Study suggests U.S. households waste nearly a third of the food they acquire

January 23 2020, by Chuck Gill

30% to 40% of the total food supply in the United States goes uneaten — and that means that resources used to produce the uneaten food, including land, energy, water and labor, are wasted as well. Credit: Patrick Mansell, Penn State

American households waste, on average, almost a third of the food they

acquire, according to economists, who say this wasted food has an estimated aggregate value of $240 billion annually. Divided among the nearly 128.6 million U.S. households, this waste could be costing the average household about $1,866 per year.

This inefficiency in the food economy has implications for health, food security, food marketing and climate change, noted Edward Jaenicke, professor of agricultural economics in the College of Agricultural Sciences at Penn State.

"Our findings are consistent with previous studies, which have shown that 30 percent to 40 percent of the total food supply in the United States goes uneaten—and that means that resources used to produce the uneaten food, including land, energy, water and labor, are wasted as well," Jaenicke said. "But this study is the first to identify and analyze the level of food waste for individual households, which has been nearly impossible to estimate because comprehensive, current data on uneaten food at the household level do not exist."

The researchers overcame this limitation by borrowing methodology from the fields of production economics—which models the production function of transforming inputs into outputs—and nutritional science, by which a person's height, weight, gender and age can be used to calculate metabolic energy requirements to maintain body weight.

In this novel approach, Jaenicke and Yang Yu, doctoral candidate in agricultural, environmental and regional economics, analyzed data primarily from 4,000 households that participated in the U.S. Department of Agriculture's National Household Food Acquisition and Purchase Survey, known as FoodAPS. Food-acquisition data from this survey were treated as the "input."

FoodAPS also collected biological measures of participants, enabling the

researchers to apply formulas from nutritional science to determine basal metabolic rates and calculate the energy required for household members to maintain body weight, which is the "output." The difference between the amount of food acquired and the amount needed to maintain body weight represents the production inefficiency in the model, which translates to uneaten, and therefore wasted, food.

"Based on our estimation, the average American household wastes 31.9 percent of the food it acquires," Jaenicke said. "More than two-thirds of households in our study have food-waste estimates of between 20 percent and 50 percent. However, even the least wasteful household wastes 8.7 percent of the food it acquires."

In addition, demographic data collected as part of the survey were used to analyze the differences in food waste among households with a variety of characteristics.

For example, households with higher income generate more waste, and those with healthier diets that include more perishable fruits and vegetables also waste more food, according to the researchers, who reported their findings in the *American Journal of Agricultural Economics*.

"It's possible that programs encouraging healthy diets may unintentionally lead to more waste," Jaenicke said. "That may be something to think about from a policy perspective—how can we fine-tune these programs to reduce potential waste."

Household types associated with less food waste include those with greater food insecurity—especially those that participate in the federal SNAP food assistance program, previously known as "food stamps"—as well as those households with a larger number of members.

"People in larger households have more meal-management options," Jaenicke explained. "More people means leftover food is more likely to be eaten."

In addition, some grocery items are sold in sizes that may influence waste, he said.

"A household of two may not eat an entire head of cauliflower, so some could be wasted, whereas a larger household is more likely to eat all of it, perhaps at a single meal."

Among other households with lower levels of waste are those who use a shopping list when visiting the supermarket and those who must travel farther to reach their primary grocery store.

"This suggests that planning and food management are factors that influence the amount of wasted food," Jaenicke said.

Beyond the economic and nutritional implications, reducing food waste could be a factor in minimizing the effects of climate change. Previous studies have shown that throughout its life cycle, discarded food is a major source of greenhouse gas emissions, the researchers pointed out.

"According to the U.N. Food and Agriculture Organization, food waste is responsible for about 3.3 gigatons of greenhouse gas annually, which would be, if regarded as a country, the third-largest emitter of carbon after the U.S. and China," Jaenicke said.

The researchers suggested that this study can help fill the need for comprehensive food-waste estimates at the household level that can be generalized to a wide range of household groups.

"While the precise measurement of food waste is important, it may be

equally important to investigate further how household-specific factors influence how much food is wasted," said Jaenicke. "We hope our methodology provides a new lens through which to analyze individual household food waste."

More information: Yang Yu et al. Estimating Food Waste as Household Production Inefficiency, *American Journal of Agricultural Economics* (2020). DOI: 10.1002/ajae.12036

Provided by Pennsylvania State University