

# Packaging and Wasted Food



An estimated 30-40% of the edible food available in the U.S. is wasted. The environmental burden – energy use, water use, greenhouse gas emissions, and other emissions – associated with producing all of that wasted food adds up. One study found that food losses increased the carbon footprint of the average American diet by 39%; across the entire U.S. population, the emissions associated just with producing that wasted food annually is equivalent to the emissions from 33 million average passenger vehicles driven for a full year. In response to growing awareness of the severity of food waste, in 2015, the USDA and the US EPA announced the first U.S. food waste reduction goal, calling for a 50% reduction by 2030.

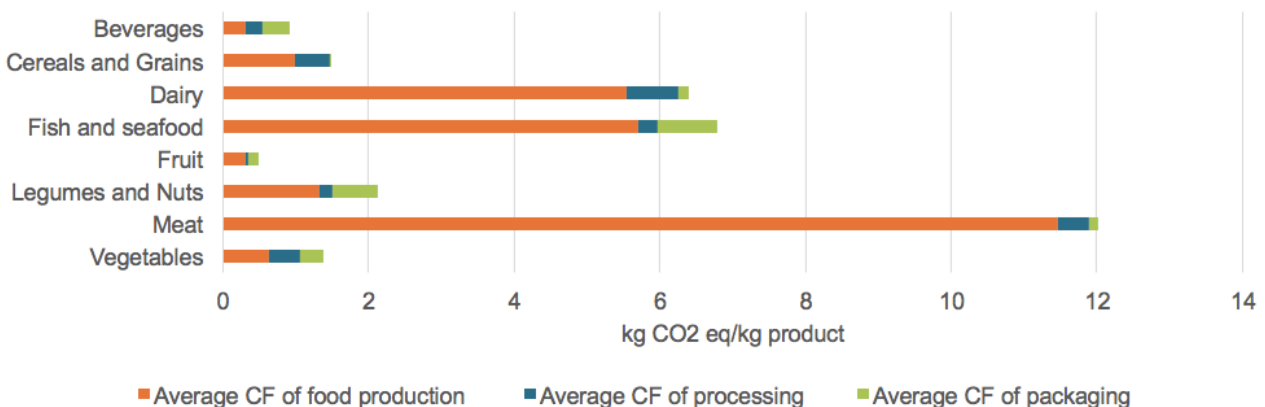
Packaging plays an important role in protecting food from damage and contamination, and extends the useful life of food items on the retail shelf and at home, thus potentially reducing wasted food and its environmental impacts. In short, because of the large amount of resources that go in to producing food, efforts to reduce food waste by increasing packaging can sometimes lead to significant reductions in environmental impact, even when the environmental impact of additional packaging is taken into account. Reduction of food waste means avoiding the environmental impacts of producing, processing and distributing the wasted food.

## Key Findings Food Products and Packaging

Whether “better” packaging that increases shelf life or makes it easier to get the last bit of content out of the container results in a net environmental benefit can be very case specific. When evaluating environmental impacts, packaging should be evaluated along with the product chain where it provides the service of delivering safe and nutritious food to the consumer. Customer interest in “green” packaging options such as recyclability often encourages a focus on design for recyclability rather than sustainability writ large.

*“The whole value chain has a responsibility to explain that sustainability is not synonymous with recycling, recyclability, recycled content, biodegradability and other popular buzz words, but that it is the overall resource efficiency of the supply chain that should be the main priority.” (Russell, 2014)*

Average carbon footprint of food product production, processing and packaging



An important parameter that emerges in these evaluations is the ratio between the environmental impact of producing the food (agricultural production plus processing) and the impact of producing and disposing of the packaging. If the impact, for example greenhouse gas emissions (GHGE), of producing the food is very large relative to the GHGE of producing the packaging, then changes in packaging that lead to food waste reductions will likely result in a net decrease in total system GHGE, even if the impacts from packaging increase. On the other hand, if the impacts of packaging are similar or greater than the impacts of producing the food, it is far less likely that more packaging will have a net benefit.

One observation from the figure above is that the average GHGE per kilogram of food associated with the manufacturing of packaging materials is low for most food groups. Foods with relatively large GHGE from production such as meats, fish, and dairy therefore have a propensity for large differences between food production and packaging production. This means that packaging leading to reductions in food waste may likely result in net system reductions in GHGE, although ultimately this is dependent on the specifics of each case.

Packaging can affect food waste in a variety of ways. Perhaps the most obvious is by extending shelf life, delaying the spoilage processes brought on by microorganisms, exposure to oxygen, or loss of moisture. Translating shelf life into food waste rates – either at the retail level or in people’s homes – is extremely complex and depends on numerous factors, but it is reasonable to assume that increasing shelf life decreases the likelihood that food will be wasted. Packaging also protects food from physical damage (bruises, crushing) and contamination throughout the product chain, and can influence food waste in many other ways.

Establishing food waste rates is challenging and makes it difficult to establish absolute standards to balance between food waste and food packaging. Awareness of the balance, however, can lead to important perception shifts by packaging designers, food system stakeholders, and consumers alike.

## Conclusions

This summary of the environmental interplay between food packaging and food waste offers a number of valuable conclusions:

- In general, the GHGE associated with manufacturing food packaging is typically small relative to the emissions associated with producing and processing the food itself.
- Packaging can influence food waste in a variety of ways. Often, changes in packaging can lead to reductions in food waste, even though these changes, such as increases in packaging weight or a shift to a non-recyclable material, may be perceived as undesirable.
- The literature demonstrates that changes in food packaging that lead to food waste reductions can result in net reductions in environmental impacts, even if the impacts of the packaging itself increases.
- Future research and abatement strategies are likely best focused on foods with high environmental impacts (e.g., meats) and those with high loss rates (e.g., fresh fruits and vegetables).

*The full report created by Center for Sustainable Systems - University of Michigan can be downloaded from <http://www.oregon.gov/deq/mm/food/Pages/Product-Category-Level-Footprints.aspx>.*