San Diego Food System Alliance (SDFSA)

Food waste measurement and consumer education in households: Save the Food, San Diego! EcoChallenge

Food Loss and Waste Measurement Case Study

Organization

The San Diego Food System Alliance ("The Alliance") is a non-profit organization working to cultivate a healthy, sustainable and just food system in San Diego County, California. The Alliance is a diverse and inclusive network that works across sectors to promote collaboration, influence policy and catalyze transformation in the food system.

The Alliance began working on food waste issues in 2015. The Alliance's Wasted Food Prevention Program (WFPP) reduces food waste through three key strategies: technical assistance, consumer education and network development. The Alliance itself provides technical assistance for wasted food prevention and recovery to institutions and cities; it also recently completed a pilot program coaching institutions on food waste reduction strategies. Additionally, the Alliance manages the Save the Food, San Diego! campaign, a regional food waste awareness consumer education campaign for residents. Other projects implemented through the WFPP include the development of a GIS map of food waste generators and implementation of a food waste educational campaign in 33 grocery stores.

Furthermore, the Alliance recently participated in a pilot training program for businesses and institutions on food waste reduction strategies, under the auspices of the Commission for Environmental Cooperation (CEC), which provided support for analyzing the data collected through the EcoChallenge program.

What was measured?

A total of 887 students, staff, faculty, and employees across 6 institutions in San Diego County, California were engaged in a food waste tracking challenge. Participants were instructed to weigh both edible and inedible food waste within their homes, such as meal leftovers, trim waste, and spoiled food. Data was also collected about participant household size.

How was it measured?

Participants were given food scales to weigh and measure their food waste at five points over a 15-month period. Food waste data was then reported by participants, in ounces, online on the EcoChallenge website. Baseline data was collected in October 2019 and reductions were calculated against this baseline.

What were the outcomes?

Compared to the baseline, EcoChallenge participants achieved a 38% reduction in household-level food waste. This reduction was calculated between October 2019 and December 2020.

Introduction

The Save the Food, San Diego! EcoChallenge is an innovative social competition engaging individuals and households in food waste tracking. After successfully implementing the Smart Kitchens San Diego program—an initiative focused on food waste measurement and reduction at the institutional level—the Alliance was interested in piloting food waste measurement at the household level and assessing the impact of consumer education on household-level food waste behavior.

The Alliance identified three key challenges and opportunities that motivated the development of the EcoChallenge program. First, literature provided limited data on household-level food waste, particularly for programs looking to obtain a baseline measurement and track reduction over time. Second, there was an opportunity to pilot a long-term intervention, as many

household-level food waste interventions spanned 1–2 weeks without continued participant engagement (Van Herpen et al., 2019). Finally, kitchen-diary studies typically use either indirect measurement methods, like waste composition analysis, or less precise measurement tools, like pen-and-paper logs. The EcoChallenge program sought to engage and measure household-level food waste among participants over 15 months using an interactive online platform and digital kitchen scales.

To correspond with the five food waste tracking periods in the EcoChallenge, there were five distinct consumer education campaigns, each with a specific thematic focus covering the spectrum of education on food waste reduction. Campaign strategies primarily focused on food waste prevention to align with the highest-priority strategy of the EPA Food Recovery Hierarchy. Topics of focus for the campaign included meal planning; smart grocery shopping; proper food storage; zero-waste cooking; social, environmental, and economic impacts of wasted food; sustainable food systems; and climate change. Between EcoChallenge tracking periods, targeted consumer education campaigns were implemented to provide participants with tips, tricks, and strategies for reducing food waste at home. This was intended not only to provide an educational component to the EcoChallenge program, but also to keep participants engaged in the program between food waste tracking periods. The consumer education campaign was primarily distributed through emails, newsletters, and social media posts.

The Alliance partnered with six institutions in San Diego County—two corporate campuses, two university campuses and two jurisdictions—to engage their students, staff, faculty and employees in the EcoChallenge program.

The EcoChallenge was fully funded by a grant from the Department of Resources Recycling and Recovery (CalRecycle) through California Climate Investments.

Setting the Scope

Based on the seven-step approach to measuring food loss and waste outlined in the Why and How to Measure Food Loss and Waste: A Practical Guide, published by the Commission for Environmental Cooperation (CEC), the EcoChallenge program focused on the implementation of Step #7: Select and implement a food loss and waste measurement method based on your sector. The sector-specific guidance for households in Module 7 was especially useful for the EcoChallenge's target audience. Table 13 in the measurement guide (Methods Used to Measure FLW in the Household Sector) validated our approach of using a direct measurement methodology to capture food waste data from program participants.

The EcoChallenge data varied greatly based on household

size and the number of days recorded. Fortunately, the CEC guidance provided on the best data analysis practices proved very useful in terms of taking such variations into account.

FLW Measurement Methods

Food waste was measured using high-quality kitchen scales, which were provided to EcoChallenge participants upon enrollment. Participants were instructed to weigh and record their food waste for seven days during designated food waste tracking periods. These tracking periods spanned a 2-week window and were held quarterly during the 15-month program for a total of 5 food waste tracking periods.

The first food waste tracking period held in October 2019 served as the baseline measurement for household-level food waste; data from each subsequent food waste tracking periods were compared to the baseline to determine reduction. Although most program participants were enrolled under this standard program timeline, a subset of participants joined a pilot test for a 6-week EcoChallenge program. This condensed pilot was created to compare the differences between household-level food waste reduction and participant retention rates between two program timelines.

Food waste was defined as food in any of the following three categories: Meal Leftovers, Food Scraps, and Spoiled Food. Pet foods and liquids were excluded from our definition of food waste for the EcoChallenge program, and no distinction was made between edible and inedible food scraps. These definitions and exclusion criteria were intended to make tracking food waste as easy as possible for program participants.

Participants recorded their daily food waste on the EcoChallenge website. The use of an online platform increased accuracy in data reporting and allowed program managers to easily access food waste data at any time during the program. The website prompted participants to record both the total weight of their food waste for the day, in ounces, and the number of people that generated that waste. Information about household size was collected in order to accurately calculate average pounds of food waste per person in our analysis.

After completion of the program, participants were provided with a qualitative survey that aimed to identify the types and causes of food waste recorded during the EcoChallenge, as well as the most common disposal methods of that food waste.

Results

In total, 887 participants across six institutional partners enrolled in the EcoChallenge program. Of those, 492 participants were enrolled in the 15-month program and the remaining 395 participants joined the 6-week pilot. However, the length of the program and the challenges brought on by COVID-19, which limited in-person contact and events, led to a significant attrition rate among program participants. Of the 887 participants enrolled in the program, 391 participated in at least one food waste tracking period during either the 15-month or 6-week program timeline. By the end of the 15-month program, 15 participants had successfully recorded 7 or more days of food waste in every food waste tracking period, and 196 participants recorded food waste at least once during the program timeline. For the 6-week program, 112 participants successfully completed the 6-week food waste tracking requirements.

As compared to baseline measurements, EcoChallenge participants in the 15-month program achieved a 38% reduction in household-level food waste (see Figure 1). The longitudinal data captured from the EcoChallenge program highlights an interesting trend between Tracking Period 2 and 3. Although recorded food waste remained below baseline levels, there was an increase in reported food waste between those periods. This coincides directly with the onset of the COVID-19 pandemic and shelter-in-place orders in San Diego County, California.

Results from the pilot 6-week EcoChallenge also demonstrated an average 34% reduction in household level food waste among program participants. Not only was this result comparable to the reduction achieved by the 15-month program, but retention rates among participants in the 6-week EcoChallenge were higher than the 15-month program. See Table 1 for a breakdown of results.

Table 1: EcoChallenge 6-Week Results

6-Week Pilot Dates	Food Waste Reduction
Jan. 2020–Feb. 2020	36%
Nov. 2020–Dec. 2020	32%

Results from the self-reported qualitative survey data indicated that food scraps, rather than meal leftovers and spoiled food, were the most common type of food waste produced by EcoChallenge participants during the program. Frequently wasted items included scraps, peels, cores and skins from fruits and vegetables; whole fruits; eggshells; and coffee grounds. Participant feedback throughout the EcoChallenge program also highlighted the positive learning and impacts brought on by both the food waste tracking exercises and engagement with the education and resources.

Figure 1: EcoChallenge 15-Month Results
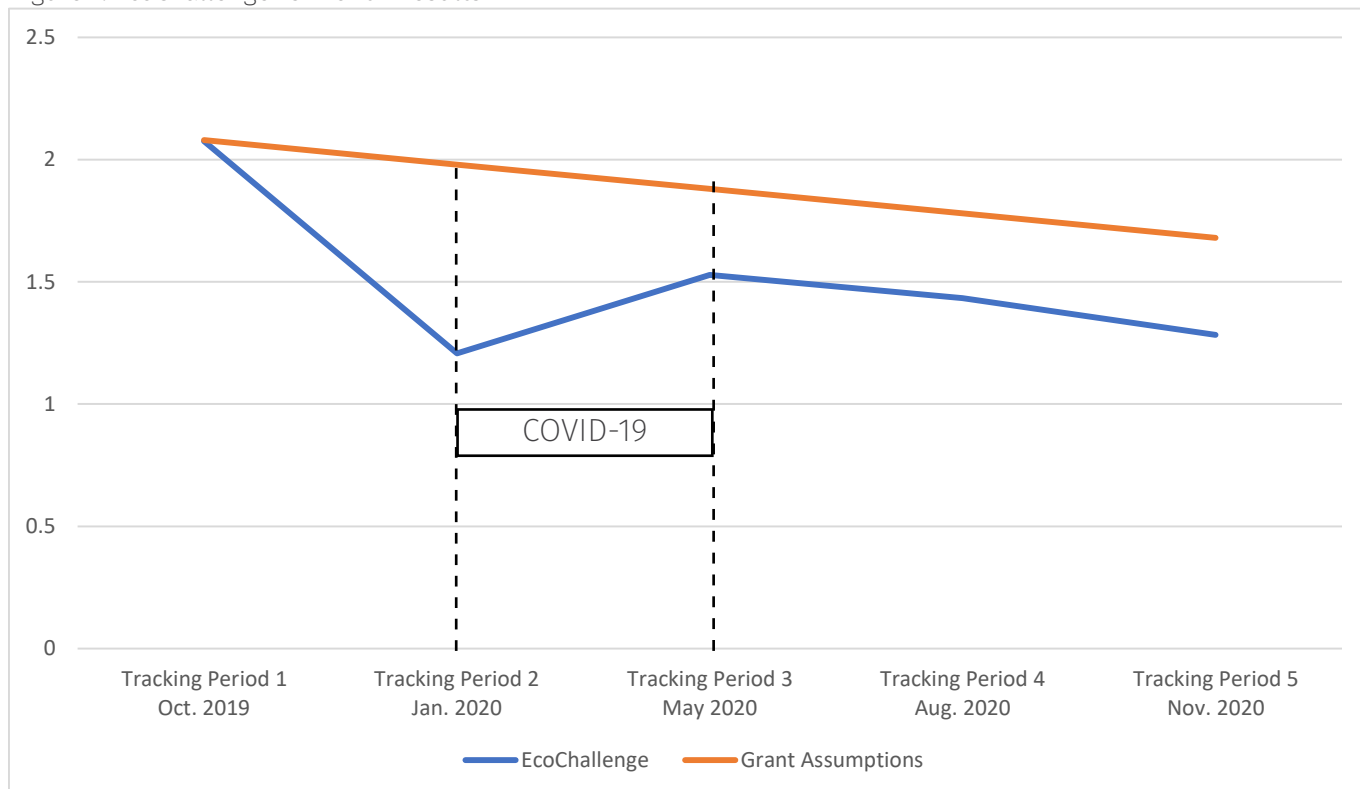
Note: The period labeled "COVID-19" in Figure 1 represents the first identified cases of COVID-19 in the United States and the start of shelter-in-place orders in the state of California. Although COVID-19 and stay-at-home orders continued for the remaining duration of the program, the period between January 2020 and May 2020 represented the most significant disruption to daily life and program implementation. The subsequent increase in recorded food waste is likely attributable to these factors.

Outcomes

The EcoChallenge program initially set out to achieve a 10% reduction in household level food waste by the end of the 15-month program. Although implementation of the program was challenged by numerous external factors, the actual outcomes far exceeded this initial expectation, with a 38% reduction in household-level food waste among program participants that consistently tracked their food waste.

Qualitative survey data collected from participants also supports positive learning outcomes from the EcoChallenge program. In fact, 90% of survey respondents reported an increased awareness of food waste and that they are implementing strategies learned during the EcoChallenge to reduce their food waste. Additionally, the EcoChallenge website featured a variety of Actions and Challenges representing food waste reduction strategies that participants could actively complete during the EcoChallenge. By the end of the 15-month program, participants had completed 22,894 actions on the EcoChallenge website.

The EcoChallenge program was novel due to its lengthy 15-month timeline and its use of an interactive online platform and digital kitchen scales to capture household-level food waste. Through our experience with this innovative program design, three key recommendations emerged for organizations looking to implement a similar project.

1. Shorten program timeline to promote higher participant retention rates

The original 15-month timeline for the EcoChallenge program was beneficial for capturing longitudinal data for household level food waste, but it came at the cost of significant participant attrition. To prioritize participant retention and food waste tracking, we recommend shortening the program timeline. The 6-week model piloted during this program proved successful in increasing participant engagement while also maintaining comparable reduction rates to the 15-month timeline.

"This is challenging me to come up with recipes to use fruit and vegetables rather than composting them like I used to." – EcoChallenge participant

*"Our household has been actively trying to reduce waste by purchasing only what we plan to eat that week. We have cut down on the amount of produce so that it is fresh and we use all of it before it gets too ripe. I have also started to recycle my coffee grounds and eggshells to use in my garden."
– EcoChallenge participant*

2. Ensure resources for data analysis

One of the most challenging aspects of this food loss and waste measurement project was analyzing the data collected. The EcoChallenge website could only provide raw data, which necessitated frequent data cleaning and aggregation. Working with a raw dataset without having a data analyst or statistician available can be a burden on program managers and coordinators, so having resources available to assist with the data analysis is key.

3. Build incentives into program budgets

Long-term retention and engagement of program participants in a voluntary program are extremely challenging. Some of the strongest tools used to encourage continued participation are prizes and incentives. As such, EcoChallenge participants were offered a variety of prizes throughout the program. Prizes and incentives can be a significant budget line item, so it is important to budget for them during the program design process. Qualitative survey data revealed that guaranteed incentives are stronger motivators for participation than a raffle-based system of prizes.