



**Title:** Do We Desire Zero Food Waste?  
**Author:** Katare Bhagyashree, Dmytro Serebrennikov, H. Holly Wang, & Michael Wetzstein  
**Issue:** PAEPB-2018\_11  
**Date:** September 5, 2018  
**Tags:** External Costs, Food Insecurity, Food Waste, Social Welfare, Sustainability  
**Abstract:** In 2010, U.S. households wasted 21% of the total food available for consumption. In response to this waste, a number of U.S. localities have considered policies (disposal taxes) directed toward reducing this waste. Currently there is no federal food-waste disposal tax. Determining the preferred government policies toward food waste requires an understanding of the household response to policies. This unravels the interrelation between social food insecurity and external environmental costs, which households do not generally consider when they waste food. Such an unraveling will only yield zero food waste if there is certainly in future food consumption, no governmental costs associated with waste mitigation and households are very responsive toward reducing their food waste to zero in response to government policies. Otherwise, some positive level of food waste is socially preferred.

### Defining Food Waste

There is no universal definition of food waste. Some consider food waste in the context of post-harvest loss, which represents all quantitative and qualitative losses of food throughout the entire food-supply chain. This includes losses and waste occurring during production (harvesting), processing, transportation, packaging, storage, and consumption of food products. Food waste can either be a result of natural factors including adverse weather conditions, which lead to changes of physical or chemical qualities of food products, or deliberate decisions to discard food.

In 2008, the United States wasted \$165.6 billion or roughly one-third of the food supply. The retail level wasted 9% of available food while households wasted 22%. Globally, its estimated in 2007, approximately 1.3 billion tons of food products were lost or wasted at different stages of the supply chain (approximately 30% of total production). In developed countries, both retailers and households bear equal responsibility for increased food waste.

### The Issue

While research has provided an accounting of food waste, little research addresses the economics behind why food waste exists. Limited analysis reveals households often dispose

of commodities with minor visual imperfections or expiration dates. Food waste also occurs when households do not plan shopping routines carefully, are subject to impulse purchases, and/or are uncertain about future food consumption. Government policies aimed at educating consumers to develop efficient shopping habits may be crucial for reducing household food waste.

A number of U.S. localities have instituted incentive mechanisms directed toward waste reduction. One example is Seattle, Washington, which employs food-waste disposal taxes in excess of landfill costs. Currently, there are no federal food disposal taxes or food-preservation policies. The Food Recovery Act (2017), which is currently in committee, would establish grant and loan programs to increase food-waste awareness, expand tax deductions for food donations, and require uniform labeling for "sell-by" dates. The bill would aid in achieving the United States and United Nations' goal, which aims for a 50% reduction in food waste by 2030. This bill reduces the household costs of food preservation by subsidizing food preservation educational programs and awareness of alternatives to disposing of food as waste.

### Policies

Disposal taxes raise the economic costs associated with waste-generating behavior and improper food disposal. Taxation of food waste is an important government policy, which helps to internalize the external costs of environmental degradation and food insecurity. Environmental effects are in the form of resources expended on food items ultimately wasted, resulting in air and water pollution, land allocation, and potential greenhouse gas emissions. Food insecurity (hunger) results from food resources directed toward food waste instead of food consumption.

Both the level of food purchases and amount of food-preserving capital employed influence the generation of food waste. There are two types of preservation capital: human and physical. Examples of human capital are meal forethought prior to food purchases and knowledge of various food shelf life. Physical capital includes proper storage facilities, including historical root cellars or refrigeration and animal suppression (pets and arthropods). Government food-preservation policies may take the form of educational programs and subsidies for improving household food-preserving capital.

### Household Food Waste

Market conditions result in households generally purchasing more food than they will currently consume. Households derive benefits from having food available for uncertain events and reducing their shopping trips. They then consume later, donate, or waste this excess food. Associated with food-waste are negative external costs, which households do not consider. This indicates market inefficiencies associated with these food purchases. The major external costs are food insecurity and environmental degradation. With missing markets for food insecurity and negative environmental effects, there are no associated market prices. This suggests possible government market intervention to provide the correct prices through a disposal tax and government food-preservation policies.

## Implications

Economic theory in combination with empirical research could help to determine the socially preferred percentage of waste reduction. This provides a rich field for the empirical investigation of government policies to mitigate food waste. Empirical comparison of this percentage reduction with the United States and United Nations' current target of a 50% reduction by 2030 would indicate how close the target is to the socially preferred level. Estimating this possible cleavage would offer insights into the consideration of possible policy shifts. Such empirical investigations would reveal the magnitude of household responsiveness required for determining the socially preferred level, along with associated target government policies of the United States and the United Nations. This would aid in comparing alternative sets of government policies for achieving the socially preferred or target levels of food waste. Without some explicit criteria, the likely success of developing the correct set of policies is low.

The socially preferred set of government policies comprise a set of policies where the tax and food-preservation policies are substitutes. The direction and magnitude of these effects are subject for empirical investigation.

Investigating the theory underlying household food waste and government policies reveals the importance of measuring the responsiveness of food waste and household food-preservation capital to a government disposal tax and food-preservation policies. Determining the socially preferred level of these government policies is directly dependent on measuring this responsiveness. The theoretical development also reveals the importance of considering government revenue derived from a disposal tax and expenditures in developing and implementing a government food-preservation policy to reduce food waste. If society is serious about reducing food waste to acceptable targets (50% less by 2030), then the mission of economists is to develop preferred policies for achieving these targets. The implementation of such policies would require theoretical and empirical analysis on the appropriate phasing-in of these mechanisms.

## Zero Food Waste

Proponents for zero food waste implicitly imply there are no governmental costs associated with waste mitigation and households are very responsive toward reducing their food waste to zero in response to government policies. Further, this assumes certainty in future food consumption. Uncertain events including changed appetites, guest dining, and social events may result in food waste. Considering government costs, household limited responsiveness, and uncertainty leads to some positive socially preferred level of food waste.

This aim of zero food waste runs counter to marginal-economic analysis, which likely yields resource efficiency at some social-optimal positive level. Instead of a zero food-waste objective, economic analysis would suggest reducing food waste while the additional benefits are greater than the costs. When the additional benefits are equal to costs this yields the efficient level of food waste, which likely results in some positive waste level.

## Source

Katare, B., D. Serebrennikov, H. Wang, and M. Wetzstein. 2017. "Social-Optimal Household Food Waste: Taxes and Government Incentives," *American Journal of Agricultural Economics* 99:499-509.