

Chapter 3 | Food and Organic Waste



Food loss and waste

Every year, American consumers, businesses, and farms spend \$218 billion a year, or 1.3 percent of the country's gross domestic product (GDP), growing, processing, transporting, and disposing food that is never eaten. That's 52 million tons of food sent to landfills annually, plus another 10 million tons that is discarded or left unharvested on farms.



Food waste has increased significantly over the past few decades. Food waste per capita in the U.S. increased by 50 percent between 1974 and 2009, according to the National Institute of Health, and now totals 1,400 calories per person per day. As much as 40 percent of food produced in the U.S. for human consumption goes uneaten. ReFED estimated in 2017 that an average of 238 pounds of food goes to waste per person each year, costing a family of four more than \$1,500.

Food waste represents the single largest component of the waste sent to landfills and waste-to-energy facilities. According to Hennepin County's 2016 waste sort, food is the largest proportion of our trash by far - comprising 19 percent of the trash by weight.

Included in this chapter

- Food loss and waste
- Reducing wasted food
- Food waste diversion and reuse
- What is compost?
- Composting at home
- Backyard composting
- Vermicomposting

The problem with wasted food

Wasted food is an environmental and social problem.

Environmentally, food disposed of in a landfill quickly rots and becomes a significant source of methane – a potent greenhouse gas. Landfills are the third largest source of methane emissions in the U.S., accounting for 16 percent of the methane emissions in 2016. Food waste also has the potential to create leachate when landfilled because of its high water content. As food waste decomposes in a landfill, water flows downward, picking up hazardous elements from other materials in the landfill. Issues arise when leachate escapes landfill containment and contaminates the surrounding soil and water.

The amount of food wasted in the U.S. is juxtaposed with issues of hunger and food insecurity. Every day, 980 million people go hungry in the world even though there is no shortage of food. In the U.S., 1 in 6 people don't have enough food.

Sources of wasted food

Food waste is categorized as either pre-consumer (such as food-prep waste) or post-consumer waste (such as leftover food or plate scrapings).

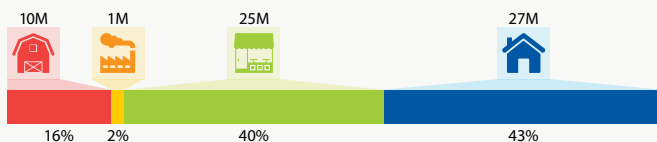
Food waste is generated from many sources:

- Food manufacturing and processing facilities
- Grocery stores and supermarkets
- Institutions, such as schools, prisons and hospitals
- Restaurants, food courts, and corporate cafeterias
- Households

As shown, most food waste is generated from households, followed by restaurants and grocery stores.

Food wasted by weight – 63 million tons

Waste occurs throughout the supply chain, with nearly 85% occurring downstream at consumer-facing businesses and homes.



According to the Natural Resources Defense Council, the reasons consumers waste food include:

- Lack of awareness and undervaluing of food
- Confusion over dates on labels and concerns for safety
- Impulse and bulk purchases
- Poor planning
- Cooking too much at once
- Forgetting about leftovers
- Large restaurant portions

Reducing wasted food

By paying attention and taking simple steps, businesses and households can significantly reduce the amount of food and money wasted every year. Here are some tips to reducing wasted food.

Practice meal planning and prepare meals at home



- Food made to take with you is usually highly processed and requires packaging. Preparing meals at home and bringing them with you in reusable containers offers more healthful and affordable choices.
- Shop your refrigerator first. Find recipes using ingredients you already have at home.
- Plan out meals for a week. Then make a shopping list.
- Create meals in batches. Freeze them for later use, in portion sizes that you can defrost later.
- Ask family members to compile their favorite recipes and share them with your entire family.
- Plan a leftovers night each week to eat everything up.



Learn how to store and preserve food

- Learn where to store items in your fridge to maximize the life of food. For example, the door is the warmest space in the fridge so it's good for condiments but not for milk or eggs; the bottom shelf is the coldest space, making it good for eggs, milk, and raw meat.
- Reorganize your fridge and put the older/more perishable food in the front and the newer/less perishable food in the back.
- Learn the best way to store fresh produce. Some produce does well in the fridge while other items should be kept on the counter or in a cool, dark place. And some produce shouldn't be stored together as it will spoil faster.
- Canning and freezing foods gives you access to local, seasonal food year-round.
- Freeze food that you may not be able to eat. Most foods, vegetables included, can easily be frozen and thawed when you're ready for them.



Understand food labeling



- The dates on food labels are generally not expiration dates, but merely suggestions as to when the product is at its freshest. The only federally regulated food labeling is on baby formula to ensure that the nutrient levels listed on the packaging are accurate until the expiration date.
- The grocery industry recently adopted voluntary standards to clear up what product date labels mean.
 - "Use by"– products with this label should be consumed by the date listed on the package.
 - "Best if used by" describes product quality. After that date, the product may not be at peak flavor, but is generally safe to consume.
- Use your sense of smell, sight and judgment to determine when food has gone bad. Don't eat foods that have developed an off odor, flavor or appearance.

Food waste diversion and reuse

For food and other organic waste that can't be prevented, there are many options for diverting it from landfills and waste-to-energy facilities.

Food-to-people

Non-perishable and unspoiled perishable food can be donated to local food banks, community kitchens, pantries, and shelters. Food-to-people programs are the highest form of reuse for edible organic materials. To encourage food donations, the federal Good Samaritan Law prevents usable food from going to waste and protects companies from liability surrounding their donations.



Food banks are community-based, professional organizations that collect food from a variety of sources and save the food in warehouses. The food bank then distributes the food to families and individuals through a variety of emergency food assistance

agencies, such as community kitchens, youth or senior centers, shelters, and pantries. Most food banks tend to collect less-perishable foods, such as canned goods, because they can be stored for a longer time.



Typical food bank donors include large manufacturers, supermarket chains, wholesalers, farmers, food brokers, and organized community food drives. Perishable and prepared foods are typically collected from restaurants, caterers, corporate dining rooms, hotels and other food establishments for prompt distribution to hungry people in their communities. Donated food includes unserved leftovers from events, products affected by labeling regulations or manufacturing glitches, expired coupons or code dates, test-market products, and food drive collections.

Food rescue programs take excess unserved perishable and prepared food and distribute it to agencies and charities that serve people in need. Many of these agencies order fresh produce and packaged products from food banks each week for their meal programs or food pantries. Many also take direct donations from stores, restaurants, cafeterias and individuals with surplus food to share. The Food Group, Second Harvest Heartland, and Loaves and Fishes are examples of organizations that accept perishable food for redistribution in the metro area.



Food to animals

Farmers have long relied on food discards to sustain their livestock. In food-to-animal programs, food waste is collected for animal feed, typically for hogs. Farmers provide collection containers and pick-up service for a fee. Barthold Recycling is a farm that collects food waste in the metro area to feed to animals.

Feeding waste food to livestock or having the food processed into animal feed is a viable option for recycling food scraps and provides economic and environmental benefits for all involved.

No federal rules or regulations apply if surplus food provided to animals contains no meat or animal materials. However, there may be state laws that regulate such feeding. If the surplus food contains meat or animal materials or has come into contact with meat or animal products, converting food into feed for hogs is regulated by the Federal Swine Health Protection Act (PL 96 468). This act requires that all such food is boiled before being fed to hogs and that facilities conducting the boiling be registered with either the USDA or the chief agricultural or animal health official in the state in which the facility is located. The Minnesota Board of Animal Health governs these programs.

Food-to-animal feed

There are also companies that convert food discards into commercial animal feed and pet food. ReConserve of Minnesota is a local company that collects food waste (not including meat) to manufacture into a dry feed product for animals. Their main customers are large food-processing companies that generate substantial amounts of vegetative and bakery waste.

Rendering fats, oil, and grease

Liquid fats and solid meat products can be used as raw materials in the rendering industry, which converts them into animal food, cosmetics, soap, and other products.

Be sure to never flush used fats, oil, and grease, down drains. Flushed fats, oil, and grease accumulate and can clog the pipes and pumps in the public sewer lines and wastewater treatment facilities. Clogs result in costly sewer overflow spills.

Commercial organics composting

Organics recycling is the collection of food scraps, food-soiled paper products, and certified compostable products for delivery to a commercial composting facility. This collection method differs from food-to-animal, food-to-animal feed and rendering fats, oil, and grease programs because more materials can be collected together and because it is an outlet for food scraps that are not otherwise edible, rather than wasted food that could go to a higher purpose like feeding people or animals.

In addition to curbside organics recycling, several drop-off options are available for organics recycling. Organics are accepted at the Hennepin County drop-off facilities in Bloomington and Brooklyn Park. The cities of Bloomington, Hopkins, Minneapolis, Richfield, Crystal, Minnetrista, and St. Louis Park also have organics recycling drop-offs available for their residents.

Additionally, a growing number of businesses, schools and institutions in Hennepin County have organics recycling programs, including schools in the Minneapolis School District, Best Buy headquarters, Target Field, Ikea and the University of Minnesota.



What is compost

Compost is organic material that is used as a soil amendment or as a medium to grow plants. Mature compost is a stable material that contains humus, which is dark brown or black and has a soil-like, earthy smell.

How compost is created

Natural composting, or biological decomposition, began with the first plants on Earth and has been occurring ever since. As vegetation falls to the ground, it slowly decays, providing minerals and nutrients needed for plants, animals, and microorganisms. Well-managed, larger-scale composting produces high temperatures around 150°F that destroy pathogens and weed seeds that natural decomposition cannot destroy.

Commercial composting facilities use the following process:

- Materials for organics recycling are dumped and inspected to make sure they don't contain too many contaminants (like plastic and glass).
- Organics are then shredded and mixed with yard waste to get the correct mixture of nitrogen (provided by the food waste) and carbon (provided by yard waste) as well as the right moisture level.
- Microorganisms like bacteria go to work turning the organics recycling into compost. This process heats up the pile to over 130 degrees Fahrenheit. The combination of microorganisms, moisture, air, and time turns the organic waste into compost. A curing process allows the finished material to fully stabilize and mature.
- After about six months, the organics and yard waste mix has been recycled into compost. The finished compost is screened to remove as many contaminants, such as plastic bags and wrap, glass and metal cans, as possible. The compost is tested to ensure the material is safe to use.

Benefits of compost

The benefits of compost include:

- Suppressing plant diseases and pests.
- Reducing or eliminating the need for chemical fertilizers.
- Promoting higher yields of agricultural crops.
- Reducing soil erosion and filtering stormwater.
- Increasing moisture retention and improving structure of soils.
- Facilitating reforestation, wetlands restoration, and habitat revitalization efforts by amending contaminated, compacted and marginal soils.
- Cost-effectively remediating contaminated soils. Where applicable, using compost costs about half as much as conventional soil, water and air pollution remediation technologies.

Composting at home

If you do not have access to curbside organics recycling or to an organics recycling drop-off, you still have options to reduce organic waste at home and protect the environment. There are two main methods for composting at home: backyard composting and vermicomposting. Although some people think composting is difficult and requires a great deal of scientific knowledge to do it right, composting is both easy and efficient. As a CRA, you can help dispel this myth.

Backyard composting

Backyard composting is an easy way to turn much of the waste from your yard and kitchen into a rich organic material that you can use to improve your soil.

Get a bin

The first step in home composting is to figure out what kind of bin you are going to use. You can purchase a bin or build your own.

Many lawn and garden stores sell compost bins. Or you can search for options online to make a compost bin yourself with a few materials and tools.



Find a place for your bin

Place your bin in a convenient location for easy access. Select a spot where your bins gets some sun to heat up your pile. Locating your bin in full sun will heat up the compost pile faster but will dry it out more often, requiring periodic watering. Some shade will prevent this.

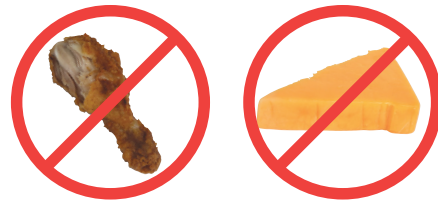
Good drainage and accessibility is important for your compost bin. You should have enough room around the bin to allow you to turn the compost and a water source nearby in case you need to add moisture.

Add the right recipe

The following items can and cannot be composted in backyard bins.



Compost	Do NOT compost
Food and yard waste:	Fats or animal products:
✓ Fruit and vegetable fruit	✗ Butter, cheese or dairy products
✓ Coffee grounds and filters	✗ Meat or bones
✓ Tea leaves and tea bags	✗ Gravies or sauces
✓ Egg shells	✗ Pet wastes
✓ Nut shells	
✓ Plant trimmings	
✓ Grass and leaves	



Note that fewer materials can be placed in backyard composting compared with curbside organics collection programs. This is because backyard compost bins do not heat up as much as industrial composting systems, so some materials like animal fats and oils cannot be broken down.

There are four basic ingredients for good compost: carbon, nitrogen, oxygen and moisture.

In the composting process, microorganisms use carbon for energy and nitrogen to make proteins. As a general rule for home composting, you want to add three parts carbon (dry, brown materials) to one part nitrogen (wet, green materials).

Browns (carbon)	3 to 1	Greens (nitrogen)
Dried grasses Leaves Straw Sawdust Twigs		Coffee grounds Fruit and vegetable peelings Grass clippings Green leaves Plant trimmings



Oxygen and moisture are important for the health and activity of the microorganisms. An active compost pile – one in which microorganisms are actively converting organic materials to compost – has good air circulation and moisture consistency of a wrung-out sponge. If a pile is compacted or too wet or too dry, microorganisms

will cease their work and the pile will become passive. Correct air circulation can be accomplished by turning your pile with a garden fork at least once a month.

Backyard composting tips

- Keep your compost pile at the right moisture level. If your compost pile has a bad odor, it may lack air circulation or it may be too wet. Try turning the pile and/or adding dry, brown materials to the pile.
- If your compost pile is not heating up, it may need more nitrogen or green material. Add grass clippings or more fruit and vegetable scraps to the pile.
- Bury kitchen scraps at least eight inches deep in the compost pile to discourage critters.
- You can keep adding to your compost pile as it is composting. However, you may want to start a second pile if you have enough material.
- Before winter, add a layer of straw or hay to the top of open compost piles to keep them covered. Your compost pile will slow down in winter, but you can continue layering your browns and greens. The composting process will start back up when temperatures are warmer.
- The best pile is made up of a variety of materials.
- The smaller the pieces of compostable material, the faster the pile will decompose.



Vermicomposting



Vermicomposting, or composting with worms, uses red worms to decompose food waste. The worms are very effective at decomposing kitchen food waste and don't take up as much space as a backyard compost bin. The worms will eat kitchen scraps and produce compost and a liquid fertilizer.

Setting up vermicomposting

- Buy a bin specifically designed for vermicomposting or construct your own.
- Add bedding. Peat moss, shredded newspaper or leaves are good options.
- Purchase worms. A general rule is one pound of worms for every half pound of food.

Feeding the worms



The following are items you can and cannot feed to the worms.

Feed these to the worms:	Do not feed worms:
✓ Uncooked fruits, vegetables and grains	✗ Meat, fish, and other animal products
✓ Egg shells	✗ Dairy products
✓ Coffee grounds or tea bags (in limited quantities)	✗ Greasy or fried foods
	✗ Pet waste

Resources

- hennepin.us/organics: Information about residential organics recycling programs in Hennepin County
- hennepin.us/businessorganics: Information about organics recycling options for businesses and organizations
- hennepin.us/composting: Information about Hennepin County compost bin sales and instructions for backyard composting.
- Food waste data and resources
 - refed.com
 - nrdc.org/food-waste
 - savethefood.com
- Preventing wasted food:
 - savethefood.com
 - lovefoodhatewaste.com
 - wastedfood.com
- Food storage preservation:
 - extension.umn.edu/food-safety/preserving-and-preparing
 - nchfp.uga.edu/publications/publications_usda.html
- Farmers markets, CSAs and local food resources
 - minnesotagrown.com
 - slowfoodmn.org
 - mfma.org
 - landstewardshipproject.org/csa-farm-directory
- Print resources: Order printed copies online at hennepin.us/environmentaleducation
 - How to compost at home factsheet
 - Troubleshooting home composting problems
 - Refrigerator insider and tips to prevent food waste flyer
- Food waste prevention apps list