food loss. The study also will assess the effectiveness of existing liability protections for food donation and ensure that USDA programs do not interfere with existing food waste recovery and disposal efforts.

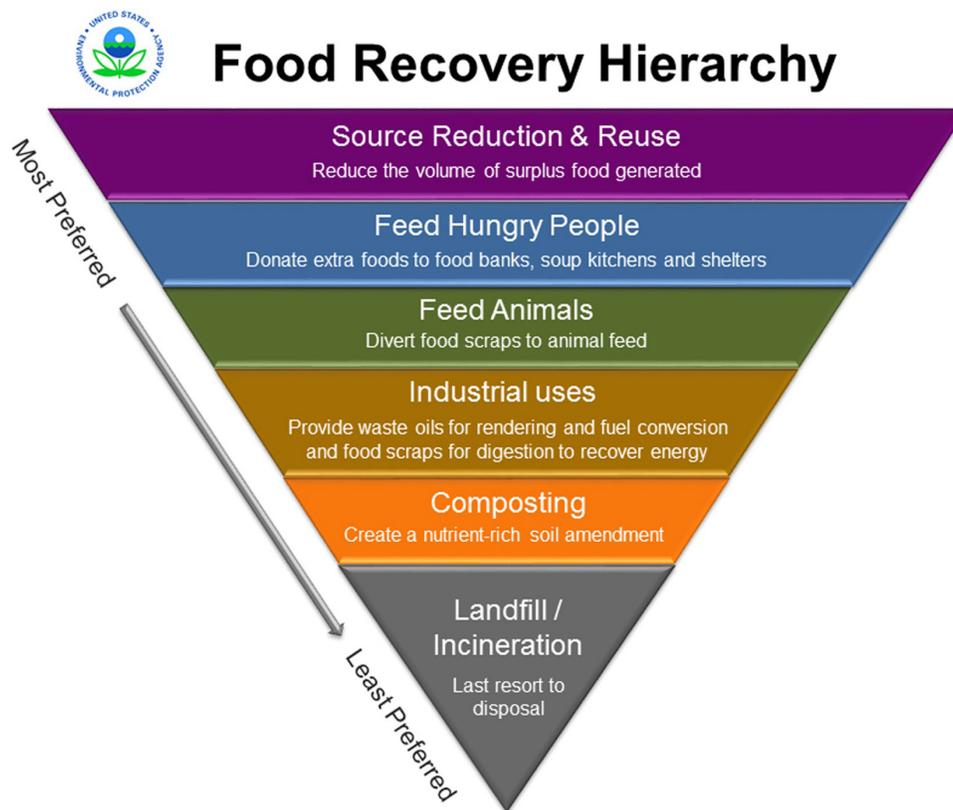
Appendix 3. Federal Government Initiatives to Reduce Food Waste

FOOD RECOVERY CHALLENGE (EPA)¹

In 2011, the U.S. Environmental Protection Agency (EPA) launched the Food Recovery Challenge (FRC) as part of its Sustainable Materials Management Program. It is designed for organizations seeking to track their food waste reduction activities. Any business or organization can join the FRC as a participant if they are generating food waste or endorse it if they help others reduce their waste. EPA provides software and technical assistance and encourages organizations to follow the Food Recovery Hierarchy to prioritize their actions to prevent and divert wasted food. Participants enter goals and report food waste diversion data annually. In return, they receive an annual climate profile report that translates their food diversion data results into greenhouse gas reductions and other measures. EPA recognizes the accomplishments with annual awards.

FOOD RECOVERY HIERARCHY (EPA)²

The Food Recovery Hierarchy prioritizes actions organizations can take to prevent and divert wasted food. Each tier of the Food Recovery Hierarchy focuses on different management strategies for wasted food. The top levels of the hierarchy are the best ways to prevent and divert wasted food because they create the most benefits for the environment, society, and the economy.



1. U.S. Environmental Protection Agency, Sustainable Management of Food, Food Recovery Challenge (FRC) (<https://www.epa.gov/sustainable-management-food/food-recovery-challenge-frc>).

2. U.S. Environmental Protection Agency, Sustainable Management of Food, Food Recovery Hierarchy (<https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy>).

U.S. FOOD WASTE CHALLENGE (USDA & EPA)³

In 2013, the U.S. Department of Agriculture (USDA) and EPA launched the U.S. Food Waste Challenge to raise awareness about food loss and waste and to provide a platform to disseminate information about the best practices to reduce, recover, and recycle food waste. They called on entities across the food chain—farms, agricultural processors, food manufacturers, grocery stores, restaurants, universities, schools, and local governments—to join efforts to:

- **REDUCE** food waste by improving product development, storage, shopping/ordering, marketing, labeling, and cooking methods.
- **RECOVER** food waste by connecting potential food donors to hunger relief organizations such as food banks and pantries.
- **RECYCLE** food waste to feed animals or to create compost, bioenergy, and natural fertilizers.

Participating organizations and businesses in the U.S. Food Waste Challenge demonstrate their commitment to reducing food waste, helping feed the hungry, and reducing the environmental impact of wasted food. The challenge had a specific goal of 400 participants by 2015 and 1,000 by 2020, but by the end of 2014, it had over 4,000 participants, well surpassing its goal.

U.S. 2030 FOOD LOSS AND WASTE REDUCTION GOAL (USDA & EPA)⁴

In 2015, in alignment with the United Nations Sustainable Development Goals, USDA and EPA announced the first domestic goal to reduce food loss and waste (FLW). Based on the EPA's estimates, 2010 was selected as a baseline at 218.9 pounds of food waste per person was sent for disposal. The reduction goal aims to reduce food waste going to landfills by 50 percent, to 109.4 pounds per person by 2030. Based on the USDA Economic Research Service's (ERS) 2010 food loss estimate of 133 billion pounds at the retail and consumer levels, the 2030 FLW reduction goal is 66 billion pounds.

U.S. FOOD LOSS AND WASTE 2030 CHAMPIONS (USDA & EPA)⁵

In 2016, USDA and EPA established the U.S. Food Loss and Waste 2030 Champions initiative to ramp up efforts to achieve the national goal of cutting food loss and waste in half by 2030. U.S. Food Loss and Waste 2030 Champions are businesses and organizations that have made a public commitment to reduce food loss and waste in their U.S. operations by 50 percent by the year 2030.

WINNING ON REDUCING FOOD WASTE (USDA, EPA, & FDA)⁶

In October 2018, USDA, EPA, and the U.S. Food and Drug Administration (FDA) launched a new initiative called Winning on Reducing Food Waste. It is aimed at improving coordination and communication across federal agencies attempting to better educate Americans on the impacts and importance of reducing food loss and waste. This initiative combines the goals of reducing food waste and making safe, nutritional foods available to all. The initiative will explore how to address obstacles facing food donation and recovery programs and help food producers recondition their products to be safely sold or donated. While businesses are a critical component of food waste reductions, consumer education is also imperative.

3. U.S. Department of Agriculture, Food Loss and Waste (<https://www.usda.gov/foodlossandwaste>).

4. U.S. Environmental Protection Agency, Sustainable Management of Food, United States 2030 Food Loss and Waste Reduction Goal (<https://www.epa.gov/sustainable-management-food/united-states-2030-food-loss-and-waste-reduction-goal>).

5. U.S. Department of Agriculture, Food Loss and Waste (<https://www.usda.gov/foodlossandwaste>).

6. U.S. Department of Agriculture, Media, Press Release, Trump Administration Launches "Winning on Reducing Food Waste" Initiative.

OTHER USDA FOOD LOSS AND WASTE REDUCTION ACTIVITIES⁷

To make the prevention of food waste the best option for farmers, businesses, organizations, and consumers, the USDA is focusing on the activities listed below

Consumer Education About Food Loss and Waste

Since consumers generate 21 percent of food loss and waste in the United States, USDA has several activities to educate consumers on reducing, recovering, and recycling food waste:

- USDA Center for Nutrition Policy and Promotion has a new infographic, *Let's Talk Trash*, with information on food loss and waste facts and reduction tips to inform consumers.
- USDA's ChooseMyPlate.gov has a new section to educate consumers about reducing food waste to stretch household budgets.
- To prevent the consumer-level food loss from confusion, USDA recently updated the safe-storage and date-labeling information on the Food Safety and Inspection Service website.⁸
- In partnership with the Food Marketing Institute, USDA updated and expanded the 10-year-old online FoodKeeper Resource,⁹ which provides food storage information on a wide range of products (in partnership with the Food Marketing Institute).
- In partnership with the Food Marketing Institute and Cornell University, USDA launched a FoodKeeper App to provide consumers with easy access to clear, scientific information on food storage, proper storage temperatures, food product dating, and expiration dates. The app is available on FoodSafety.gov.¹⁰

Recover or Recycle Food That Cannot Be Sold

- To increase donations of wholesome fresh imported produce subject to destruction or rejection because of federal marketing standards, USDA connected fresh produce importers with charitable institutions.
- Recognizing that misbranded products are often safe and wholesome, USDA streamlined procedures for donating wholesome misbranded meat and poultry products.
- USDA's Let's Glean, United We Serve Toolkit¹¹ provides information on how to develop a successful gleaning program, including steps for finding donors.

Minimize Food Waste in the School Meals Programs

- USDA has taken steps to measure plate waste in the school meal programs and develop innovative approaches to reduce school food waste.

Grant Programs for Food Waste Reduction, Reuse, and Recycle

- USDA offers various loan and grant programs that could incorporate funding, investment, and outreach initiatives for food loss and waste reduction, reuse, and composting techniques.

7. U.S. Department of Agriculture, Food Loss and Waste (<https://www.usda.gov/foodwaste/activities>).

8. U.S. Department of Agriculture, Food Safety and Inspection Service, Food Product Dating (<https://www.fsis.usda.gov/wps/portal/food-safety-education/get-answers/food-safety-fact-sheets/food-labeling/food-product-dating/food-product-dating>).

9. Food Marketing Institute, The FoodKeeper (<https://www.fmi.org/industry-topics/corporate-social-responsibility/food-keeper-food-storage-database>).

10. <https://www.foodsafety.gov/keep/foodkeeperapp/index.html>

11. https://www.usda.gov/sites/default/files/documents/usda_gleaning_toolkit.pdf

Research and Innovation for Reducing Food Waste

- USDA ERS estimates food loss in the United States.
- USDA's Agricultural Research Service conducts, often in collaboration with industry and academic partners, research on new technologies for reducing spoilage of fresh foods and the development of new products from waste materials at food processing facilities.

OTHER EPA ACTIVITIES FOR PREVENTING AND DIVERTING FOOD WASTE

EPA provides resources to the public, as well as specific food-waste generators, to help reduce, reuse, and recycle food waste. Some of these resources are listed below.

Food: Too Good to Waste¹²

Food: Too Good to Waste (FTGTW) is an innovative community food waste prevention tool that was designed by EPA. *FTGTW Implementation Guide and Toolkit* is designed for community organizations, local governments, households, and others interested in reducing wasteful household food management practices. The Implementation Guide provides local governments and other implementing organizations a description of the FTGTW Campaign and Toolkit as well as information on how they can launch a wasted food prevention challenge. The FTGTW Campaign aims to engage households in efforts to reduce wasted food and its impacts through community-based social marketing (CBSM) principles. CBSM messaging and tools are designed to address barriers and emphasize benefits to changing behaviors. The campaign provides tools to households to keep food out of landfills and more money in their pockets. The Toolkit identifies five behavior changes that have significant potential to reduce wasted food in households, identifies strategies to achieve these behavior changes, and provides tools based on the strategies to help people make the behavioral changes. The FTGTW Challenge asks participants to track their wasted food generation for a period of two weeks before adopting new FTGTW strategies to become aware of how much food they are wasting. The challenge engages participants in learning tips to make small shifts in how they shop for, prepare, and store food.

U.S. EPA Excess Food Opportunities Map¹³

The U.S. EPA Excess Food Opportunities Map supports nationwide diversion of excess food from landfills. The interactive map identifies and displays facility-specific information about more than 500,000 potential generators of excess food in the industrial, commercial, and institutional sectors and provides estimates of excess food by generator type. The map also displays the locations of communities with source-separated organics programs and more than 4,000 potential recipients of excess food.

12. EPA, Sustainable Management of Food, Food: Too Good to Waste (<https://www.epa.gov/sustainable-management-food/food-too-good-waste-implementation-guide-and-toolkit>).

13. EPA, Sustainable Management of Food, Excess Food Opportunities Map (<https://www.epa.gov/sustainable-management-food/excess-food-opportunities-map>).

Resources for assessing wasted food¹⁴

Believing that the first step toward reducing wasted food is to perform a food-waste assessment, EPA created a variety of guides to conduct and analyze food-waste assessments. A food-waste assessment identifies what is thrown away and why. This knowledge can cut down on disposal costs, reduce overpurchasing and labor costs, reduce water and energy use associated with food production, and reduce greenhouse gas emissions. At the end of the assessment, the amount of food that can be diverted for donation or composting can be determined. These guides include:

- A Guide to Conducting and Analyzing a Food Waste Assessment.¹⁵
- Reducing Wasted Food & Packaging: A Guide for Food Services and Restaurants.¹⁶
- Guide to Conducting Student Food Waste Audits: A Resource for Schools.¹⁷
- Food waste management cost calculator.

Tip sheets for food loss prevention¹⁸

EPA developed separate tip sheets for grade schools, food manufacturers, restaurants, universities and grocery stores that provide suggestions for preventing food loss and waste. They include tips to effectively prevent wasted food by taking source reduction steps such as inventorying supplies, changing processes, and buying less.

Food Tips for K-12 Schools: Get Kids to Eat More and Waste Less¹⁹

This guide provides best practices to get kids to eat more and waste less, including references, toolkits, audit guides, and creative ideas. It includes the USDA Food and Nutrition Service guidance to support efforts to reduce waste and donate wholesome food from school breakfast and lunch programs.

Other EPA resources related to food waste

EPA website (www.epa.gov) has wealth of information about food waste and how to reduce, reuse, and recycle wasted food. These resources include:

- Reducing food waste at home.
- Donating food.
- Composting at home.
- Waste Reduction Model (WARM).
- Managing and transforming waste streams.
- Webinars on sustainable management of food.

14. EPA, Sustainable Management of Food, Resources for Assessing Wasted Food.

15. EPA, Sustainable Materials Management, A Guide to Conducting and Analyzing a Food Waste Assessment. March 2014. (https://www.epa.gov/sites/production/files/2015-08/documents/r5_fd_wste_guidebk_020615.pdf)

16. EPA, Reducing Wasted Food & Packaging: A Guide for Food Services and Restaurants. (https://www.epa.gov/sites/production/files/2015-08/documents/reducing_wasted_food_pkg_tool.pdf)

17. USDA, EPA, and University of Arkansas, Guide to Conducting Student Food Waste Audits: A Resource for Schools. November 20, 2017. (https://www.epa.gov/sites/production/files/2017-12/documents/guide_to_conducting_student_food_waste_audit_-_nov_20_2017.pdf)

18. EPA, Sustainable Management of Food, Food loss prevention options for grade schools, manufacturers, restaurants, universities, and grocery stores. (<https://www.epa.gov/sustainable-management-food/food-loss-prevention-options-grade-schools-manufacturers-restaurants>)

19. <https://www.epa.gov/schools/food-tips-k-12-schools-get-kids-eat-more-and-waste-less>.

Appendix 4. Initiatives by National Organizations to Reduce Food Waste

ReFED

ReFED is a collaboration of more than 50 private, nonprofit, and public sector leaders committed to reducing food waste in the United States. ReFED was formed in early 2015 to create *A Roadmap to Reduce U.S. Food Waste* (Roadmap), the first national economic study and action plan driven by a multi-stakeholder group committed to tackling food waste at scale. ReFED engages stakeholders throughout the food system to implement solutions and envision a future where combatting food waste is a core driver of business profits, job creation, hunger relief, and environmental protection.¹

*A Roadmap to Reduce U.S. Food Waste by 20 Percent*²

The Roadmap is designed to fill the gap between awareness and action by creating transparency in the waste flows, costs, and opportunities of a more efficient food system achieved by preventing, recovering, and recycling food waste. It was developed to identify the most cost-effective solutions to cut food waste at scale, define research priorities, and spur multi-stakeholder action. The Roadmap revolutionized the way the industry looks at food waste—looking beyond challenges and identifying concrete opportunities to save money and resources, feed people, and create jobs.

The Roadmap shows 27 solutions identified by ReFED to achieve a 20 percent reduction of food waste within a decade.³ These solutions would annually divert 13 million tons from landfills and on-farm losses while generating \$10 billion in economic value.

Implementing the Roadmap is projected to generate 15,000 new jobs, double recovered food donations to nonprofits (1.8 billion meals per year), reduce up to 1.5 percent of freshwater use (1.6 trillion gallons per year), and avoid nearly 18 million tons of greenhouse gas emissions each year. Additionally, the Roadmap estimates \$1.9 billion annual business profit potential and \$5.6 billion annual consumer savings.

The 27 solutions to reduce food waste were analyzed using the EPA Food Recovery Hierarchy, which prioritizes prevention first, then recovery, and finally recycling:

Prevention

Prevention stops waste from occurring. Prevention solutions have the highest cost-effectiveness and net environmental benefit, potentially diverting 2.6 million tons of annual waste. The Roadmap provides 12 solutions for prevention:

1. Standardized date labeling
2. Packaging adjustments
3. Spoilage prevention packaging
4. Produce specifications (integrating the sale of “imperfect produce”)
5. Smaller plates
6. Trayless dining
7. Waste tracking and analytics

1. ReFED, *A Roadmap to Reduce U.S. Food Waste by 20 Percent—Executive Summary*, 2016 and ReFED, *Retail Food Waste Action Guide*, 2018.

2. ReFED, *A Roadmap to Reduce U.S. Food Waste by 20 Percent*, 2016.

3. See Appendix I for descriptions of ReFED Roadmap solutions.

8. Cold chain management
9. Improved inventory management
10. Secondary resellers
11. Manufacturing line optimization
12. Consumer education campaigns

Recovery

Recovery is redistributing food to people. Food recovery captures food donations from businesses and transports it to organizations that feed the hungry. The Roadmap provides seven solutions for recovery:

1. Donation matching software
2. Donation storage and handling
3. Donation transportation
4. Value-added processing
5. Donation liability education
6. Standardized donation regulation
7. Donation tax incentives

Recycling

Recycling is repurposing waste as energy for agriculture and other products. Recycling offers the most scalable path to reducing food waste, enabling 9.5 million tons of annual waste diversion—nearly three-quarters of the total Roadmap potential. Recycling through processing diverts food waste from landfills and transforms it into beneficial soil amendments, clean biogas, or animal feed. The Roadmap provides eight solutions for recovery:

1. Centralized anaerobic digestion (AD)
2. Water resource recovery facility with AD
3. In-vessel composting
4. Commercial greywater
5. Community composting
6. Centralized composting
7. Animal feed
8. Home composting

The Roadmap demonstrates that achieving a 20 percent reduction in food waste will generate a positive financial, social, and environmental return on investment. But it will not happen without a concerted multi-stakeholder effort to galvanize action across four areas:

Financing

Overall the Roadmap will require nearly \$18 billion of new investment, amounting to less than a tenth of a penny for every pound of food waste diverted from landfill. This investment will yield an expected \$100 billion in economic value over a decade. The estimated funding need is \$8.2 billion of government support via mostly existing legislation, \$6.6 billion of market-rate private investments, and \$2.9 billion of philanthropic grants and impact investments.

Policy

Commonsense policy adjustments that expand state and local incentives and reduce permitting barriers are needed to scale federal food donation tax incentives, standardize safe handling regulations, and boost recycling infrastructure. ReFED suggests a comprehensive federal food waste legislation that bundles multiple policies together. Such legislation would make it easier for food businesses to follow when there are common standards and help every key stakeholder group.

Innovation

Key technology and business-model innovations are needed for packaging and labeling, IT-enabled transportation and storage, logistics software, value-added compost products, and distributed recycling. These could be accelerated through a national network of food waste innovation incubators.

Education

There is a need for education, training, and capacity-building for consumers and food business staff to enable change at scale. In addition to campaigns to raise food waste awareness among consumers, it is critical to launch a widespread training effort to change behaviors of food business employees.

Stakeholder Action Guides⁴

Building off the Roadmap, ReFED developed stakeholder-specific action guides for retail, food service, restaurant, and foundation leaders to drive food waste reduction.

Foundation Action Guide⁵

Philanthropic support is critical to the successful implementation of Roadmap solutions. This guide demonstrates how food waste initiatives enable foundations to achieve mission objectives and provides key insights to help funders maximize their impact.

Retail Food Waste Action Guide⁶

Produced in partnership with leading grocery retailers and trade associations, this guide is designed to help retailers develop and implement food waste solutions.

Foodservice Food Waste Action Guide⁷

Produced in partnership with the four largest U.S. foodservice providers and trade associations, this guide is designed to help foodservice providers develop and implement food waste solutions.

Restaurant Food Waste Action Guide⁸

Produced in partnership with leading restaurant and trade associations, this guide is designed to help restaurants develop and implement food waste solutions.

2018 U.S. Food Waste Investment Report⁹

The *2018 U.S. Food Investment Report* details key trends in the capital and innovation landscape. It also highlights specific examples of philanthropic, public, and private food waste investment, including a special report on foundation funding.

4. <https://www.refed.com/resources>

5. ReFED, *Foundation Action Guide: Foundation Opportunities to Drive Food Waste Reduction*, 2016.

6. ReFED, *Retail Food Waste Action Guide*, 2018.

7. ReFED, *Foodservice Food Waste Action Guide*, 2018.

8. ReFED, *Restaurant Food Waste Action Guide*, 2018.

9. ReFED, *2018 U.S. Food Waste Investment Report: Trends in Private, Public, and Philanthropic Capital*, Fall 2018.

Other ReFED activities

ReFED's continued efforts include promoting date label standardization through a multi-stakeholder initiative; collecting data and generating insights on innovation to reduce food waste; and centralizing food waste policies at the state and federal level. These tools help businesses, nonprofits, government, and investors enact the most impactful solutions to reduce food waste. Two useful tools that were developed by ReFED are:

The Food Waste Innovator Database¹⁰

The ReFED Innovator Database is a living compilation of more than 350 commercial and nonprofit entries that are turning the food waste problem into an entrepreneurial opportunity.

U.S. Food Waste Policy Finder¹¹

ReFED collaborated with the Harvard Law School Food Law and Policy Clinic to develop the Food Waste Policy Finder to provide an overview of current federal and state policies related to food waste. The tool is intended to show the existing policy landscape while highlighting best-practice legislation to promote development and implementation of sound food waste policy.

NATIONAL RESOURCE DEFENSE COUNCIL (NRDC)¹²

NRDC is a nonprofit organization founded in 1970 by a group of law students and attorneys at the forefront of the environmental movement. The organization continues to work in more than a dozen program areas to ensure the rights of all people to clean air, clean water, and healthy communities. Food is one of the work areas of NRDC, and food waste is one of the priorities in this area.

NRDC works to make America's food system more efficient and less wasteful by:

- Helping cities redirect surplus food to people in need.
- Inspiring consumers to waste less food at home and equip them with the strategies to make it happen.
- Pushing the food industry and the federal government to put an end to confusing date labels and adopt other waste-reducing policies.
- Working with communities, businesses, and policy makers to support the prevention of food waste, the rescue of surplus food, and the composting of food scraps across the supply chain.

In 2012, NRDC published *Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*,¹³ which revealed that up to 40 percent of food in the United States goes uneaten. This report sparked a national conversation about wastefulness and its consequences. In 2017, NRDC released an updated version of the report¹⁴ showing America's progress and recommending what to do to reduce the amount of food we waste.

10. <https://www.refed.com/tools/innovator-database>

11. <https://www.refed.com/tools/food-waste-policy-finder>

12. www.nrdc.org

13. Dana Gunders, *Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*, NRDC Issue Paper IP: 12-06-B, August 2012.

14. Dana Gunders and Jonathan Bloom, *Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*, Second Edition, NRDC Report R: 17-05-A, August 2017.

Upon the federal government announcement of its goal to reduce food waste across the nation by 50 percent by 2030, NRDC developed 10 strategies to provide direction to government, businesses, and the philanthropic sector for pursuing this ambitious goal:¹⁵

1. Engage and educate consumers
2. Catalyze food-industry involvement
3. Collect and share better data
4. Measure and reduce farm losses
5. Standardize food expiration dates
6. Scale food-recovery capacity
7. Expand recycling of food scraps
8. Foster entrepreneurship and innovation
9. Mobilize public and private financing
10. Enhance coordination

NRDC's food waste work focuses on two policy solutions—empowering cities and driving federal action.

Empower Cities to Prevent, Rescue, and Recycle Food Waste

NRDC believes that reducing the amount of food wasted can help local governments address landfill challenges, fight food insecurity, and work toward curbing climate change. NRDC is developing a multipronged approach that encourages innovation by city governments and collaboration with community stakeholders to tackle wasted food. Their approach is to keep food from going to waste, ensure that appropriate surplus food reaches people in need, and direct remaining food scraps to be recycled rather than sent to a landfill. Their analyses and methodologies are designed to provide groundbreaking tools and insights to inform and inspire cities across the country to more fully meet the challenge of wasted food.

NRDC conducted research in three major U.S. cities, Denver, Nashville, and New York City, to better understand how much, what, and where food is being wasted.¹⁶ To help cities waste less food, NRDC developed two reports and a series of case studies highlighting efforts to waste less food from a range of stakeholders. *Estimating Quantities and Types of Food Waste at the City Level*¹⁷ offers critical data about the amounts, sources, and types of food going to waste in three U.S. cities. *Modeling the Potential to Increase Food Rescue: Denver, New York City, and Nashville*¹⁸ reveals opportunities at the city level for redirecting additional surplus foods to those in need.

Drive Federal Action To Reduce Food Waste

NRDC is helping ramp up federal efforts to prevent and reduce food waste from farm to fork. Two of NRDC's major calls for federal action have centered on standardizing food-date labels and expanding food-donation laws. They partnered with Harvard Food Law and Policy Clinic (HFLPC) in their work in these areas and published the results of their work. *The Dating Game: How Confusing Food Date Labels Lead to Food Waste in America*¹⁹ revealed that an enormous amount of food is going to waste because of confusion about date labels. Don't Waste, Donate: Enhancing Food Donations Through

15. National Call to Action! 10 Strategies for Achieving U.S. Food Waste Reduction Goals. NRDC Fact Sheet, FS-16-08-B, September 2016.

16. NRDC, *Food Matters: What We Waste and How We Can Expand the Amount of Food We Rescue*. Issue Brief, IB:17-09-B, October 2017.

17. Darby Hoover, NRDC, *Estimating Quantities and Types of Food Waste at the City Level*, October 2017.

18. JoAnne Berkenkamp, NRDC and Caleb Phillips, PhD, Small White Cube, *Modeling the Potential to Increase Food Rescue*, October 2017.

19. Harvard Food Law and Policy Clinic and NRDC, *The Dating Game: How Confusing Food Date Labels Lead to Food Waste in America*, NRDC Report R:13-09-A.

Federal Policy²⁰ provides a roadmap for the federal government to remove barriers that limit the amount of surplus food reaching communities in need. It recommends enhancements to the existing liability protection and tax benefit laws to encourage food donation.

Save the Food campaign²¹

In 2016, NRDC, together with the Ad Council, launched Save the Food national public service campaign directed at consumers, who collectively are the largest source of wasted food. The goal is to show consumers that they bear responsibility to reduce food waste, and they have the power to make a change. The initiative, by altering consumer awareness and perception about food waste, encourages them to reduce the amount of food they trash, thereby saving the water, energy, and money that are lost along with it. All campaign assets direct people to SaveTheFood.com, where they can learn more about the consequences of food waste and find resources on how to reduce the amount of food they waste. Resources include tips on developing meal and shopping plans, properly storing different foods, and making use of leftovers.

HARVARD LAW SCHOOL FOOD LAW AND POLICY CLINIC²²

The Food Law and Policy Clinic (FLPC), established in 2010, assists a range of federal, state, and local clients around the world in understanding the legal and policy regimes that apply to the food system. It provides legal and policy guidance to its clients seeking solutions to a variety of food system related issues, including reducing waste of healthy, wholesome food. FLPC does research, conducts webinars, and publishes reports, legal guides, fact sheets, and more on topics related to food law and policy. Some of FLPC publications include:²³

- Keeping Food Out of the Landfill: Policy Ideas for States and Localities
- Good Laws, Good Food: Putting Local Food Policy to Work for Our Communities (2017)
- Legal Fact Sheet: The Bill Emerson Good Samaritan Food Donation Act
- Food Safety Regulations and Guidance for Food Donations: A 50-State Survey of State Practices
- Don't Waste, Donate: Enhancing Food Donations Through Federal Policy
- Recommendations to Strengthen The Bill Emerson Good Samaritan Act
- Leftovers for Livestock: A Legal Guide for Using Excess Food as Animal Feed
- Opportunities to Reduce Food Waste in the 2018 Farm Bill
- The Dating Game: How Confusing Food Date Labels Lead to Food Waste in America
- Consumer Perceptions of Date Labels: National Survey
- Expired? (Film about date labels)

FLPC also conducts research and publishes reports for specific states and District of Columbia, including one for Maryland, *A Review of Food System Policies in Maryland*.²⁴ This publication has a section on recovering food with information and suggestions on liability protection, tax incentives, wasted food in schools, date labels and food safety, and food recovery infrastructure and awareness.

20. Harvard Food Law and Policy Clinic and NRDC, *Don't Waste, Donate: Enhancing Food Donations Through Federal Policy*, March 2017.

21. www.nrdc.org/experts/dana-gunders/save-food; Ad Council press release, "NRDC and AD Council Launch New "Save the Food" National Public Service Campaign, April 20, 2016.

22. www.chlpi.org/food-law-and-policy

23. Harvard Law School, Center for Health Law and Policy Innovation, Food Library Publications. (www.chlpi.org/food_library/)

24. Harvard Law School Food Law and Policy Clinic, *A Review of Food System Policies in Maryland*, September 2017.

FOOD WASTE REDUCTION ALLIANCE²⁵

The Food Waste Reduction Alliance (FWRA) is a collaborative effort of the Grocery Manufacturers Association (representing food and beverage companies), the Food Marketing Institute (representing food retailers), and the National Restaurant Association (representing the foodservice industry). The FWRA's mission is to reduce the volume of food waste sent to landfills by addressing the root causes of waste and by securing pathways to donate or recycle unavoidable food waste. Established in 2011, this cross-industry initiative includes more than 30 manufacturing, retailing, and foodservice companies, along with expert partners from the anti-hunger community and waste management sector. FWRA is co-chaired by Conagra Brands, one of the world's largest food processors, Wegman's Food Markets, a leading U.S. grocery store chain, and Yum! Brands, a leading global quick-service food company including the Taco Bell and KFC brands.

Working collaboratively across sectors, FWRA seeks to achieve three goals:

1. Reduce the amount of food waste generated.
2. Increase the amount of safe, nutritious food donated to those in need.
3. Recycle unavoidable food waste, diverting it from landfills.

To achieve these goals, FWRA focuses on four areas:

Assessment—Measuring food waste

FWRA collects data directly from participating companies to accurately measure food waste generated by manufacturing, retail, and foodservice sectors to identify the sources and root causes of food waste. They believe accurate assessments to benchmark and track progress of these sectors would be fundamental to affecting meaningful reductions in food waste. FWRA's research results were released in four reports to date.²⁶

Emerging solutions and best practices

Based on a 2013 survey, FWRA compiled best practices by manufacturers, retailers, and foodservice operators in food donation, food waste reduction at the source, and keeping food out of landfills. This compilation was published in 2014.²⁷ The following year, FWRA released a second volume, providing additional insight; revisiting model practices and emerging solutions compiled from more than 30 FWRA member companies and expert partners from the hunger relief and waste management sectors; and featuring real-life examples and case studies.²⁸

Policy

FWRA identifies and advocates for public policies that could incentivize more food donation from the private sector and expand options for landfill alternatives such as composting and anaerobic digestion.

Communication and stakeholder outreach

FWRA engages stakeholders working on food waste reduction and food donation and collects, aggregates, and disseminates model practices to advance individual company efforts. It educates diverse audiences about the issue of food waste and the work of the FWRA.

25. <https://foodwastealliance.org>

26. FWRA, *2016 Analysis of U.S. Food Waste Among Food Manufacturers, Retailers, and Restaurants*.

27. FWRA, *Best Practices and Emerging Solutions Toolkit*, Volume 1, Spring 2014.

28. FWRA, *Best Practices and Emerging Solutions Toolkit*, Volume 2, Fall 2015.

FEEDING AMERICA²⁹

Feeding America was established in 1979 under the name Second Harvest as a national organization of food banks. In 2008, its name changed to Feeding America. It is the nation's largest domestic hunger-relief organization with a network of 200 food banks and 60,000 food pantries across the country. Food recovery is one of their approaches to fight hunger. Feeding America believes that when we stop food waste, we take a big step toward ending hunger, because we will have enough food for everyone. Therefore, they are fighting food waste with food rescue. By partnering with farmers, food manufacturers and distributors, Feeding America rescues perfectly edible whole food that would have otherwise gone to waste. They feed 46 million people at risk of hunger with that food, while diverting it from landfills and incinerators. Just last year, they rescued 3.5 billion pounds of food.

Working with experts, Feeding America develops innovative ways to get good food to people who need it most. Some of the new solutions they have in action to rescue food include the following:

MealConnect^{TM30}

One of Feeding America's newest innovations is MealConnect, a technology platform that makes it easier than ever to rescue good food and reduce food waste. It makes convenient, free, safe, and quick food donations possible by matching food businesses directly to the Feeding America network. Local grocery stores, restaurants, hotels, and more can use MealConnect to alert nearby food banks, food pantries, or meal programs when they have food ready for immediate pick up. With MealConnect, donors have easier pickups, easier tracking, and easier receipt recording. Their surplus meals are connected with food-insecure neighbors instead of being wasted.

*Starbucks FoodShare*³¹

In 2016, Starbucks, through a strategic partnership with Feeding America, initiated a FoodShare program to rescue 100 percent of food available to donate from all of its U.S. stores. Together, they designed an innovative model, sending a dedicated driver to pick up unsold food nightly, and quickly redeploying it through local Feeding America member food banks to the communities they serve. The program will provide 50 million meals annually and divert 60 million pounds of food waste from landfills and incinerators.

29. <https://www.feedingamerica.org/>

30. <https://mealconnect.org/>

31. www.feedingamerica.org/hunger-blog/putting-unsold-food-to-good and www.starbucks.com/responsibility/community/foodshare

Appendix 5. Household Food Waste Survey Questionnaire



The Maryland-National Capital
Park and Planning Commission

Prince George's County Household Food Waste Survey

Welcome to the Prince George's County Household Food Waste Survey!

Thank you for taking part in this important survey. Your input will help us better understand the habits and thoughts of Prince George's County residents regarding food waste. Survey results will be published in a report and used to develop countywide recommendations on this topic.

Food waste includes edible food available for human consumption but is not consumed for any reason as well as non-edible parts of food such as peels, pits, bones, egg shells, etc.

This survey should take about ten minutes to complete, and all of the answers that you provide will be confidential and anonymous. You must be at least 18 years old to complete this survey.

Please click 'Next' to begin.



Prince George's County Household Food Waste Survey

Do you live in Prince George's County, Maryland?

Yes

No

Please think about food in your household that is perfectly edible at one point but end up being discarded.
When you discard such food, how often do you discard the following types of food:

	Never	Rarely	Some of the time	Most of the time	Always	Do not eat this item
Fresh fruits and/or vegetables	<input type="radio"/>					
Breads	<input type="radio"/>					
Meats	<input type="radio"/>					
Fish	<input type="radio"/>					
Milk	<input type="radio"/>					
Dairy products	<input type="radio"/>					
Eggs	<input type="radio"/>					
Packaged foods	<input type="radio"/>					
Prepared and/or ready- to-eat foods	<input type="radio"/>					



Prince George's County Household Food Waste Survey

Does your sink have a garbage disposal?

- Yes
- No
- I do not know.

Please think about all kinds of food, including edible food and food scraps*, when answering this question. When you discard food, how often do you use the following methods:

*Food scraps can be kitchen trimmings (including peels and pits) from fruit, vegetables, and herbs; stale or moldy food; bones; egg shells; used coffee grounds and tea bags; etc.

	Never	Rarely	Some of the time	Most of the time	Always
Trash	<input type="radio"/>				
In-sink garbage disposal	<input type="radio"/>				
Giving to other people	<input type="radio"/>				
Feeding animals	<input type="radio"/>				
Backyard composting	<input type="radio"/>				
Municipal or private food scrap pick-up for composting	<input type="radio"/>				
Dropping off food scraps to farms or stores for composting	<input type="radio"/>				
Other	<input type="radio"/>				

Other (please specify)



Prince George's County Household Food Waste Survey

When shopping for food, how often do you:

	Never	Rarely	Some of the time	Most of the time	Always
Estimate quantities needed before shopping	<input type="radio"/>				
Use a shopping list	<input type="radio"/>				
Find that you have bought more than you needed	<input type="radio"/>				
Plan meals before shopping	<input type="radio"/>				

How often do you eat food that is past the date (best by, consume by, or expires by) on its label?

	Never	Rarely	Some of the time	Most of the time	Always
Milk and dairy products	<input type="radio"/>				
Meats	<input type="radio"/>				
Other items that must be refrigerated	<input type="radio"/>				
Packaged fresh produce	<input type="radio"/>				
Baked products	<input type="radio"/>				
Boxed items	<input type="radio"/>				
Canned food	<input type="radio"/>				
Jarred food	<input type="radio"/>				



Prince George's County Household Food Waste Survey

Which of the following methods do you use to store food so that it will keep longer? Mark all that apply.

- Refrigerating
- Freezing
- Putting in a container designed to extend its life
- Using a vacuum sealer
- Canning
- Dehydrating
- Do not typically try to store food so that it will keep longer

When cooking food at home, how often does your household have leftovers that are eaten or used later?

- Never
- Rarely
- Some of the time
- Most of the time
- Always
- Do not cook at home



When eating out in a restaurant or prepared food establishment, do you and/or your household members typically bring leftovers home?

- Yes
- No
- Never have leftovers
- Do not eat out

In general, which of the following best describes your feelings when eating out in restaurants and prepared food establishments?

- Portion sizes are too small
- Portion sizes are too large
- Portion sizes are just right
- Do not eat out



Prince George's County Household Food Waste Survey

Indicate your agreement or disagreement with the following statements about why your household might discard food.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Worry about food poisoning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My household members do not like eating older food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food spoils before my household consumes it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We compost uneaten food, so it is not wasted.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The food we throw away does not cost much money.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We do not pay attention to reduce our household's food waste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We do not think about environmental impacts of food waste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We do not think about economic impacts of food waste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My household's individual actions do not make much difference.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We do not have enough time to prevent food waste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Prince George's County Household Food Waste Survey

Are you aware of any negative impacts of wasting food?

- Yes
- No

In the past twelve months, have you read, seen, or heard anything about food waste?

- Yes
- No



Prince George's County Household Food Waste Survey

When considering whether to throw food away, how important are the following motivations for reducing food waste?

	Very unimportant	Unimportant	Somewhat important	Important	Very important
Saving money	<input type="radio"/>				
Setting an example for children	<input type="radio"/>				
Managing my household efficiently	<input type="radio"/>				
Thinking about hungry people	<input type="radio"/>				
Guilt about waste in general	<input type="radio"/>				
Using resources prudently	<input type="radio"/>				
Making a difference through my actions	<input type="radio"/>				
Protecting the environment	<input type="radio"/>				

Which of the following actions are you willing to do to reduce food waste in your household? Mark all that apply.

- Check your fridge and pantry before going to the store
- Make a shopping list and buy only what you need
- Plan your meals
- Cook just what you can consume; do not cook too much food
- Use your leftovers to make new meals
- Freeze food
- Learn how to store different kinds of food so that they can be kept longer
- Compost food scraps
- None of the above



The Maryland-National Capital
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Prince George's County Household Food Waste Survey

Do you think learning additional tips and tricks to reduce food waste would be useful?

- Yes
- No
- Maybe

In which of the following areas would you be most interested in learning tips and tricks? Mark all that apply.

- Buying food
- Storing food
- Cooking food
- Consuming food
- Discarding food
- None of the above



Prince George's County Household Food Waste Survey

Do you think Prince George's County should establish/expand programs to reduce food waste?

Yes

No

If safe and sanitary curbside food scrap* collection for composting** were provided by the County, would you participate?

*Food scraps can be kitchen trimmings (including peels and pits) from fruit, vegetables, and herbs; stale or moldy food; bones; egg shells; used coffee grounds and tea bags, etc.

**Composting uses natural processes to recycle organic materials (including food scraps) into a fertilizer for growing plants.

Yes

No

Maybe

You indicated that you would not participate in curbside food scrap collection for composting if it were provided by the County. Please explain why not. (Optional)



How do you think the County government can help reduce food waste and recover wasted food?

If you wanted to develop one policy related to food waste reduction and recovery at the County level, what would it be?



Prince George's County Household Food Waste Survey

Where do you live?

Zip code:

Your age

- 18-24
- 25-34
- 35-44
- 45-64
- 65 and over

Your education

- Less than high school
- High school degree or equivalent
- Some college or associate degree
- Bachelor's degree
- Advanced degree

Thank you!

Appendix 6. Household Food Waste Survey Results

Please see the Food Waste in Prince George’s County section of the report for survey development, administration, and analysis. This appendix provides detailed supplemental information about the survey. Survey results are presented by respondents’ behaviors, attitudes and motivations, awareness and knowledge, and suggestions for local government programs and policies.

BEHAVIORS

Respondents were asked to indicate the frequency of discarding certain types of food. As shown in Table 1, the majority of respondents stated that, with the exception of fresh fruit and vegetables, they never, or rarely, discard food.

Table 3. Frequency of Discarded Food by Food Type

	Never	Rarely	Some of the time	Most of the time	Always
Fresh fruits and/or vegetables	2.9%	30.4%	51.7%	9.2%	5.8%
Breads	13.5	44.5	32.5	7.0	2.5
Meats	22.8	55.6	17.5	1.6	2.6
Fish	34.4	50.0	12.4	0.5	2.7
Milk	27.0	48.1	17.5	4.2	3.2
Dairy products	19.0	55.9	20.0	2.1	3.1
Eggs	54.6	31.6	9.7	1.5	2.6
Packaged foods	15.0	45.5	33.5	3.0	3.0
Prepared and/or ready-to-eat foods	17.8	40.8	33.5	4.2	3.7

- Fresh fruits and vegetables are by far the most discarded food type, followed by breads, prepared and/or ready-to-eat foods, and packaged foods. Two-thirds of the respondents indicated that they discard fresh produce some of the time, most of the time, or always. At least 40 percent of respondents reported discarding each of the other three food types (breads, prepared and/or ready-to-eat foods, and packaged foods) at least some of the time.
- Although one-third of the respondents never or rarely discard fresh fruits and vegetables, more than half of the respondents discard them some of the time and 15 percent discard them always or most of the time. Only 3 percent of respondents never discard them. Fresh produce is by far the lowest scored food type among the list of never discarded food types.
- Eggs are the least discarded food; 86 percent of respondents never or rarely discard eggs. Only 10 percent of households discard eggs some of the time and 4 percent discards them always or most of the time.
- Fish is the second-least discarded food item. Among those who eat fish, 84 percent never or rarely discard it, 12 percent discard it some of the time, and 3 percent discard it most of the time or always.
- Approximately three-quarters of respondents never or rarely discard meats, dairy products, or milk. Twenty percent or fewer of households discard these items some of the time, and less than 7 percent discard them always or most of the time.

Respondents were asked to indicate the frequency of a variety of methods used to discard food.

- As shown in Table 2, the most frequently used method used by respondents is throwing food waste in the trash. More than two-thirds of respondents trash food at least some of the time. While 10 percent indicated that they never trash food, 11 percent reported that they always trash it.

Table 4. Frequency of Methods Used to Discard Food by Number of Respondents

	Never/Rarely	Some of the time	Always or most of the time
Trash	64	61	72
In-sink garbage disposal	106	71	19
Giving to other people	166	29	0
Feeding animals	154	38	4
Backyard composting	109	24	67
Municipal or private food scrap pick-up for composting	168	6	22
Dropping off food scraps to farms or stores for composting	193	1	1
Other	102	3	1

- The second-most used method is backyard composting. A third of the respondents compost their food waste always or most of the time. This is a very high percentage. Most likely, many participants in this survey are interested in the subject of food waste and do backyard composting. However, the majority of respondents do not compost.
- The third-most used method is in-sink garbage disposal. Eighty percent of the respondents have an in-sink garbage disposal, but only 12 percent of them use it on a regular basis to discard food. While 44 percent discard food in the garbage disposal some of the time, 44 percent never or rarely use garbage disposal as a method to discard food.

Table 5. Use of Garbage Disposal Among People Who Have One

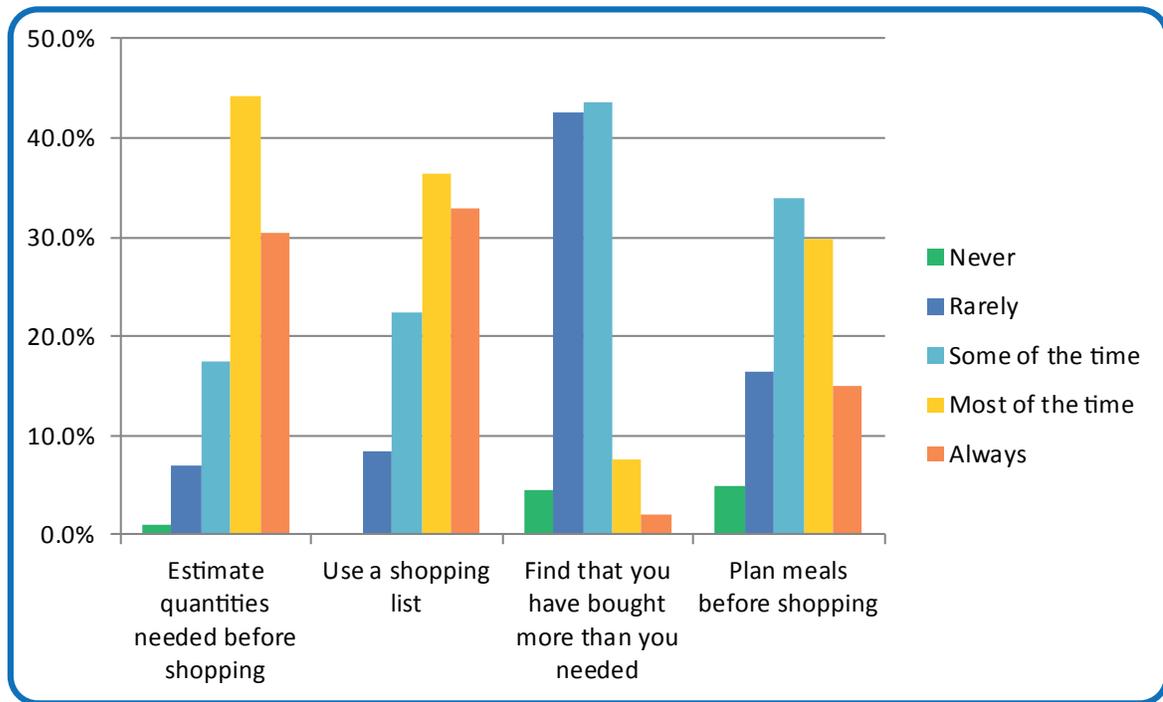
Always	1%
Most of the time	11
Some of the time	44
Rarely	31
Never	13

- Among those who have a garbage disposal and never use it, 70 percent mostly compost their food waste. Among households that discard food in the garbage disposal most of the time, 72 percent do not compost. This shows that composting and garbage disposal are almost mutually exclusive as a preferred method of discarding household food waste.

Residents were asked about their food shopping behaviors to see if their behaviors reduce food waste.

- In general, the reported food shopping behaviors of respondents are helping to reduce household food waste. As displayed in Figure 1, three-quarters of respondents estimate what quantity of food they need before shopping, and more than two-thirds use a shopping list always or most of the time. In fact, there is no respondent who chooses not to use a shopping list, and only one percent does not estimate quantities. These behaviors prevent consumers from buying too much food that potentially goes to trash.

Figure 7. Food Shopping Behaviors

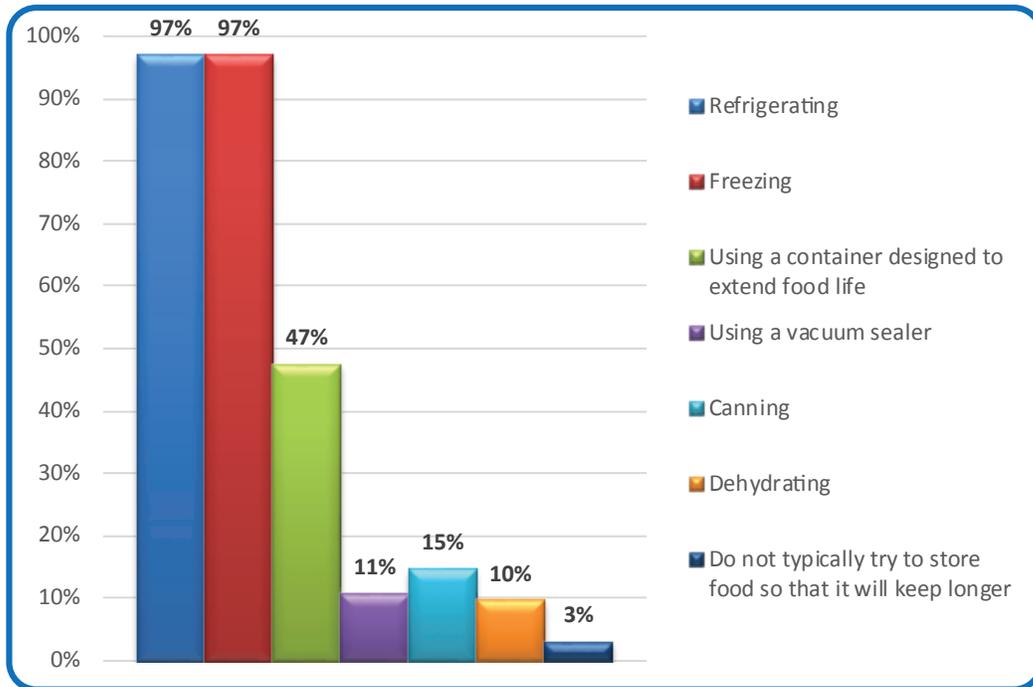


- Planning meals before shopping is not overwhelmingly done by respondents, but 45 percent do it most of the time or always, and more than one-third some of the time.
- Close to half of the respondents never or rarely find that they have bought more than they needed, whereas only less than 10 percent buy excessive amounts all or most of the time.

To determine the food preservation, thus waste prevention, behaviors of residents, respondents were asked what methods they use to store food so that it will keep longer.

- As depicted in Figure 2, residents who responded to the survey use various storage methods to extend the life of food items.

Figure 8. Food Storage/Preservation Methods

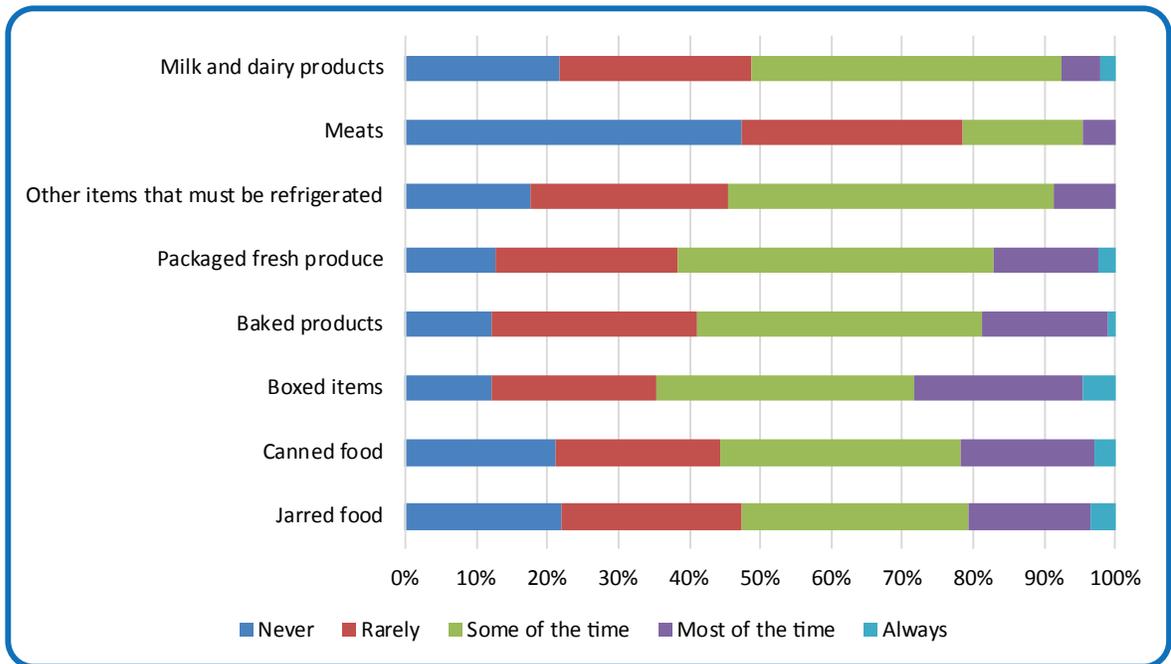


- Almost all respondents refrigerate and freeze food items to keep them longer. Almost half of the respondents use containers designed to extend food's life. Canning, using a vacuum sealer, and dehydrating are other methods used by at least 10 percent of the respondents.
- Only 3 percent of the respondents indicate that they do not typically try to store food to keep it longer.

Several questions were related to household eating behaviors. Respondents were asked how often they eat certain foods past the expiration date. They were asked whether they eat leftovers at home and bring leftovers home when they eat out. Also, their opinions were sought about restaurant portion sizes.

- As shown in Figure 3, with the exception of meat, most respondents eat food past the due date at least some of the time. “Some of the time” is the most checked frequency by those who eat expired food. Very few people eat them always, and less than one-quarter eat them most of the time.

Figure 9. Frequency of Consuming Food Past the Expiration Date by Food Type

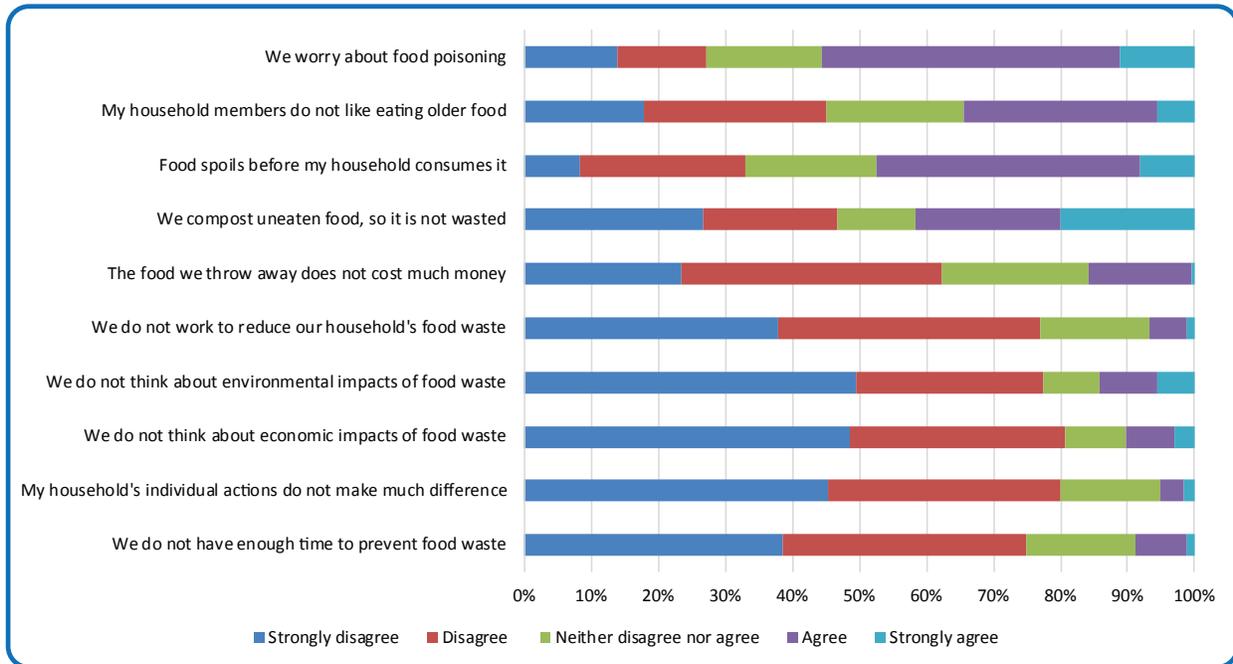


- Respondents overwhelmingly reported that they never or rarely eat meat if past the expiration date. Almost half of the respondents do not eat milk and dairy products with expired labels.
- Close to two-thirds of the respondents indicated that they eat expired boxed items and packaged fresh produce with expired dates at least some of the time. Boxed items are the most eaten food all or most of the time.
- Respondents mostly eat leftovers of home-cooked meals, and most people who eat out bring leftovers home.
- At home, almost three-quarters of respondents eat leftovers either always (22 percent) or most of the time (50 percent), while 24 percent eat leftovers some of the time. Only 4 percent rarely eat leftovers. There are no respondents who do not eat leftovers at all.
- When eating out, an overwhelming 85 percent reported that they typically bring leftovers home, and 5 percent stated that they never have leftovers. Ten percent of respondents do not bring leftovers home.
- Almost two-thirds of respondents who eat at restaurants and other prepared-food establishments think that portion sizes are too large, and almost one-third think that they are just right. Only 3 percent indicated that they are they are too small.

Attitudes and Motivations

To find out residents' reasons for discarding food, respondents were asked to agree or disagree with a set of statements. The responses are shown in Figure 4.

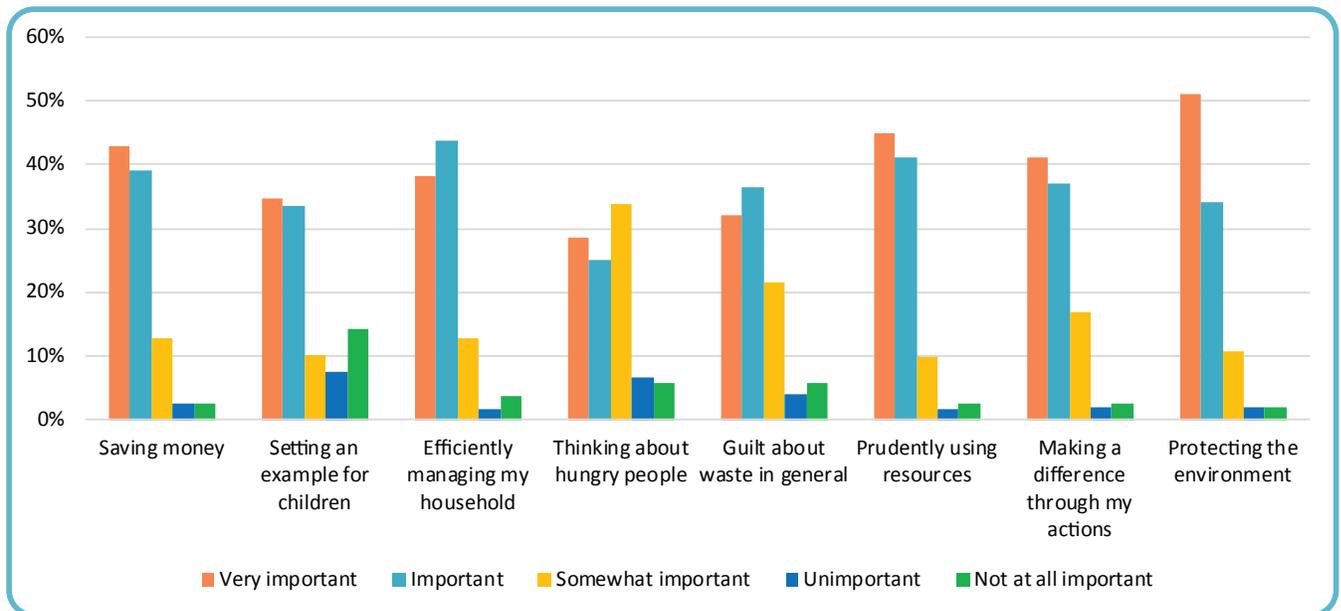
Figure 10. Statements Related to Discarding Food



- The responses indicated that the most common reason for discarding food is worry about food poisoning. The second reason for discarding food is food being spoiled before consumed, followed by not considering food is wasted because they compost it, and disliking older food.
- Forty-two percent of all respondents and 68 percent of those who compost indicated that because they compost uneaten food, it is not considered wasted.
- More than three-quarters of respondents indicated that they do not ignore economic and environmental impacts of food waste when discarding food.
- Similarly, more than three-quarters of respondents believe that households' individual actions make a difference, they work to reduce their households' food waste, and time is not an issue when it comes to preventing food waste.
- Two-thirds of the respondents disagree that food they throw away does not cost much money.

Respondents were asked to rate the importance of potential motivations for reducing food waste. Figure 5 displays the responses.

Figure 11. Motivations to Reduce Food Waste

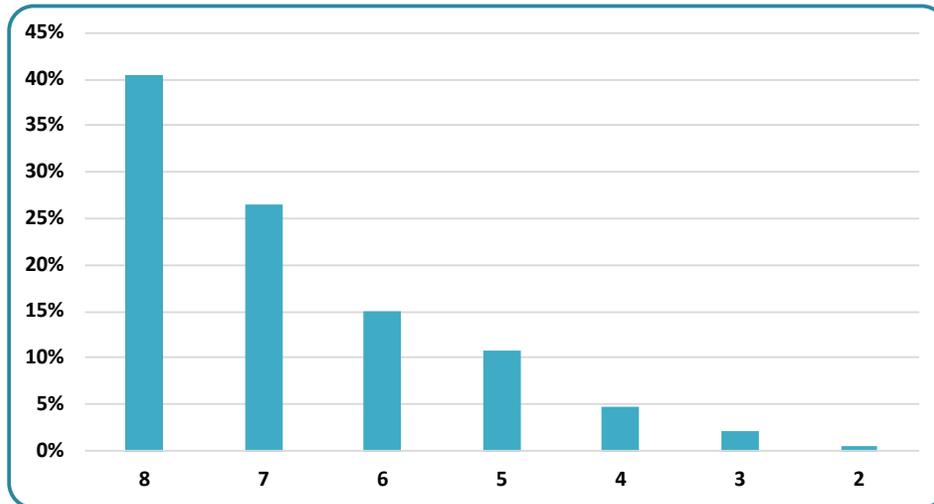


- Respondents indicated that protecting the environment and prudently using resources are the most important motivations for reducing food waste. More than half of the respondents chose protecting the environment as a very important motivation. Only 4 percent of respondents think that protecting the environment is not important. Similarly, 4 percent indicated that prudently using resources is unimportant.
- Saving money, efficiently managing their households, and making a difference through their actions are also important motivations for the respondents. All three are considered at least somewhat important by more than 90 percent of respondents. But more people ranked saving money as very important.
- Thinking about hungry people, although somewhat or more important to 88 percent of the people, is only second-to-last in motivating people to reduce waste. Overall, guilt about waste in general is more important than thinking about hungry people for the respondents.
- The least important motivation for the respondents is setting an example for children. Close to one-quarter of the respondents think that it is not an important motivation at all. It is by far the highest-ranked unimportant motivation.
- In general, people’s food shopping behaviors align with food spoilage in their households. In households where food usually spoils, 68 percent of householders estimate quantities of food needed, 16 percent usually buy more than what they need, and 39 percent plan meals before shopping for food. These percentages are 84, 3, and 53, respectively, for households where food does not usually spoil.

Respondents were given eight action items and asked which one of these they are willing to do to reduce food waste.

- As shown in Figure 6, respondents are overwhelmingly enthusiastic about taking actions to reduce food waste.

Figure 12. Percent of Respondents Per Number of Actions They are Willing to Take to Reduce Food Waste



- Ninety-two percent of respondents indicated that they are willing to take at least five actions to reduce their household food waste. Forty percent indicated they would do all eight actions.
- None of the respondents opted out; everybody is willing to do at least two actions.
- Table 4 shows the action item choices of respondents.

Table 6. Percentage of Respondents Willing to Take Actions to Reduce Food Waste by Action

Action Item Choices	Responses
Check your fridge and pantry before going to the store	97%
Freeze food	95
Make a shopping list and buy only what you need	93
Use your leftovers to make new meals	92
Plan your meals	82
Learn how to store different kinds of food so that they can be kept longer	77
Compost food scraps	75
Cook just what you can consume; do not cook too much food	67
None of the above	0

- Checking refrigerator and pantry prior to food shopping is what the largest number of respondents is willing to do, followed by freezing food.

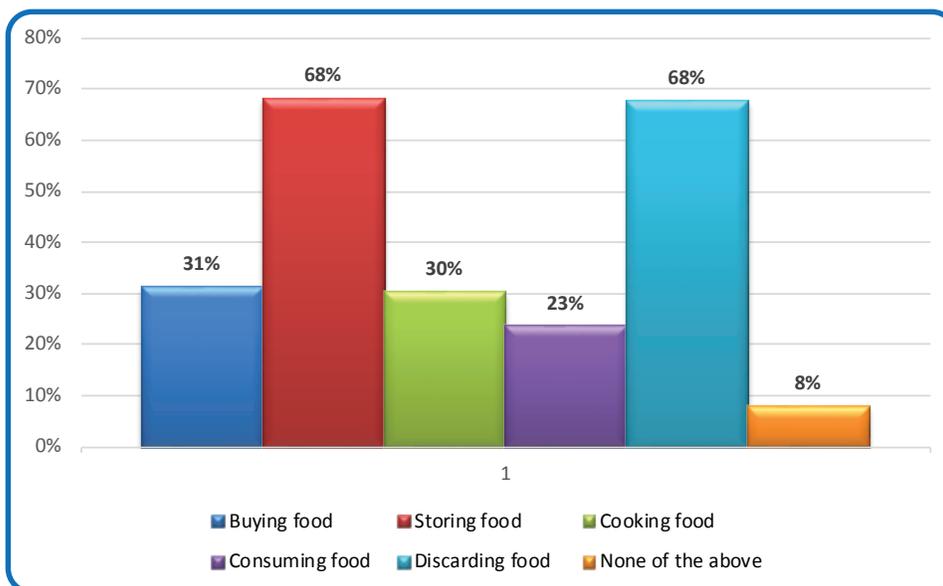
- Making a shopping list and buying only what they need and using leftovers to make new meals are also actions more than 90 percent of respondents are willing to do.
- Three quarters of respondents are willing to compost their food scraps.
- The least favorable action is cooking the right amount of food, but still 67 percent are willing to do that.
- People’s enthusiasm to take some actions to reduce food waste is even more pronounced when their current behaviors are examined.
 - Respondents who do not work to reduce their households’ food waste now are willing to do at least three actions to reduce food waste. More than 60 percent of them are willing to take at least seven actions.
 - Respondents who believe that their households’ actions do not make much difference are willing to do at least two actions to reduce food waste, and 60 percent of them are willing to take at least seven actions.
 - Respondents who do not have enough time to prevent food waste now are willing to do at least three actions to reduce food waste. Almost 60 percent of them are willing to take at least seven actions.

AWARENESS AND KNOWLEDGE

Several questions were asked related to respondents’ awareness and knowledge about food waste.

- The awareness level of respondents is pretty high. Only 9 percent of respondents are not aware of the negative impacts of food waste.
- Three quarters of the respondents have read, seen, or heard something about food waste in the last 12 months.
- More than two-thirds of the respondents indicated that learning additional tips to reduce food waste would be useful, and a quarter of them said it may be useful. Among those who are not aware of the negative impacts of food waste, there is not even one person who did not think that learning tips to reduce food waste would be useful.
- As shown in Figure 7, respondents indicated the areas in which they are most interested in learning tips to reduce food waste.

Figure 13. Areas Where Respondents Are Interested In Learning Tips



- Most respondents are interested in learning about how to store and discard food. Close to one-third of them are interested in buying and cooking food.

Comparison of awareness and knowledge of respondents with their behaviors showed that knowledge makes a difference.

- The highest percentage of people who have not read, seen, or heard anything about food waste in the past 12 months trash food waste *most of the time*, while the highest percentage of people who heard about food waste trash food *some of the time*.
- While 38 percent of the people who heard about food waste never or rarely trash food, only 16 percent of those who have not heard anything about food waste never or rarely trash it.
- Backyard composting is done by 39 percent of people who have heard about food waste and 19 percent of those who have not heard anything about food waste.
- The majority of people who are aware of the negative impacts of wasting food work to reduce their households' food waste as opposed to a little more than a quarter of those who are not aware of the negative impacts of food waste.
- While discarding food, less than 10 percent of those who are aware of the negative impacts of food waste do not think about environmental impacts of food waste as opposed to the majority of those who are not aware of the negative impacts.
- Similarly, the majority of those who are aware of the negative impacts of food waste think about the economic impacts of food waste while discarding food as opposed to less than half of those who are not aware of the negative impacts.
- A higher percentage of people who always or most of the time eat food past its due date has read, seen, or heard something about food waste in the past 12 months. A higher percentage of people who never eat food past its due date has not heard anything about food waste in the past 12 months.

SUGGESTIONS RELATED TO LOCAL GOVERNMENT PROGRAMS AND POLICIES

Respondents were asked a couple of questions regarding County programs to reduce food waste and their willingness to participate.

- An overwhelming 93 percent of respondents suggested that Prince George's County should establish and/or expand programs to reduce food waste.
- When asked whether respondents would participate in a safe and sanitary curbside food scrap collection, almost three-quarters answered yes and 16 percent answered maybe.
- Of the 10 percent of respondents who would not participate in curbside collection, 74 percent stated that they would not participate because they are already doing backyard composting. Twenty one percent stated that they are concerned about rodent attraction, and 5 percent indicated that they do not have food scraps.

Respondents were asked an open-ended question about how the County government can help reduce food waste and recover wasted food. Suggested topics are shown in Table 5.

Table 7. Suggestions to County Government to Help Reduce Food Waste

Suggested Topics	Percent of Respondents
Composting programs	51%
Awareness campaign/education	29
Curbside food scrap collection	26
Coordinating food donations	19
Encouraging source reduction	12
Incentives	9
Information dissemination	4
Other	8

- More than half of the respondents suggested that the County should establish composting programs. A variety of programs with an emphasis to community composting were mentioned.
- The second most popular suggestion was about awareness and education. Respondents suggested that the County should help reduce food waste by providing awareness campaigns and education to students, residents, and businesses. Suggested topics include:
 - Food waste costs and how to save money by reducing waste.
 - Home economics.
 - Meal planning, preparation, and food preservation.
 - Where to dispose of different types of food wastes.
 - How to share excess food.
 - Expiration dates and how to determine what is safe to eat after expiration date.
 - Negative impacts of food waste.
 - How to compost.
- More than a quarter of respondents sought government help related to food waste collection. They provided several suggestions:
 - Countywide curbside food scrap collection was the most suggested method.
 - Provide convenient drop-off centers.
 - Invest in garbage trucks to take food waste to a composting facility.
 - Distribute high-quality compost bins and have a program with biodegradable plastic-type bags for apartment homes to collect waste.
 - Offer food scrap collection for composting with the option to buy back compost really cheap.
 - Regular pickups of spare food from restaurants/eateries/grocery stores to food pantries, shelters, feeding programs, or composting.

- Respondents suggested that the County may help coordinate donation and distribution of excess food to residents in need. Suggested coordination efforts include:
 - Coordinate donation of usable but unsellable food by grocery stores, restaurants, and other food businesses to food pantries and charities and efficient distribution of donated food to people who need it.
 - Educate food businesses/restaurants about laws regarding donating food.
 - Promote and market food donation drop off locations. Provide pick up locations for free food for all of those interested. Perhaps a “Little Free Pantry” at designated sites would be helpful.
 - Support farmers markets and market gleaning to provide fresh food to low-income residents and reduce market waste.
 - Establish food recovery programs to get surplus prepared food to hungry people.
- Respondents also suggest that the County should encourage source reduction. Suggested actions include:
 - Charge people per bag for landfill trash and fine people for not recycling or for separating waste incorrectly.
 - Encourage grocery stores and restaurants to practice efficient buying practices.
 - Encourage grocery stores not to prepackage fresh produce and other food items in large amounts.
 - Charge organizations and retail facilities more for trash if they do not compost.
- Respondents suggested that the County provide incentives for the following:
 - Municipal composting programs.
 - Households that produce fewer bags of trash, particularly low food waste.
 - Households that participate in curbside food scrap collection program.
- Some respondents suggested that the County should provide online resources and guidelines, including:
 - Where and how to dispose of different types of food wastes, including cooking oils.
 - Assess the major components of our waste stream and disseminate this information to residents and then set targets and recommendations so that households are encouraged to decrease the particularly negative components of our waste.
- Other suggestions made by respondents include:
 - Invest in making sure every house can grind up leftovers and dispose in kitchen sink.
 - Promote the use of ugly fruits and vegetables from local farms.
 - Plastic bag tax at grocery stores to highlight to consumers how much they are purchasing.

Respondents were asked what one policy would they want to develop related to food waste reduction and recovery at the County level. Responses to this open-ended question were categorized and suggested policies in each category displayed below.

- Restaurants:
 - Incentivize restaurants to participate in food waste reduction/recovery programs, such as composting and donating to local shelter/food kitchens.
 - Incentivizing restaurants to serve smaller portions or two portion sizes at most meals.
 - Require restaurants to compost and contribute to their city’s composting efforts.
- Grocery stores:
 - Require grocery stores to stop prepackaging fresh produce.
 - Incentivize grocery stores for offering older, but still, good food at a reduced cost.
 - Disallow grocers and shopping centers from locking their dumpsters.
- Food scrap collection and composting:
 - Legislation/regulations that would expand the food scrap composting capacity.
 - Legislation to mandate food scrap composting by businesses or mandatory program of commercial food waste collection for composting.
 - All large food generators (e.g. one ton a week) would have mandatory food waste pick up/drop off.
 - Prohibit mixing food scraps in regular trash.
 - Policy requiring a food scrap collection program with the intention of composting a percentage of wasted food.
 - Mandatory collection of residents’ food waste to be held at a central location, where urban farmers/farmers can cheaply obtain the compost for their land.
 - Make food scrap disposal into a mandatory recovery program and fine individuals or businesses for placing food waste into trash or recycling bins.
- Food waste reduction:
 - Establish “pay as you throw” policies so that people are motivated to reduce their waste and separate waste correctly.
 - Commercial places that serve food should participate in a planned food waste reduction program.
 - Establish some sort of incentive for businesses to compost or reduce waste.
 - Give incentives to households for participating in food waste program.
 - Charge for trash by weight, with a certain allowance, but make food waste and recycling pickup free.
 - Ban organic materials at the landfill with heavy penalties for those who do not comply.
 - Legislation to reduce food waste that starts from our County institutions on down.
- Food donation:
 - Legislation to allow for the discounted sale of donated foods.
 - Allow restaurants and stores to donate usable food even if open or slightly past sell by date.

Appendix 7. Summary of Interviews with Food Waste Generators and Mitigators

Interview summaries are presented by industrial/functional categories for food waste generators and food waste mitigators. Brief descriptions of the interviewed businesses and organizations are also included. Due to confidentiality, other than a few exceptions, businesses and organizations are not identified.

FOOD WASTE GENERATORS

Farms

Two large and two small farms were interviewed; three of which are primarily vegetable farms. One large farm grows vegetables and grains and has a tree nursery and animals.

Food Recovery and Disposal

- Because of the nature of food production, the weather, or other natural reasons (such as bug infestation) there will always be some food that cannot be sold or eaten. Every farm has some food “residues” to deal with. Depending on the size and type of farm and their operation style, different methods are implemented to recover, reuse, or dispose of food residues.

Reduced-Price Sales and Free Giveaways

- One large farm grades their produce and sells the lower-grade produce at their farm market and farmers’ markets. They also sell some second-quality produce to other clients, such as restaurants for use in soups and sauces.
- One farm offers a pick-your-own option for certain crops and lets its Community Supported Agriculture (CSA) members to take culls for free.
- Another farm, specialized in ethnic produce, sells its surplus at the end of the farmers’ market to a supermarket next door.

Donations

- When seconds cannot be sold or picked up by CSA members, farms donate to either Capital Area Food Bank (CAFB) or other charities.
- One farm participated in a pilot project through Brighter Bites via CAFB and donated produce to participating schools, where food was distributed to families for free.

Gleaning

- At the end of the harvest season, one farm organizes volunteers from 4-H, churches, and corporations to glean. Another farm lets CSA members glean.

Feeding Animals

- Although not a considerable amount, some surplus food is fed to animals on the farm or given to other farmers to feed their animals.

Composting

- None of the farms sends food waste to a composting facility.
- None of the farms do major composting. The ones that create compost, usually pile culls and other food trimmings and let them rot. One farm uses it for flowers, but not for crops. The other farm cannot use it for crops because it puts too much nitrogen in the soil.

- One large farm spreads the scarred, broken, and rotten produce in the field and lets it rot. It is rare, but sometimes, they let the surplus rot on the vine. The other large farm tills back crops into the fields if animals bite greens (leaving marks) or if the greens get bitter.

Landfill

- Only one farm sends food waste to the landfill. They only send the produce that goes bad to the landfill if they cannot use it as animal feed or spread it in the fields. Food waste is no more than 10 percent of their dumpster that goes to the landfill.

Strategies Used to Minimize Food Waste

- One small farm, recognizing the production issues, will start using software to track all the factors that affect production. They believe the software will increase efficient production and reduce waste.
- One large farm is willing to send out food waste to the composting facility as opposed to the landfill.

Barriers to Preventing and Reducing Food Waste

- Not being able to harvest all the crops due to labor shortage. Unharvested crops create food waste.
- Not having the training, equipment, infrastructure, or land to run a composting operation.
- Not having a dumpster or trailer designated to hold food scraps and not having a truck to haul food to the composting facility.

Local Government Support and/or Policy Recommendations

- The County government can help small farmers by directing them. They need stimulus money for things such as hoop houses and fencing that would help with production and reduce on-farm food loss.
- The County government could lobby for agricultural guest worker program at the federal level. Labor shortage is a major issue for small farms. Sometimes they get abundant crops but don't have the capacity to harvest them all. If they have labor, they can harvest more, so food won't be wasted.
- The County government can help by providing compost bins, setting up infrastructure and logistics, educate people, and encourage participation in the composting program by providing financial incentives or tax credits to get it started.
- Require people and force businesses to compost (mandatory composting). Set up a system for it. We may have a facility, but we don't have logistics or materials. People need to be educated, separate containers should be provided, and pick-up should be organized.
- One policy that needs to be changed is the specific rules about phosphorus and not allowing farms to use their own compost in their fields.
- Countywide compost program should be established. The County should pick up food scraps for composting.
- Provide compost pick-up along with the trash, or advise about managing food scraps at home.

Food Processors and Distributors

Two food distributors (one large and one medium, which also do limited processing—mainly cutting and packaging) and two specialty food processors (coffee and sausage) were interviewed.

Food Recovery and Disposal

- The amount of food waste generated by food processors and distributors depends on the size and nature of production. The methods they use to recover and dispose food waste vary due to company policies and the kind of waste they generate.

Reuse/Repurpose

- Whenever the sausage producer has surplus ingredients, they use the extra in another recipe or try out new recipes with it.

Donations

- Food processors/distributors are generous donors of food. They donate edible surplus food to a variety of charities, including the Capital Area Food Bank, Maryland Food Bank, and D.C. Central Kitchen. The frequency and amount of donations depend on the surplus food they have. While the large distributor donates fresh produce twice a week, others donate once a month or occasionally.
- Donated foods include overstocked and unsold perfect food and food that has passed its best buy date but is still edible.

Feeding Animals

- The mid-size distributor tried donating to a hog farmer, but it did not work out.
- The large distributor generates over 100,000 pounds of food scraps weekly from processing only. Except for contaminated ones, all food scraps are delivered to a hog farm in Charles County.

Composting

- Coffee processor sends the entire coffee waste generated from production to the Prince George's County Organics Composting Facility.
- The large distributor does not work with any composter but is interested in sending food waste to the Prince George's County Organics Composting Facility.
- The mid-size distributor's attempts to send food waste to composting was unsuccessful. Since the amount of waste they produce was "bigger than people realize," it was difficult for haulers to handle. Composters did not regularly collect, causing waste to pile up.

Landfill

- Both food distributors send a significant amount of food waste to the landfill. Food waste that ends up in the landfill includes edible surplus food that could not be donated because of logistics or capacity of the receiving end. Edible packaged products with past due dates, such as mixed greens in clamshells, that go to the landfill remain fully packaged. Rotten, scarred, bruised, or tired produce, contaminated food, and in some cases, trimmings and scraps from processing also go to the landfill.
- The large company distributes close to 250 million pounds of food annually. Their 32-yard trash compactor is delivered to the landfill daily. The compactor includes all sorts of solid waste, but the bulk of it is food waste. Food waste in the compactor does not include the majority of food scraps generated in the processing area.
- A recent FDA regulation banned feeding contaminated food to animals. Any food that falls on the floor in the processing area is considered contaminated and unsafe for animals. The

large processing company has been sending all the food scraps generated in the processing area to the hog farm for 20 years. Since the enactment of this law, they have been separating the food that touched the floor and put it in the compactor. Although the exact amount of contaminated food is not known, the amount of food waste they send to the landfill significantly increased. Because of this increase, the hauling company started charging them by the pound anything over a designated weight limit as opposed to a flat fee.

- The smaller distributor indicated that they drain water out of the compactor into a grease trap before sending it to the landfill to reduce the cost of tipping.
- Sausage processor generates approximately 130 pounds of trimmings and scraps from 38,000 pounds of sausage production annually and sends them to the landfill.
- Coffee processor does not send any food waste to the landfill.

Strategies Used to Minimize Food Waste

- All processors and distributors implement similar strategies to extend the food life and minimize waste. They have strategies at every step of their operation as summarized below.

Ordering

- Predicting and ordering the right amount. Overordering causes surplus food, which may end up in the landfill. Projections are based on history, season, clients, inventory, and sometimes using software to track historical demand.
- The large distributor has an “imperfectly delicious produce” (IDP) line that includes fresh, delicious, but not perfectly shaped produce. They sell these products to institutions, food service providers, and restaurants. By offering IDP, they rescue perfectly edible produce that would have been left in the fields.

Receiving

- Thoroughly inspecting products before unloading the trucks to avoid unusable and unsellable food.
- Finding a buyer for below-grade products. Usually, second-tier companies get rejected produce from Grade A companies.
- When some of the product is unsuitable to sell, sometimes they run through the product, remove the bad ones, re-box the good ones, and sell them.

Processing and Storage

- Quick turnaround is the key to prevent food from going bad. Depending on the product type, distributors deliver them within one to seven days. They breakdown larger containers to make smaller orders.
- Anything that requires processing is processed right away and delivered to the clients. At the sausage processing company, meat turns into sausage the same day it is received and then it is frozen. They use freezer space for finished product, not for storing pre-processed meat.
- Making sure that the cold chain is working during transportation and at the warehouse. Having generators keeps refrigerators and freezers working in case of power outage.

Distribution

- Training employees and drivers on how to handle, monitor, and take care of loads minimizes mishandling and accidents.
- The large distributor reinspects items rejected by their customers to determine if they can be re-packaged and sold to other customers. If they can't sell them, they donate the products in good condition.

Willingness to Participate in Programs to Mitigate Food Waste

- The meat processor indicated that it depends on how often it would be picked up. Meat must be refrigerated, which takes up space.
- The large distributor is willing to participate in programs to mitigate food waste as well as food recovery programs.

Barriers to Preventing and Reducing Food Waste

- Employee training and turnover can be an issue. Making it an everyday regimen would be difficult.
- Cost and logistics; they are running out of space for extra dumpsters.

Local Government Support and/or Policy Recommendations

- The local government can better support their efforts by providing help for businesses to compost at no or minimum cost.
- Coordinated compost pick-up effort or separate compost at the landfill and offer a better rate for organics.
- Changing the FDA rule about produce trimmings being donated as animal feed, so that the food that drops on the floor of the precut facility will still be used at the hog farm.
- Programs to help offset recycling/waste disposal outside of the County.
- Offering an incentive/reward to those who are donating food.
- Finding ways to build community: “It’s not just about feeding people, it’s about bringing people together.”

Retailers

Among grocery stores, two national chains, one regional chain, one co-op, and one small specialty market were interviewed. Additionally, interviews were conducted with three farmers’ markets.

Food Recovery and Disposal

- Grocery stores have a variety of methods to recover and dispose surplus food and food scraps.

Reuse/Repurpose

- The stores that prepare ready-to-eat food, repurpose leftover food in a creative way for prepared foods. One example is using leftover rotisserie chicken in chicken noodle soup or chicken salad. This type of food repurposing is new to some grocery stores.
- To avoid food waste because of cosmetic requirements, one grocery chain sends food that does not meet their stringent specifications, but cannot be rejected by USDA rules, to food manufacturers to be used in processing. For example, strawberries with too much white on their tops go to a strawberry ice cream manufacturer.
- One grocery chain partnered with a brewery to create beer from discarded stone fruits.

Donations

- All chain grocery stores donate food to charities. Their recipient partners and the types of food they donate differ, but their donations are always in high demand. Some work with national organizations or regional food banks, some donate to local charities, food pantries, and churches.
- One grocery store has a seconds program for fresh produce. Employees inspect produce for seconds and put them in boxes. Charities come to pick up seconds.

Feeding Animals

- One grocery chain partners with farms and animal rescue organizations to donate produce clippings that are edible for animals. Another one contracted with a hauler to take food scraps to farm animals.
- One grocery chain sends meat and seafood waste to a rendering company that turns them into animal feed.

Composting

- Grocery stores get involved in composting at varying sizes and places. Some give away food scraps to local farmers to turn them into compost. Some use private composters, and some send food scraps to the County's composting facility.

Landfill

- Although all grocery stores send food waste to the landfill, it seems like due to their sustainability efforts, the amount of food waste that goes to the landfill is minimal. Usually edible food goes to the landfill when donation is not possible because of recipients' capacity.
- Farmers' markets interviewed do not have programs related to food waste. Market managers do not provide any collection services for composting or landfill, nor are they involved in any food recovery efforts. It is individual vendor's responsibility to clean their space at the end of the market. Apparently, depending on the day of the market, if there is another market the next day, farmers sell the surplus at that market. Some farmers use the surplus in their Community Supported Agriculture shares. Some take surplus back to their farms and throw it out on the fields to decompose.

Strategies Used to Minimize Food Waste

- All grocery stores have sustainability goals and strategies to reduce food waste. While some have specific initiatives to reduce and/or rescue wasted food, others have less structured, but effective, practices.
 - Employee training to increase buy-in—teaching the EPA's Food Recovery Hierarchy and organizing field trips to waste management and food rescue organizations.
 - Ordering the right amount based on history, awareness, and experience, as well as stocking, and rotating are important strategies to not have surplus and sell everything before it spoils or goes out of date.
 - Some stores have a reduced-price produce program. One store applies this strategy to all items in the store. Anything damaged, distressed, or out of date is sold for half price. If it is still on the shelf two days after initial markdown and is still good, it will be marked down by half again.
 - Some grocery stores pull food items one or two days before the expiration date, freeze, and donate them.
 - In general, grocery stores do not allow employees to take unsellable damaged or old food home to avoid deliberate damaging. But one grocery store has a different policy. They put such items in a bin and staff can pick through and take home what they want.
 - One grocery chain is trying to set up waste audits with the goal of decreasing composting and increasing donations.
 - One national grocery chain has launched a zero-waste initiative with 80 percent diversion goal. Although this program is not yet in effect in Prince George's County, the current diversion rate is already 74 percent. It will most likely exceed the goal when the initiative goes into effect here.

Willingness to Participate in Programs to Mitigate Food Waste

- Depends on requirements and the scope of the programs. If it requires more than a reasonable amount of physical space and employee time, it may not be worth it.

Barriers to Preventing and Reducing Food Waste

- Customers' understanding of date labels on packages.
- Liability concerns about donating food.

Local Government Support and/or Policy Recommendations

- Educate grocery stores about tax incentives in place so that they will donate food and make use of them.
- Introduce mandatory composting. Also switch to small trash cans, big recycling bins, and big compost bins. Compost should be free, and trash placed outside of the bin should cost more.
- Educating customers on date labels.

Food Service Providers

Only one major food service provider, Sodexo, was interviewed. Sodexo has 13,000 sites just in the United States; therefore, their focus is providing guidance to their sites. They have many sites in Prince George's County, but information on each site's food waste activities is not available. These sites' practices are based on Sodexo's overall food waste policies and guidance.

Food Recovery and Disposal

Donations

- Provide guidance for their sites on how to donate overproduced and overpurchased food.

Feeding Animals

- In some areas, they collect from restaurants and take them to pig farms. (It is not known whether this is done in Prince George's County.)

Composting

- At some sites, Sodexo operates facilities and manages composters. At some places, the client contracts composters.

Anaerobic Digestion

- Sodexo does not own an anaerobic digester, but at some locations they provide food waste to an AD company. They do not own the end-product biogas. (It is not known whether this is done in Prince George's County.)

Strategies Used to Minimize Food Waste

- Sodexo is a member of Food Waste Reduction Alliance.
- They do not want to generate any food waste. Since they cannot always ship their waste for composting, recycling, or animal feed, they focus on waste reduction. They try to impact the system through reduction, because this is the only part of the puzzle they can control.

Waste Watch

- They use Leanpath, food waste tracking and analytics software, to analyze their food waste so that they can prevent it. The goal is to eliminate food waste globally by 2025 by measuring overproduction spoilage, any operator error, overcooking, and similar practices that cause waste.
- Chefs or managers are responsible for waste watch program at each site.

Guidance

- Sodexo purchases ingredients from approved vendors and purveyors. Due to food safety reasons, sites need to purchase through them. They purchase certain amounts of food from specific vendors to assure quality and prevent overpurchasing.
- They track local food purchase stakeholders and collaborate with vendors. When a farmer has surplus product about to go bad, they purchase it to prevent food waste.

Training

- Sodexo trains everyone who cooks or prepares food at their sites.
- There are different training modules: how to handle salad bars, purchasing, preparing, disposing, how to compost, or donate.

Client Contracts

- Collaboration with clients is important. During contract negotiations, they discuss food waste.
- They implement waste watch even when the client does not ask.

Local Government Support and/or Policy Recommendations

- Encourage composting.
- Offer incentives to reduce food waste.
- Develop infrastructure needed to allow organizations to deal with waste.

Restaurants

Gaylord Resort and Conference Center, which operates four restaurants, a market that sells grab-and-go food, and an employee cafeteria that feeds 2,000 daily; and four independent restaurants were interviewed. There are many commonalities among restaurants in their operations and food waste related practices despite their differences in size, type, and cuisine.

Food Recovery and Disposal

Reuse/Repurpose

- Restaurants let employees eat leftover food from buffets. At Gaylord, banquet leftovers are served at the employee cafeteria. Some restaurants allow employees to eat the food declined by customer, if the customer never touches it.
- Because Gaylord has multiple restaurants and banquet rooms, they move unserved surplus food around and find a place to serve it.
- They are creative about using ingredients that are nearing expiration dates or food trimmings to make new dishes.
- One ethnic restaurant does not reuse or repurpose food. They pay close attention to freshness and taste. The taste **suffers** if they reheat or repurpose.
- One restaurant participates in the Maryland Oyster Recovery Program and delivers oyster shells weekly.

Donations

- Restaurants are concerned about liability and do not donate food.

Feeding Animals

- One restaurant works with a farmer who picks up grain remains from the brewery to feed his pigs and cows.

Composting

- Onsite composting is a concern for one restaurant because of rats.
- A couple of restaurants sometimes send their food scraps to a local farm for composting.

Landfill

- Restaurants send significant amounts of food waste to the landfill. Food waste includes pre- and post-consumer waste. Since most of them do not use food scraps to feed animals or for composting purposes, almost all food waste is thrown away.
- Due to health safety regulations, any food that is served to the customer and comes back uneaten cannot be donated and must go to trash. This includes untouched food and buffet leftovers.
- Lots of food waste is generated at buffets. Due to food health safety reasons, buffet food cannot be donated. Therefore, all of it ends up in the landfill. There are three reasons for high volume of food waste at buffets:
 - Restaurants keep buffet trays close to full, because customers do not want to see half-empty trays. It is hard to balance customer needs and saving food; they need to choose between losing customers and wasting food.
 - People take more food than they can eat. According to one restaurateur, people are obsessed about price per value and take more than they need and then leave food on their plates.
 - During special event buffets, food is prepared for certain number of people and because of no-shows, food is leftover.

Strategies Used to Minimize Food Waste

- All restaurants are careful about not wasting food, primarily due to economic concerns. They use various strategies to minimize food waste.
 - Source reduction strategies include training employees and finding ways to avoid waste before it happens.
 - Putting a system in place—keeping menus consistent, ordering and cooking the right amount, and batch cooking.
 - Using software to look back on history and understand patterns.
 - Efficiently using ingredients, such as making mashed potatoes with skins to reduce trim waste.
 - Watching plate waste and adjusting portion sizes accordingly. One restaurant noticed that people leave side dishes on the plate, so they reduced the size of the sides. However, restaurants are not willing to reduce main dish sizes or offer two portion sizes. Their attempts to reduce portion sizes and keep the price the same instead of increasing the price failed. Consumers like consistency and are willing to pay more for larger sizes. Offering optional small portions are not economically feasible. However, they are all willing to reduce portion sizes if it becomes a requirement and all restaurants do the same.
 - Putting labels describing food on the buffet items. This is especially important at ethnic restaurants to avoid waste due to customers' unfamiliarity with ethnic dishes.

Willingness to Participate in Programs to Mitigate Food Waste

- They are willing to participate in a food scrap collection program if it is mandatory or low-cost or no-cost to them, the County provides a separate dumpster, and pickups are frequent enough to keep rodents away.

Barriers to Preventing and Reducing Food Waste

- Liability concerns about donating food.
- Lack of knowledge, equipment, and logistics to send food for composting.
- Banquets are the biggest challenge for waste. Attendance usually is not predictable so it makes food estimates difficult.

Local Government Support and/or Policy Recommendations

- Portion control. The government should help with people’s mindset by providing guidance and education on the amount of food that should be consumed based on health implications and side effects of eating too much.
- Reach out to everybody in the County and send the message about why it is bad to waste food. Educate people.
- Health Department policies can be looked at again. Food is definitely wasted because of the rules we operate under. If the rules are more sensible, food would not be wasted as much.

Institutions

Food service practices at institutions vary considerably based on the nature of the institution. The size of the institution and whether food service is an in-house operation or contracted also make a difference.

Two hospitals and two universities—University of Maryland-College Park (UMD) and Bowie State University (BSU) were interviewed. One hospital and UMD have in-house operations, the others have contractors. Additionally, interviews conducted regarding food waste related initiatives within the Prince George’s County Public Schools (PGCPS) system.

Food Recovery and Disposal

- Both hospitals offer patient meals and cafeteria meals for staff and visitors. The rules for disposing patient food are different than cafeteria food. Universities have cafeterias and other on-campus food services. For the purpose of this study, only cafeterias were examined at universities.
- In all institutions, due to the volume of food served, significant amounts of food waste is generated regardless of efforts to minimize it. The following are the methods used to discard food waste:

Reuse/repurpose

- Generally, in all institutions, food scraps and peelings are used to make soup stocks.
- Prepared but uncooked leftovers are repurposed and added to the next day’s menu at the hospitals and UMD. At one hospital, they are frozen up to 72 hours, and if they cannot be used, they are put in the trash.
- At BSU, certain unserved food items are reintroduced at the next meal. Leftovers are not reused to create different dishes.

Donations

- Neither hospital donates any food. BSU does not donate either.
- At UMD, already prepared but unserved food left in the pans in the kitchen is taken by the Food Recovery Network volunteers at the end of the day and donated to a church in Riverdale to feed the hungry. By law, only food that was not put out for self-serve can be donated. Proteins are served by cafeteria staff; therefore, leftover proteins in the pans can be donated. But leftover food in the self-serve area goes into the compost bin.
- Unused inventory items at UMD are donated to Capital Area Food Bank.

Composting

- UMD has a compost compactor behind each cafeteria. Trimmings and peels that cannot be repurposed and all plate waste go into the compost compactors. Compactors are delivered to the Prince George's Organics Composting Facility twice a week.
- No composting is done at the hospitals or BSU.

Landfill

- At the hospitals, all foods served to patients go in the trash. Once food is delivered to the patient's room, it cannot go back to the kitchen. Even if the patient does not touch the food and asks it to be heated later, they must throw it away and bring new food to control infection.
- At BSU, food scraps and leftover food go into the trash and end up in the landfill. UMD cafeterias do not send any food waste to the landfill.
- At the hospitals, any food with past due date goes in the trash. University cafeterias have a high turnover in inventory, so they never have anything with a past due date.

Strategies for Minimizing Food Waste

- There are certain strategies that all institutions apply to minimize cost that also helps minimize food waste.
 - Rotating menus periodically. Repeating the same menus helps predict the amount of ingredients needed and prevents over-ordering.
 - Ordering no more than what is needed and buying smaller amounts of things that are not used often.
 - Managing the inventory well. Constantly checking the pantry and the refrigerator and using the older stuff first ("First In, First Out" rule)
 - Reusing or repurposing leftovers.
 - Using peels and scraps to make soup stock or sauce.
 - Batch cooking based on demand.
 - Providing correct portions, so consumers would not leave food on their plates.
 - Seeking customer feedback and adjusting menus and/or cooking style accordingly.
- One chef indicated that peeling and cutting vegetables the right way is critical to preventing food waste. He watched his employees cutting off the tomato tops and told them not to throw them in the trash. Instead, he asked them to put them in the bin he provided. At the end of the week, they had filled the bin with twenty pounds of tomato tops. He turned them into tomato sauce. He told his employees that over the course of the year, those tomato tops would account for over 1,000 pounds of tomatoes. He also showed them a more efficient way to cut tomatoes, which eventually reduced waste considerably. He said that communication is the key to do things the right way.

- There have been special efforts to minimize food waste at both UMD and BSU.

Cafeteria Reform at the University of Maryland (UMD)

- After working for three years with two external consultants, holding focus groups, and conducting surveys, in August 2016, change came to the campus.
- Change included:
 - Switching to all-you-can-eat style unlimited access.
 - Elimination of carry-out containers.
 - Elimination of disposable plates, cups, and utensils, including straws.
 - Elimination of trays.
 - Switching to small size plates and bowls.
 - Introducing vegan food.
 - Introducing more variety and specialty items.
 - Shrinking the standard portion sizes—proteins are cut in smaller pieces, dessert slices are skinny, sandwiches are cut in half.
- Results of change:
 - A lot less food is wasted.
 - Students eat normal amount of food. In the old system, there was no self-serve, and portion sizes were standard. Everything served by cafeteria employees or made by order. Students were eating these huge amounts of food, or those who couldn't finish and could not take the leftovers with them were throwing the food away. At the made-to-order pasta station, flat-cost pasta bowls were giant size, and 60 percent of students could not finish the food. At 251 Dining Hall, during all-you-can-eat, students were lining up and then stuffing themselves all night. Not anymore.
 - Food cost stayed the same for the base plan. In 251 Dining Hall, food cost came down, because students do not stuff themselves anymore.
 - Food insecurity is gone. During the point system, about 1,200 students used to run out of points before the end of the semester and become food insecure and struggle. Students do not worry about running out of food anymore.
 - Students eat healthy. They eat variety of food, not just choose filling foods like pizza. They try new foods in small amounts without wasting their points or food. They eat more fruit, because it is not pay by weight anymore. They can eat as much as they want.
 - Cafeteria satisfaction scores improved.
- Cafeteria observation revealed that there are efforts to educate students about food waste.
 - Sayings to remind students not to waste food carved in glass at every serving station.
 - Plates are no bigger than 9 inches in diameter, and salad bowls are probably 6 inches and not too deep. Students do not fill their plates. Some of them probably get food more than once.

Food Waste Audits at the University of Maryland (UMD)

- Food waste audits were conducted by students in two cafeterias in April 2017 and in all three cafeterias in February 2018. The purpose of these two-day food waste audits is to create awareness among students and thus reduce food waste.
- Key findings:
 - In 2017, on average, each diner generated 2.5 ounces of food waste per meal period. This amount declined to 1.6 ounces in 2018. This decrease may be an indicator of increased awareness among students.
 - In both the 2017 and 2018 audits, carbohydrates made up the majority of food waste, followed by produce and proteins.
 - In 2018, dining halls produced an average of 34.27 pounds of waste per hour.
 - According to the 2018 waste generation amounts, based on the amount of water to produce and prepare the food, an average UMD student wastes 30 gallons of water per dinner in discarded food. This equates to a 15-minute shower. Overall, 30,000 gallons of water is wasted per dinner, equivalent to a volume of three hockey rinks.
- Having audits in front of the students helps create awareness. Some students admitted that they felt embarrassed about leaving food in their plates on the first day of the audit and were careful about not wasting food the second day.

Food Waste Reduction Technical Assistance to Bowie State University (BSU)

- In May 2018, the Maryland Department of the Environment (MDE) awarded technical assistance to BSU for food waste management, reduction, and diversion through the U.S. Environmental Protection Agency Pollution Prevention Grant Program. MDE contracted with MSW Consultants, LLC to provide technical assistance. MSW Consultants assessed the food services and food waste management at BSU and came up with recommendations.
- Assessment summary:
 - Thompson Hospitality is the contracted food service vendor. They operate the main cafeteria and other supplemental food service cafés, catering, and snack areas on campus.
 - Estimated annual food waste generation at BSU is 166 tons; this is 28 percent of all waste generated on campus.
 - Current food waste reduction strategies are primarily implemented by Thompson Hospitality. Their waste reduction incentives appear linked to operating efficiency, costs savings, and sustainable practices embraced by Thompson Hospitality.
 - There are excellent food waste reduction and diversion strategies at the cafeteria:
 - Staff, aided by in-house software, track and manage food ordering, production, and serving.
 - Single-serving portion control is implemented at the point of service. Customers must come up again for additional servings.
 - Except for the salad serving area, there are no self-serve food areas.
 - Cooks prepare dishes in “batches” to control waste.
 - The food menu is scheduled on a four-week cycle. Data from the first week is applied to fine-tune food planning, ordering and serving for the remaining 3 weeks of the meal schedule.
 - Certain unserved food items are reintroduced at the next meal. Leftovers are not reused to create different dishes.

- Compostable materials are disposed in the trash. The quantity of potentially recoverable food waste that could be diverted to composting is small. Therefore, enhanced food waste recovery could likely be limited to a manageable small-scale onsite composting.
- Recommendations:
 - Establish broad waste reduction and diversion goals, and align goals, objectives, and activities across stakeholders.
 - Engage vendors and suppliers to guide solid waste system management decisions and require standard reporting.
 - Develop a concise strategic plan for “BSU Materials Management.”
 - Coordinate with the contracted service vendor to weigh and report disposal-bound food waste over a period of time to establish an accurate baseline for disposed food.
 - Pilot-test small-scale, onsite composting. Start with recovery of pre-consumer food waste from the cafeteria food preparation areas. Conduct the pilot study for one year to determine the feasibility of developing a permanent onsite food waste composting area and program at BSU. Elements of this pilot should include:
 - Coordination by BSU and contracted food service vendor.
 - Clearly labelled food recovery containers.
 - A designated area on campus to pilot-test low-tech composting.
 - Student participation, which could include delivery of food waste containers to the compost area and recording of food waste and compost data.
 - Integrate the compost pilot with student education and existing curriculum.
 - Explore and evaluate uses of compost products including application on campus as inorganic fertilizer replacement and soil amendment.
 - Develop an education strategy that includes student-led participation in waste reduction and diversion initiatives and student buy-in.

Food Recovery Network Chapters at UMD and BSU

- UMD is the birthplace of Food Recovery Network (FRN). UMD chapter of FRN is very active and recovered over 230,000 pounds since its inception in 2013.
- BSU is in the process of establishing a FRN chapter.

Local Government Support and/or Policy Recommendations

- The County should help educate people and encourage them to care. The more people know, the less they waste. If people cared more, there would be less waste.
- Health inspections are an educational opportunity – instead of simply saying, “you are not compliant,” tell them why. Inspectors should be able to speak to a variety of things related to the County and should use time in food service establishments as teachable moments. Even coming prepared with pamphlets would be good.
- Continue and expand the County’s composting program.

M-NCPPC Venues

The acting division chief of the Arts and Cultural Heritage Division who oversees the historic rental properties, the Sports and Learning Complex manager and food service contractor, and the Show Place Arena food manager were interviewed.

Historic Rental Properties

- At all historic rental venues, clients bring caterers. M-NCPPC also has contracts with some caterers that clients can choose from.
- M-NCPPC only has guidelines for cleaning and use of grease traps. Disposing food and hauling trash are all caterers' responsibility.

Show Place Arena

Show Place Arena is the only M-NCPPC venue with an in-house food manager. They usually have three to four events each month where they run the concession stand. They have at least one catering event a month. Catering events can be sit-down plate serving or buffet styles. Buffets are usually self-serve, unless the client asks them to serve.

Food Recovery and Disposal

- They usually do not have much plate waste. The biggest waste happens when they have a buffet and all food cannot be consumed. There is a two-hour window to consume buffet food. If food cannot be consumed, they let the employees eat the food. But they cannot take food home due to liability concerns.
- They do not donate food, because they are concerned about liability. They are not aware of the federal Bill Emerson Good Samaritan Act that protects food donors.
- They sometimes give food scraps to horses.
- They do not compost and do not have time to drop off to the composting facility.

Strategies Used to Minimize Food Waste

- Order weekly as events come up. They can project the amount needed based on their experience.
- Repurpose as much as they can. They make new dishes from leftover vegetables.
- Freeze.
- They use food with expired date if it is safe to use.
- They use nine-inch plates and do not put too much food on the plates.

Barriers to Preventing Food Waste and Willingness to Participate in Programs

- Fear of liability.
- Not having the means to haul food waste.

Local Government Support and/or Policy Recommendations

- Help with composting or food waste collection.
- Liability protection and guidelines about donating different kinds of food.

Prince George's Sports and Learning Complex

Simply Good, Inc. is a contractor for all the food services at the Sports and Learning Complex. These services include Betty's Café, indoor and outdoor concessions, and catering for events.

Food Recovery and Disposal

- They are required to use oil and grease traps and due to a new ban by the County or WSSC, they can no longer use in-sink garbage disposal.
- All trimmings and leftover food go into the trash and then to the landfill.
- They do not donate food because of fear of liability. They have never heard of the Good Samaritan Act. If an event is cancelled at the last minute, they take the prepared but untouched fresh food to an adult daycare center. Sometimes clients of the catered events get the leftovers for donation.
- They do not compost or send food waste to a composting facility. They do not know where to send. They are not aware of the County's composting facility.
- Due date does not mean not edible, but not sellable. They give items with expired labels to employees.

Strategies Used to Minimize Food Waste

- Their goal is not to have waste. From a business perspective, they always watch waste.
- They train employees how to save food and give them ownership and make them accountable.
- They order no more than what they need; they follow sales and keep the inventory accordingly.
- At concessions, they prepare food based on the previous sales for the same event. At the café, they know their daily sales and prepare food accordingly.
- They cook small batches.
- They reuse and repurpose.

Barriers to Preventing Food Waste and Willingness to Participate in Programs

- Other than expense to food operator, there are no barriers. They have to train employees. Maybe this is an inconvenience at the beginning, but the reward is good. Once you start doing it and get used to it, it will be great.
- Composting is a good idea, but from a business perspective, it is not feasible. You have to pay somebody to pick it up and deliver to the composting facility. Here, they put everything in the dumpster and it is not their responsibility to haul it. If they pick up food waste the same way, they will be glad to participate.
- Feeding animals is a great idea. They would love to give all the trimmings to animals at Watkins Park or elsewhere.

Local Government Support and/or Policy Recommendations

- Provide a system for collecting and hauling food waste for composting.
- Expiration dates should be changed. Instead of expiration, "born on date" should be on everything. Educate consumers on expiration dates.

FOOD WASTE MITIGATORS

Food Recovery Organizations

There are various organizations with slightly different missions whose ultimate goal is to recover wasted food to feed hungry people. These are regional or national organizations that actively work in Prince George's County. Three of these organization were interviewed. They rescue food at the production and retail stages.

AmpleHarvest.org

- AmpleHarvest.org is an online platform that matches community and home gardeners with local food pantries. Whenever gardeners know that they will have surplus products, they contact the registered food pantries on Ample Harvest platform and make arrangements to deliver excess harvest. Gardeners usually harvest just before the delivery.
- They have 8,500 registered food pantries nationwide and 12 in Prince George’s County.
- The exact number of participating gardeners is not known. They reach gardeners through various gardening associations, County extension services, and Master Gardeners.
- The nationwide gardener survey conducted by AmpleHarvest.org in 2016 revealed that 83 percent of gardeners are willing to donate their excess garden bounty, and 56 percent are able to contribute 273 pounds annually.

Hungry Harvest

- Hungry Harvest aims to make food recovery accessible to consumers through education. They sell perfectly edible food that could not make the supermarket shelves at affordable prices.
- They get fruits and vegetables that do not meet aesthetic perfection standards as well as surplus produce that cannot make the market. They pay fair prices to their partner farmers for this produce that would otherwise go uneaten—eliminating farm-level waste and filling in revenue gaps for growers.
- They also rescue other products on wholesalers’ excess inventory or rejected by grocery stores, because the expiration dates do not meet their shelf-life standards.
- They box these fresh rescued products and deliver to customers’ doorsteps and charge less than grocery store prices. They offer a variety of sizes and options. Customers can customize their weekly harvest and get only what they need, minimizing the possibility of post-consumer waste.

Meals on Wheels

- Meals on Wheels rescues food that vendors are willing to donate at the end of the day at some farmers’ markets.
- They use rescued surplus food to make meals. They donate anything they cannot or do not use to a church.
- Meals on Wheels also gets bread donations from Panera Bread.

Food Banks and Food Pantries

One food bank and three food pantries were interviewed. Capital Area Food Bank (CAFB) is the only food bank that serves Prince George’s County. All food pantries are members of CAFB. One food pantry belongs to a church. One pantry belongs to the Community Ministries of Prince George’s County (a coalition of 21 churches and five nonprofit organizations), the third belongs to a nonprofit organization and has two locations.

Capital Area Food Bank (CAFB)

Food Sources

- The majority of food banking is based on minimizing food waste.
- Eighty percent of the food is donated from manufacturers, retailers, processors, distributors, other food banks, and Feeding America.
- The 20 percent they purchase is mostly fruits and vegetables from local growers. They have

growers on a contract basis, who provide a guaranteed amount of food. They also have non-contract growers from whom they get food on the spot. They have partnerships with two large vegetable farmers in the County, but also get food from other Maryland counties, Delaware, Virginia, and sometimes Pennsylvania.

- They also get “ugly fruits and vegetables” or seconds from a network of growers. They encourage growers to harvest them and sell to CAFB for less than the market value.

Logistics of Receiving and Distributing Food

- The nature of food recovery is flexibility. Therefore, they do offer a variety of ways to receive and distribute food to meet the partners’ needs.
- They handle delivered and picked-up food. They receive five truckloads of food daily. They have 17 trucks that go to 100 grocery stores, one to five times a week. They set up pick-up schedules and make sure what they can donate. Drivers inspect food to make sure it is all edible. They hire a logistics company to handle pickups from farmers.
- The Partner Direct Program connects food pantries directly with donors. This builds stronger relationships, saves time, and saves shelf time for food.
- They have two rules regarding what to accept, regulated by their mother agency Feeding America. Except fresh fruits and vegetables, everything they get must have a label with ingredients and nutritional value. Therefore, they don’t accept bulk donations unless labels are provided. Then they package them and affix labels.
- They receive many past-due-date items. They created a guideline about food expiration dates to show what is safe to eat after expiration date.
- When someone wants to donate prepared hot food, CAFB acts as a liaison and contacts partners. Lots of partners do not have the capacity to handle hot food distribution.
- Their turn-around time for produce is 12 hours to a week. Network partners come and get what they want but sometimes CAFB gives away packages.
- CAFB has also direct distributions via mobile market. They take pallets of food to community centers and other locations, such as Iverson Mall.

Discarding Food

- Volunteers try to salvage as much food as possible, but sometimes must discard food.
- Sometimes they get rotten produce and deliver them to a hog farm. If they get damaged packages of cereal or flour, they open the packages and put them in a bin and send to a hog farm.
- They are exploring a composting option.
- They put destroyed cans in the trash. Their trash compactor is picked up once every three weeks.

Food Pantries

Food Sources

- All pantries get food primarily from CAFB—They get fresh fruits and vegetables for free but pay a nominal fee for other groceries.
- They all purchase food from grocery stores.
- One pantry does not get any food donations. Two of the pantries get cooked cold food donations from restaurants and grocery stores. One pantry gets donations from churches and other organizations. One pantry gets donations from a farm, Joint Base Andrews, and from a grocery store when they have a refused shipment.

Food Assistance Services

- Hot meals—One pantry offers weekly dinner to about 40 people, the other one offers weekday lunch Monday-Thursday to about 30 people. The third does not serve food but offers cold cooked meals.
- Free groceries—One pantry offers free groceries to 150 families weekly, the other two give away groceries once a month, one to 50 people, the other to 600 families. They all let people choose what they want to take but have limits (such as three full grocery bags.)
- Pantry—Emergency food is available at all pantries.

Discarding Food

- They usually distribute all fresh fruits and vegetables right away. Rotten items are thrown away. One pantry sometimes gives them to farmers to feed the animals.
- If too much food is donated, one pantry gives the surplus food to other pantries.
- If they receive any food past its due date, one pantry trashes them, another one offers them but alert the clients, and the third one follows the CAFB guidelines.

Local Government Support and/or Policy Recommendations

- Restaurants throw away too much food. They should be required or encouraged to have partnerships with food pantries and donate food. The receiving end usually doesn't have the manpower to handle the distribution. But maybe something can be done with legislation or a program.
- Give incentives to nonprofit organizations to partner with them and donate.
- Create a policy and education about expiration dates.

Food Scrap Collectors and Composters

Two municipalities with composting programs and three private/nonprofit businesses with compost-related operations that serve Prince George's County were interviewed.

Municipal Programs

Two municipalities, the Town of University Park and the City of Bowie, were interviewed about their food scrap collection programs.

Town of University Park

- University Park initiated the first food scrap collection program in the County. They first contracted with a food waste collection company that collected food scraps and delivered to ECO City Farms. Now, the town collects the food scraps and delivers them to the Prince George's County Organics Composting Facility.
- They expanded the program from 15 to 230 households. This is more than a quarter of the households. The goal is to make it mandatory and get all households to participate.
- The town provides five-gallon buckets as well as smaller containers with compostable bags for kitchen countertops. Public Works crew collects food waste once a week on Tuesdays in a small truck and delivers to the composting facility.

City of Bowie

- The City of Bowie initiated a six-month pilot food waste collection program in May 2017 with 85 participating households. The pilot went well and turned into a regular program.
- The program is not citywide. They only target certain neighborhoods because of the capacity of the Public Works Department. Currently, 170 households participate. They are aiming for 200 households.
- Each participant receives a two-gallon scrap collection bin for their kitchen, a six-gallon curbside bin and a set of 60 compostable bags. Pickup is every Wednesday. Collected food waste is taken to the Prince George's County Organics Composting Facility.
- The program runs smoothly. There are no complaints. Overall, resident inputs are positive. They will reevaluate the food scrap collection program next year and decide to expand it or not.

Local Government Support and/or Policy Recommendations

- Both municipalities would like financial support from the County. Funding is sought for bins and trucks as well as for establishing community composting.
- Mandatory countywide curbside food scrap pickup for composting.

Other Composting Operations

One regional composting company, an urban farm with composting operations, and a Washington, D.C. Metro Area food scrap collection company provided information about their operations in the County.

- The regional company serves four states and D.C. They have facilities in two states, including Maryland. They have residential, commercial, and special event food scrap collection services. They haul food scraps to their composting facility and turn them into compost for sale. They have customers in Prince George's County.
- ECO City Farms in Prince George's County has a vermicomposting operation in their Bladensburg farm. This is an indoor operation in a large hoop house. They have 15 wooden bins and a newly purchased large metal bin with continuous flow through system, which allows constant harvesting. ECO City Farms used to do windrow composting in Edmonston farm. They used to get District of Columbia residents' food waste through a food waste collection company. Now, they get food scraps primarily from a small organic market and a restaurant in Prince George's County and use the collection company on an as-needed basis. ECO City Farms prefers to get food scraps from local businesses or, even better, from the next-door apartment complex residents. However, there is no system in place for collection. Currently, they need 300 pounds of food waste weekly. They produce 500-600 pounds of vermicompost monthly. They use all of it for their own food production. Their goal is to switch to all metal bins and triple their capacity. When this happens, they will need about a 1,000 pounds of food waste weekly and will produce enough vermicompost to sell. Vermicompost is up to 10 times more valuable than regular compost, and there is a high demand for it.
- The Washington, D.C. Metro Area food scrap collection company has contracts with some County businesses to collect their food scraps. They recently started residential food waste collection in some communities inside the Beltway. Weekly residential pickup costs \$32/month. They provide a five-gallon bin with lid and a roll of bin liners. When they collect, they leave the bin clean. Twice a year, they give free compost (one cubic foot regular compost or a two-pound bag of worm castings) to their customers. They also have a drop-off site in D.C., but not in the County.

Local Government Support and/or Policy Recommendations

- Access to available land for composting. Government property availability.
- Recognition and support. Support can be financial for providing community service and easing zoning and permitting requirements. Composting creates jobs.
- Tipping fees and compost prices at the Prince George's County Organics Composting Facility (PGCOCF) should be compatible with other places. Tipping fees at other places are around \$70 per ton and compost prices are \$22-35 per cubic yard; these are \$45 and \$12-15 at PGCOCF, respectively.
- Stakeholder meetings and focus groups to create partnerships and communicate effectively and consistently.
- Ban food waste in the landfill. Make composting mandatory. This is a game changer. We have been successful about yard waste, we can be successful in food waste too.
- Incentives and encouragement for businesses to participate. Regulations, incentives are needed to push people into getting in food waste collection or composting businesses too.

Appendix 8. Reducing Wasted Food at Home¹

WAYS TO REDUCE WASTED FOOD

Planning, prepping, and storing food can help your household waste less food. Below are some tips to help you do just that:

Planning Tips

By simply making a list with weekly meals in mind, you can save money and time and eat healthier food. If you buy no more than what you expect to use, you will be more likely to keep it fresh and use it all.

- Keep a running list of meals and their ingredients that your household already enjoys. That way, you can easily choose, shop for and prepare meals.
- Make your shopping list based on how many meals you'll eat at home. Will you eat out this week? How often?
- Plan your meals for the week before you go shopping and buy only the things needed for those meals.
- Include quantities on your shopping list noting how many meals you'll make with each item to avoid overbuying. For example: salad greens - enough for two lunches.
- Look in your refrigerator and cupboards first to avoid buying food you already have, make a list each week of what needs to be used up and plan upcoming meals around it.
- Buy only what you need and will use. Buying in bulk only saves money if you are able to use the food before it spoils.



Source: <https://www.epa.gov/recycle/reducing-wasted-food-home>

Storage Tips

It is easy to overbuy or forget about fresh fruits and vegetables. Store fruits and vegetables for maximum freshness; they'll taste better and last longer, helping you to eat more of them.

- Find out how to store fruits and vegetables so they stay fresh longer inside or outside your refrigerator.
- Freeze, preserve, or can surplus fruits and vegetables - especially abundant seasonal produce.
- Many fruits give off natural gases as they ripen, making other nearby produce spoil faster. Store bananas, apples, and tomatoes by themselves, and store fruits and vegetables in different bins.
- Wait to wash berries until you want to eat them to prevent mold.
- If you like to eat fruit at room temperature, but it should be stored in the refrigerator for maximum freshness, take what you'll eat for the day out of the refrigerator in the morning.

¹ U.S. EPA, Reducing Wasted Food at Home

Prep Tips

Prepare perishable foods soon after shopping. It will be easier to whip up meals or snacks later in the week, saving time, effort, and money.

- When you get home from the store, take the time to wash, dry, chop, dice, slice, and place your fresh food items in clear storage containers for snacks and easy cooking.
- Befriend your freezer and visit it often. For example,
- Freeze food such as bread, sliced fruit, or meat that you know you won't be able to eat in time.
- Cut your time in the kitchen by preparing and freezing meals ahead of time.
- Prepare and cook perishable items, then freeze them for use throughout the month.
- For example, bake and freeze chicken breasts or fry and freeze taco meat.



Source: <https://www.epa.gov/recycle/reducing-wasted-food-home>

Thriftiness Tips

Be mindful of old ingredients and leftovers you need to use up. You'll waste less and may even find a new favorite dish.

- Shop in your refrigerator first! Cook or eat what you already have at home before buying more.
- Have produce that's past its prime? It may still be fine for cooking. Think soups, casseroles, stir fries, sauces, baked goods, pancakes or smoothies.
- If safe and healthy, use the edible parts of food that you normally do not eat. For example, stale bread can be used to make croutons, beet tops can be sautéed for a delicious side dish, and vegetable scraps can be made into stock.
- Learn the difference between "sell-by," "use-by," "best-by," and expiration dates.
- Are you likely to have leftovers from any of your meals? Plan an "eat the leftovers" night each week.
- Casseroles, stir-fries, frittatas, soups, and smoothies are great ways to use leftovers too. Search for websites that provide suggestions for using leftover ingredients.
- At restaurants, order only what you can finish by asking about portion sizes and be aware of side dishes included with entrees. Take home the leftovers and keep them for or to make your next meal.
- At all-you-can-eat buffets, take only what you can eat.

Appendix 9. Benefits of Anaerobic Digestion of Food Waste at Wastewater Treatment Facilities



The Benefits of Anaerobic Digestion of Food Waste At Wastewater Treatment Facilities

Why Anaerobic Digestion?

Anaerobic digestion occurs naturally, in the absence of oxygen, as bacteria break down organic materials and produce biogas. The process reduces the amount of material and produces biogas, which can be used as an energy source.

This technology is commonly used throughout the United States to break down sewage sludge at wastewater treatment facilities. In the past few years, there has been a movement to start adding food waste to anaerobic digesters already in place at wastewater treatment facilities.

The anaerobic digestion of food waste has many benefits, including:

- **Climate Change Mitigation** – Food waste in landfills generates methane, a potent greenhouse gas. Diverting food waste from landfills to wastewater treatment facilities allows for the capture of the methane, which can be used as an energy source. In addition to decreased methane emissions at landfills, there are greenhouse gas emissions reductions due to the energy offsets provided by using an on-site, renewable source of energy.
- **Economic Benefits** – Wastewater treatment facilities can expect to see cost savings from incorporating food waste into anaerobic digesters. These include reduced energy costs due to production of on-site power and tipping fee for accepting the food waste.
- **Diversion Opportunities** – Most municipalities are investing in ways to divert materials from landfills. This is usually due to reduced landfill space and/or recycling goals. Wastewater treatment facilities offer the opportunity to divert large amounts of food waste, one of the largest waste streams still going to landfills.

Why Food Waste?

Food waste is the second largest category of municipal solid waste (MSW) sent to landfills in the United States, accounting for approximately 18% of the waste stream. Over 30 million tons of food waste is sent to landfills each year. Of the less than 3% of food waste currently being diverted from landfills, most of it is being composted to produce a fertilizer.

There are many reasons to divert food waste from landfills, including:

- **Waste Diversion Goals** - Many states and local governments currently have mandated diversion goals. Aggressive recycling is one way that many communities are trying to meet diversion goals. However, organic waste- namely food scraps and yard waste- still makes up the

Municipal Solid Waste Sent to Landfill, 2007

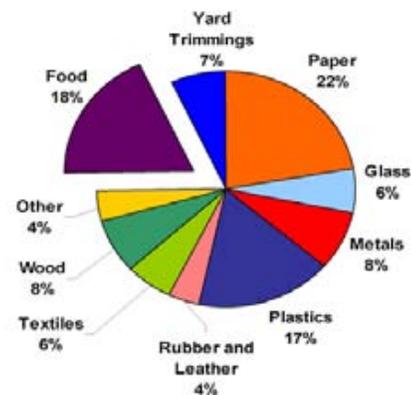


Figure 1. 2007 U.S. Waste Characterization showing materials disposed in landfills.

largest percentage of what is still being landfilled, and is often left out of recycling programs.

- **Easily Biodegradable** – Food waste is highly biodegradable and has a much higher volatile solids destruction rate (86-90%) than biosolids. This means that even though additional material is added to the digesters, the end residual will only increase by a small amount.
- **Renewable Energy Generation** – Arguably, the most important reason that food waste should be anaerobically digested is for capturing the energy content. Unlike biosolids and animal manures, post consumer food scraps have had no means of prior energy capture. In fact, in a study done by [East Bay Municipal Utility District](#) it was revealed that food waste has up to three times as much energy potential as biosolids.

Food waste has THREE TIMES the methane production potential as biosolids!

- Cattle manure= 25m³ gas/ton
- Biosolids= 120 m³ gas/ton
- **Food waste= 376 m³ gas/ton**

As energy prices continue to climb and our nation looks towards renewable energy generation and energy independence, capturing the energy from food waste becomes more important.

When facilities start digesting food waste, the increased energy production allows them to offset the amount of energy they are using and potentially sell excess energy back to the grid.

Why Wastewater Treatment Facilities?

Wastewater treatment facilities are an ideal place to increase the diversion of food waste.

- **Existing Infrastructure** – Many wastewater treatment facilities in Region 9 and across the country use anaerobic digesters to reduce the volume of the biosolids before they are taken off site. The anaerobic digesters produce biogas which is either flared or used on-site as an energy source. Therefore, the energy capturing infrastructure is already in place at many facilities.
- **Existing Expertise** – Wastewater treatment facilities already have the on-site expertise and years of experience dealing with anaerobic digesters; vessels that are difficult to operate without thorough knowledge.
- **Located in Urban Areas** – Wastewater treatment facilities are often located in dense, urban areas, where compost facilities are not. It makes logical sense for a highly populated area to ship organic waste to a nearby anaerobic digester where the energy content is recovered and the volume reduced. The residual can then be trucked to compost facilities, which are typically located farther from urban areas.

Parameter	Units	Food Waste Digestion				Municipal Wastewater Solids Digestion
		15-day MCRT		10-day MCRT		15-day MCRT
		Meso	Thermo	Meso	Thermo	Meso ⁽¹⁾
VS (as percent of TS), Feed	%	86.3	87	89.9	90.6	77
VS Loading, Feed	lb/ft ³ -day	0.28	0.29	0.53	0.54	0.2 ⁽²⁾
COD Loading, Feed	lb/ft ³ -day	0.55	0.57	1.09	1.11	0.06-0.3 ⁽³⁾
VSD	%	73.8	80.8	76.4	82.4	38-57% ⁽⁴⁾
Methane (CH ₄) Content	%	64	67	59	60	63
Methane Production Rate, Avg (Range)	ft ³ /lb TS applied	13,300 (9,800–17,000) ⁽⁵⁾		9,500 (6,600–14,400) ⁽⁵⁾		10,000 (7,500–12,600)
	ft ³ per day/ 1,000 ft ³ digester volume	2,300 (1,100–3,200)		2,600 (1,800–3,800)		750 (550–930)
Residuals (Mass of Biosolids Produced) as a Percent of Feed Applied.	%	36	30	31	26	56-70
Notes: 1. Based on data from previous EBMUD bench-scale pilot study. Digesters were fed thickened waste activated sludge and screened primary sludge. 2. Maximum recommended loading rate, WEF MOP 8. 3. Maximum recommended loading rate, M&E, 4th Edition. 4. EPA 503 Regulations minimum is 38%. Typical average is 57% from EBMUD bench-scale pilot study. 5. Data combined for mesophilic and thermophilic digesters.						

Figure 2. Summary of Parameters Comparing Anaerobic Food Waste Digestion to Anaerobic Municipal Wastewater Solids Digestion. (VS= Volatile Solids, TS = Total Solids, COD = Chemical Oxygen Demand, VSD= Volatile Solids Destruction)

How do I Make the Investment?

While many local governments and municipalities may be interested in processing food waste in anaerobic digesters at treatment facilities, they may feel that the cost is a limiting factor. However, there are many things to remember before immediately discounting this technology based on cost.

Payback period: Although the initial costs may be large, the digestion of food waste can be quite lucrative and the payback period can be less than three years depending on the existing infrastructure at the wastewater plant.

When a facility accepts food waste at a plant, they can charge the waste hauler a tipping fee for accepting the material. In addition, there is a significant amount of money that will be saved in energy avoidance due to methane production. The excess energy can be sold back to the grid for profit.

Funding Mechanisms:

While the short payback period may be an incentive for treatment facilities to invest in this technology, that doesn't necessarily mean that the up-front money is available.

For specific information on grants and funding opportunities, please see the Region 9 Water Sustainable Infrastructure funding page at <http://www.epa.gov/region9/waterinfrastructure/>

- **Federal and State Sources** can provide financial assistance. The federal government provides grants, loans, and rebates. California agencies also provide grants, loans, rebates, renewable credits, and stand-by rates for energy conservation practices. Local utility districts may provide private sources of funding.

- **Performance contracting** is one way to pay for the infrastructure upgrades needed to implement anaerobic digestion at a wastewater treatment facility.



Figure 3. This post-consumer food waste will produce energy and a soil amendment when anaerobically digested and then composted.

Performance contracting begins with a company hired to work with a locality or municipality. The company studies the potential energy savings of a particular investment, in this case the excess methane that will be produced during the anaerobic digestion of food waste. The performance contractor then provides the upfront capital needed to invest in the new infrastructure and installation costs. They are paid back with the energy savings of the municipality. The locality will start to gain the energy income after the contractor has been paid back.

- **Grants** are another option to secure funding for implementing new infrastructure. Many state and local organizations are looking for new ways to promote renewable energy sources. Although applying for and receiving grants can be a long and arduous process, grants are the ultimate source of funding as they do not have to be paid back. However, some grants do require the awarded organization to provide a match in funding.

- **Other Funding Sources:** If your situation does not allow for performance contracting and seeking grants has been an unsuccessful venture, there are still ways to secure funding. Consider options such as; loans, venture capitalist money, research and development budgets, and state funds promoting renewable energy sources. In addition, consider conducting an economic analysis that would compute the payback period and cost savings for your specific situation. When presented to local officials, a private board, etc. they may be more willing to invest in the technology when they see the financial potential.

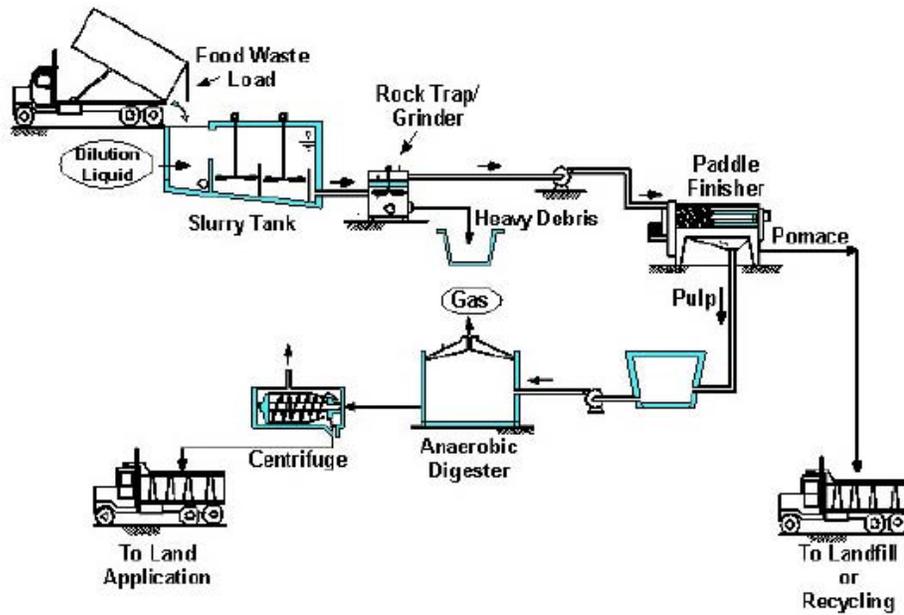


Figure 4: The East Bay Municipal Utility District Food Waste Treatment Process. The process accepts ground food waste, removes contaminants through a series of steps and ultimately anaerobically digests a clean, homogenous, and rich in energy food waste mixture.

Appendix 10. Benefits of Community Composting¹

Raises Awareness

- Exposes community members to the concept of source-separation of food scraps.
- Educates children and the general public about composting, how it is done, and how it can be incorporated into everyday life.
- Creates advocates and the necessary leadership for changes in policies, laws, and regulations.
- Prepares the next generation for full-scale composting as part of our way of life.

Environmental Benefits

- Creates a rich, nutrient-filled soil amendment.
- Enhances soil fertility.
- Improves soil structure, thus reducing stormwater runoff and soil erosion.
- Substitutes for energy-intensive fertilizers, pesticides, and fungicides.
- Improves plant growth, and thus carbon sequestration.
- Reduces waste.
- Protects the climate by cutting landfill methane emissions and creating a carbon sink in soils.
- Reduces vehicle emissions by decreasing transportation distances between material generators and compost producers and users.

Community Benefits

- Allows for a neighborhood level, local operation.
- Builds the culture and know-how of composting in the community.
- Keeps resources and money changing hands within the local community.
- Builds healthier local soils.
- Promotes human-scale technology, instead of large capital-intensive systems.
- Supports locally-grown, healthy food production, and “closed-loop” systems.

Local Government Benefits

- Diverts materials from landfills and incinerators.
- Allows management of organic materials close to the source.
- Meets local directives for recycling and waste reduction.
- Extends life of regional landfills, avoiding cost and environmental impact of new disposal facilities.
- Helps reduce public and private sector solid waste management costs.
- Builds support for local municipal composting programs.
- Offsets stormwater costs (when compost is used in low-impact development).

1. Brenda Platt, ILSR and James McSweeney and Jenn Davis, Highfields Center for Composting, *Growing Local Fertility: A Guide to Community Composting*. April 2014.

Local Economy, Jobs Training & Employment Benefits

- Stimulates and diversifies local economies by supporting local small-scale enterprises.
- Encourages local training, volunteering, and employment opportunities.
- Sustains more jobs on a per-ton basis than landfilling or incineration.
- Helps urban and rural farmers diversify farm products and increase farm income.
- Supports new businesses in green infrastructure and low-impact development (rain gardens, green roofs, conservation landscapes, and bioswales).

Glossary

Anaerobic digester	A unit designed for processing organics through the process of anaerobic decomposition.
Anaerobic digestion	A process by which a machine breaks down biodegradable material in the absence of oxygen through a series of biological procedures to produce biogas which can be combusted to generate electricity or be converted into transportation fuels.
Animal feed	Feed for animals made from food that would otherwise be wasted; usually manufactured with heat treatment and dehydration, and either mixed with dry feed or fed directly.
Avoidable food waste	The edible portion of food discards that may have been avoidable with effective prevention activities.
Backyard composting	Composting operation done by residents in their backyards.
Biofuel	A fuel such as ethanol produced from renewable biological resources such as plant biomass and treated municipal and industrial waste.
Biogas	A mixture of methane and carbon dioxide gases produced during the anaerobic digestion process; can be used for heat and electricity or converted into vehicle fuel.
Centralized composting	Large-scale composting done in a big composting facility where compostable materials collected from commercial and residential areas are delivered for composting.
Cold chain	A temperature-controlled uninterrupted series of refrigerated production, storage and distribution activities, along with associated equipment and logistics, which maintain a desired low-temperature range.
Combusted solid waste	Solid waste processed in an incinerator by burning.
Commercial composting	Large-scale composting business operated by a composting company.
Community composting	A small-scale and locally-based composting done by community participation at the neighborhood or community level.
Compost	A dark, crumbly, and earthy smelling form of decomposing organic matter that is used as soil amendment.
Composting	A process whereby plants, foods, and other organic material is converted into fertile soil by letting it decompose through the action of aerobic bacteria, fungi, and other organisms; composting facilities speed up this process through active turning and combining of feedstocks.

Compost-related infrastructure	Infrastructure related to compostable material (i.e., food scraps) collection, storage, and processing.
Date Labels	Labels put on food product by manufacturers showing expiration dates such as “sell-by,” “best-by,” “use-by,” or “best before,” mostly as an indicator of the guaranteed product quality by that date.
Eutrophication	A natural process that occurs over time due to natural runoff of soil nutrients and the decay of organic matter. It may result in an explosive growth of algae.
Food insecurity	Not always being able to access enough nutritious and safe food to support a healthy life because of limited or uncertain access to adequate food at any point throughout a year.
Food loss	The decrease in quantity and quality of food. Food loss usually used for uncontrollable and unavoidable waste, such as waste caused by natural disasters.
Food recovery	Actions taken to prevent and divert food waste from landfills and incinerators. Most commonly used to refer to recovery for direct human consumption, but also used as an umbrella term including recycling and putting discarded materials to any beneficial use including processing into value added products and creating animal feed.
Food rescue	Practice of collecting edible surplus food that would have otherwise gone to waste from grocers, restaurants, and other food establishments and delivery to local hunger relief agencies that feed the hungry people.
Food scraps	Food that is no longer fit for human consumption, including spoiled or damaged food and non-edible parts of food such as peels, pits, bones, and egg shells.
Food supply chain	A system of organizations, people, activities, information, and resources involving moving food from farm to fork.
Food system	A soil-to-soil system of interconnected activities that facilitates the production, processing, distribution, acquisition, and consumption of food and the reduction, disposal, and management of food waste.
Food waste	Food that is not eaten by humans and discarded.
Food waste audit	Measuring and examining the amount of food waste in a given location to see where, what, and why is generated. The data gained from an audit can help develop specific strategies to reduce wasted food.
Greenhouse Gas (GHG)	Gases that trap heat in the atmosphere.
Gross Domestic Product (GDP)	A comprehensive measure of U.S. economic activity. GDP is the value of the goods and services produced in the United States.

Imperfect produce	Perfectly edible produce that does not meet the cosmetic standards of grocery stores because of its size, shape, or color and rejected.
Incineration	The controlled combustion of solid waste at extremely high temperatures.
Incinerator	A high-temperature furnace that burns garbage.
In-vessel composting	Composting that takes place in an enclosed environment (usually a container or vessel) in which air flow and temperature can be controlled.
Landfill ban	Ban of disposal of materials at a landfill, usually restricted to certain types of materials such as organic waste and intended to divert this waste to recycling, composting, or other reuses, and in some cases, to prevent waste.
Landfill fee	Fee charged for disposal of materials in a landfill.
Municipal Solid Waste (MSW)	Municipal solid waste, also called garbage or trash, consists of everyday items that are discarded by households, institutions, and businesses.
Municipal waste stream	The entire life-cycle of waste from generation to treatment to final disposition.
Organics diversion	Diverting organic waste, including food and plant trimmings, from being landfilled or incinerated by recycling it.
Source reduction	Stopping waste before it happens.
Tipping fee	The fee paid by haulers for waste disposal at landfills or composting facilities.
Ugly fruits and vegetables	Produce that is perfectly fresh, nutritious, and delicious but does not have the perfect shape.
Value-added processing	Processing foods (in this case, those that are donated or would otherwise be wasted) into products that are less perishable, such as soups, sauces, or juices.
Waste diversion	Keeping waste out of the landfill, often through reusing, recycling, or composting.
Waste tracking and analytics	Tracking commercial food discards (such as in restaurants) in order to identify wasteful practices and operational strategies to prevent them.
Wasted food	Good, edible food that is not eaten by humans and discarded.
Water footprint	Direct and indirect amount of water consumed and polluted to produce each food item throughout its full production cycle from the supply chain to the end-user.
Zero waste	Reusing or recycling all products so that no trash is sent to landfills or incinerators.

Acknowledgements

The Maryland-National Capital Park and Planning Commission Prince George's County Planning Department

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Special thanks to:

Tom O'Donnell, Ph.D., United States Environmental Protection Agency Region III, for his guidance and assistance throughout the research project as well as reviewing the draft report and providing valuable input.

Susan Schechter Bortner, Senior Fellow at NORC at the University of Chicago, who graciously assisted with developing the household survey questionnaire.

Marilyn Rybak and Denice Curry, Prince George's County Department of the Environment, and Ben Fischler, the Prince George's County Food Equity Council member, for reviewing the draft report and providing valuable input.

Representatives of all businesses, organizations, and institutions who agreed to be interviewed and provided valuable information about their operations.



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