



State of Oregon
Department of
Environmental
Quality

Briefing Paper: Best Management Practices for Discarded Food Scraps

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Background

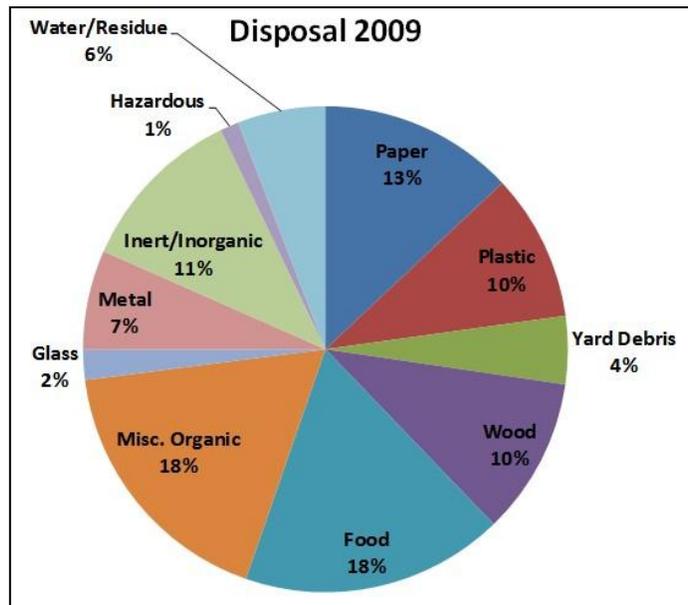
Oregonians waste a large amount of food each year. In 2009, almost 500,000 tons of food scraps went to landfills or incineration, representing almost 18 percent of all wastes disposed. In contrast, Oregonians recovered for composting only 5 percent of food scraps generated. Food scraps and other compostable organic materials represent the largest component of municipal solid waste thrown away in Oregon. These statistics do not include the additional quantities of food waste disposed of through in-sink disposals.

The U.S. Environmental Protection Agency (EPA) defines food waste as *any food substance, raw or cooked, which is discarded, or intended or required to be discarded. Food wastes are the organic residues generated by the handling, storage, sale, preparation, cooking and serving of foods.*

Food waste, also called discards or scraps, is generated from many sources. The largest generators of food waste include food manufacturing and processing facilities and food service providers such as supermarkets, schools, prisons, hospitals and restaurants. Compared to these facilities, individual households throw away small amounts of food waste such as uneaten leftovers and spoiled produce. However, collectively households send a relatively large quantity of food waste to landfills.

Food waste generation has considerable economic and environmental consequences. Wasted food leads to unnecessary financial costs and wasted money. Food waste results in a myriad of environmental consequences. Decomposition of food waste in landfills creates significant amounts of methane, a greenhouse gas that is 25 times more potent than carbon dioxide. But this is just the tip of the iceberg. Greenhouse gas emissions associated with producing food that is purchased for consumption in Oregon are about 30 times higher than the emissions from post-consumer disposal. Agricultural food production represents a significant investment in energy, greenhouse gas emissions and resources to grow, harvest and transport the food to market. By one estimate, the domestic production of food that is subsequently uneaten accounts for more than one quarter of all U.S. freshwater consumption and energy equivalent of 300 million barrels of oil annually.

Because we throw away more food than anything else, we have a huge opportunity for environmental and monetary savings by reducing food waste. Often food purchasing, storage and preparation practices

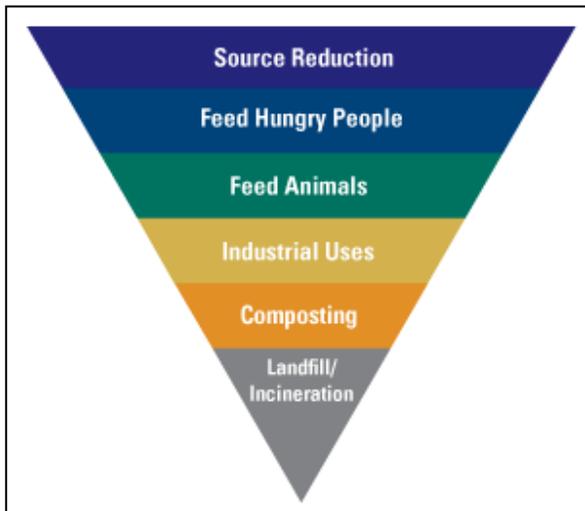


can yield significant reductions in green house gas emissions, food waste generation and food-related costs.

Food Waste Recovery Hierarchy

Similar to Oregon’s solid waste management hierarchy, which begins with the three R’s -- “Reduce, Reuse, Recycle” -- EPA developed an inverted pyramid hierarchy focusing on food waste recovery. EPA’s and Oregon’s statutory hierarchies differ in their placement of energy recovery from food waste. EPA places energy recovery above composting; Oregon places it below. DEQ has not conducted a thorough evaluation of best management practices for food scraps and its limited review of the literature comparing aerobic composting to anaerobic digestion is inconclusive. The EPA hierarchy is used in this paper as a convenient tool to address best management practices and does not necessarily reflect DEQ policy or opinion.

This hierarchy represents EPA’s perceived best management activities for food scraps, starting with the most beneficial at the top and moving down to the least attractive.



Source Reduction - Reduce the amount of food waste being generated

Feed Hungry People - Donate excess food to food banks, soup kitchens and shelters

Feed Animals - Provide food scraps to farmers

Industrial Uses - Provide fats for rendering or fuel and food discards for animal feed production

Composting - Compost food scraps into a nutrient rich soil amendment

Landfill/ Incineration – Send food scraps to landfill or incineration if there are no other beneficial options

Source Reduction - The nearly 500,000 tons of food waste disposed in Oregon in 2009 consisted of food wasted from industrial production, produce and food wholesalers, retailers, food service providers and households. Food losses from retail, food service and households include spoilage in storage, preparation waste and plate waste. The U.S. Department of Agriculture estimates that retail, food service and household food losses account for 27 percent of edible food supplies, with two thirds of those losses being fresh fruits and vegetables, milk, grain products and sweeteners (Kantor *et al.* 1997). Other researchers estimate that system-wide food losses are now approaching 40 percent of all food produced, with per-capita food waste up approximately 50 percent from 1974 (Hall *et al.* 2009). In 2006 EPA estimated that food service and households wasted 14 percent of all food purchased, costing a family of four nearly \$600 per year (Jones, 2006).

The potential for reducing food losses in the food service industry and within households is great, with a number of places to focus. Focus areas include:

- Evaluating what food is being wasted and where the waste is generated. This knowledge allows businesses and households to gain an understanding of what is in the waste stream, where it is generated and how much is thrown away.
- Modifying food planning and purchasing practices to eliminate unnecessary food purchases. Planning meals and using a shopping list.

- Reducing kitchen waste (pre-consumer for the food service industry). Storing food properly to prevent spoilage, preparing food properly so it can be consumed, planning portion sizes, and finding uses for vegetable and fruit trim waste. A DEQ-grant funded [pilot project at two Intel cafeterias](#) demonstrated reductions of pre-consumer food waste of 47 percent and reduced food costs by 13 percent per meal.
- Reducing post-consumption food waste. For households and food service this requires planning portions to eliminate plate waste and effectively using any prepared foods that are leftovers. For food service, menu modifications, such as reducing the number of menu items and a plan to use leftovers in other menu items the next day, can also reduce food waste.

Feed Hungry People - A 2009 U.S. Department of Agriculture Hunger Survey (Nord, *et al.* 2010) concluded Oregon is one of the hungriest states in the nation, with more than half a million Oregonians facing “food insecurity.” Food insecurity means households had difficulty providing enough food for their family because they lacked resources. Yet in 2009, nearly 500,000 tons of food was disposed in Oregon. Much of that wasted food was edible, and if captured, could have fed hungry people. In fact a 2009 United Kingdom study found that 60 percent of food and drink wasted by households was edible sometime before disposal (Quested 2009). Non-perishable and unspoiled perishable food can be donated to local food banks, soup kitchens, pantries and shelters. Food banks and food rescue programs frequently offer free pickup and provide reusable containers to donors.

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 hungry families and individuals through a variety of emergency food assistance agencies, such as soup 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.

Food rescue programs take excess perishable and prepared food and distribute it to agencies and charities that serve hungry people such as soup kitchens, youth or senior centers, shelters and pantries. Many of these agencies visit the food bank each week to select fresh produce and packaged products for their meal programs or food pantries. Many also take direct donations from stores, restaurants, cafeterias and individuals with surplus food to share.

Between 2000 and 2007, DEQ provided 14 grants totaling \$372,577 for food donation and food rescue programs throughout the state. Some food donation programs in Oregon include:

- Fork It Over! Metro's food donation program
<http://www.oregonmetro.gov/index.cfm/go/by.web/id=9887>
- Oregon Food Bank – www.oregonfoodbank.org
- Partners for a Hunger-Free Oregon – www.oregonhunger.org
- Food for Lane County - <http://www.foodforlanecounty.org/en/>
- Linn-Benton Food Share - <http://www.csc.gen.or.us/foodshare.htm>
- Marion-Polk Food Share - <http://www.marionpolkfoodshare.org/>
- Neighbor Impact - <http://www.neighborimpact.org/food.html>
- Care Inc. - <http://www.careinc.org/>
- ACCESS Inc. - <http://www.access-inc.org/index.asp>
- others

Feed Animals - Food residuals can be used to directly feed livestock or be processed into commercial animal feed or pet food. Oregon has a long history of feeding raw fruit and vegetable cannery waste to livestock. Food wastes containing meat or meat products are not allowed to be fed to hogs in Oregon. Feeding waste food to livestock or having the food processed into animal feed is sometimes a viable option for recycling food scraps and can provide economic and environmental benefits.

Industrial/ Commercial Uses - In addition to making animal feed, food residuals can also be used in certain industrial and commercial processes to create products and energy. A number of industrial technologies can use different characteristics of food scraps to create new products or create energy. Some of these technologies include:

- Rendering, which is a process that converts meats, fats and oils into various products such as animal food, cosmetics and soap. Oregon currently has no rendering facilities but many parts of the state are serviced by rendering facilities in Washington and northern California.
- Biodiesel production facilities, which convert fats, oils and greases to create biodiesel which in turn can be used as motor fuel. Oregon has a number of biodiesel production facilities; most are quite small. Sequential Biofuels is Oregon's largest commercial biodiesel production facility, producing 17 million gallons of biodiesel in 2010, using locally collected waste cooking oil and Oregon-grown canola as feedstocks.
- Anaerobic digestion facilities (biogas plants), which use microorganisms to break down biodegradable material, including food waste and manures, in the absence of oxygen to create methane gas and liquid and solid substrates. Methane generation is often the primary purpose of these facilities, thus the term "biogas plants." Methane is burned to create electricity while the solid and liquid substrates can be used as fertilizers, soil conditioners, livestock bedding or compost feedstock. Oregon currently has five operating digesters with 10 other digesters either in the planning or construction stage. Many of these digesters will be located on farms and will receive food discards as feedstocks to compliment dairy manure. Two of the proposed commercially operated biogas plants propose to use industrial food processing waste and other food discards as primary feedstocks.

Composting - Composting facilities are operations that process various organic feedstocks, including food scraps, into a finished product called compost. Composting facilities and biogas plants have similarities and differences. Similar to biogas plants, composting facilities use microorganisms to break down organic matter, but in the presence of oxygen. Unlike biogas plants, composting facilities do not generate electricity, as they create little methane; nutrients are stored in the finished compost.

Composting can be an efficient method for recycling organic materials that might otherwise be disposed of in a landfill. Avoiding placement of these materials in a landfill, where they decompose, prevents the release of methane, a significant greenhouse gas.

Compost use offers numerous benefits: when incorporated into soil, it can improve soil tilth and fertility; it can provide a more stable form of nitrogen less susceptible to leaching into water supplies; on heavy soils, it helps reduce compaction and increases infiltration. Incorporation of compost into soil stores carbon, helping reduce atmospheric carbon.

Oregon has 47 permitted composting facilities; 11 of these obtained permits within the past year to accept food scraps, including meat, dairy products and eggs. Four cities currently collect food scraps from industrial, residential and commercial sources (Corvallis, Keizer, Portland and Salem). Eugene, La Grande and The Dalles are collecting commercial loads of food scraps. Numerous other cities statewide

are in the planning stages to collect food scraps. It is expected that many parts of the state will be able to compost food scraps by 2016.

Resources

The following sites provide more information about best management practices for food scraps:

- EPA food waste recovery site - <http://www.epa.gov/osw/consERVE/materials/organics/food/index.htm>
- CalRecycle's Food Scraps Management website - <http://www.calrecycle.ca.gov/organics/Food/>
- Metro's Fork It Over! food donation website - <http://www.oregonmetro.gov/index.cfm/go/by.web/id=9887>
- *A Short Guide to Food Waste Management Best Practices* – Lean Path - http://www.leanpath.com/docs/Waste_Guide_o.pdf
- *Best Management Practices in Food Scraps Programs* - http://www.foodscrapsrecovery.com/Econservation_EPAREgion5_FoodWasteReport_2011.pdf
- *Waste Not, Want Not: Feeding the Hungry and Reducing Solid Waste Through Food Recovery* - http://www.epa.gov/osw/consERVE/materials/organics/pubs/wast_not.pdf

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- Quested T, Johnson H (2009) Household Food & Drink Waste in the UK. Waste & Resources Action Programme . [ISBN: 1-84405-430-6](#)