

Laura Valletti¹ and Ann C. Wilkie²



¹ Soil and Water Sciences Minor, Soil and Water Sciences Department, CALS

² Faculty Advisor, Soil and Water Sciences Department, University of Florida-IFAS, Gainesville, Florida



Abstract

There is an exorbitant amount of food waste generated worldwide, with over 1.3 billion tons of food waste discarded annually. The Student Compost Cooperative (SCC) at the Bioenergy and Sustainable Technology Laboratory provides a space for students and community members to compost their food waste in Gainesville, Florida. The objective of this study was to quantify the amount of food waste that was brought to the SCC, and thereby diverted from the landfill. Over the course of six months, October 2021 through March 2022, the collected food waste was audited and analyzed. An on-site scale was provided for participants to weigh the mass of food waste contributed to the compost bins. Data was analyzed on an individual participant and on an overall basis. The individuals who deposited their food waste during this time also completed a participant survey to determine what factors influence their likelihood to compost. Some key findings identified in the analysis include the total weight of food waste composted per person, the specific composition of the food waste, and one-time versus repeater participant behavior. In total, 1,397 lbs of food waste were diverted from the landfill over the six-month period.

Introduction

Food loss is defined as the edible amount of post-harvest food that is available for human consumption but is not consumed for any reason. Approximately 1.3 billion tons, one-third of all food produced for human consumption globally, is lost or wasted (FAO, 2011). Food waste has significant contributions to the greenhouse gas footprint, thus exacerbating the climate change crisis (USDA, 2022). "A landfill is similar to tying food in a plastic bag as the nutrients never return to the soil, the wasted food rots and produces methane gas" (EPA, 2022). Composting allows food to be diverted from landfills and utilized as a soil amendment. The SCC provides a sustainable composting infrastructure to students and other city residents who are interested in sustainable practice. The main concentration of this study is the use and deposits of the composting amenities. The aim of this study is to quantify the amount of food waste the SCC diverts from landfills. On average people waste about a pound of food per day (Conrad et al., 2018). Approximately two-thirds of avoidable waste consisted of vegetables and fruit (Elimelech et al., 2018). It is hypothesized that produce will be the highest food waste content deposited.

Objectives

- Quantify the amount of food waste diverted from landfills by the SCC
- Quantify the mean food waste deposit per individual

Methods

- A food waste audit was conducted over a six-month timeframe using a notebook, instruction list, datasheet, Taylor digital 33-pound kitchen scale and pens located in a water-resistant container.
- Participants were instructed to weigh food waste in their container with the lid on the provided scale, deposit their food waste into the respective compost bin, and reweigh the now empty original container.
- A 13-question survey was constructed using Qualtrics software to record participant information.
- Responses were collected and food waste audit data were analyzed.

Results

- **Table 1** depicts the total weight of food waste collected, number of deposits, and the mean of deposit instances, indicating a total weight of 1,397 pounds and 5.7 ounces, with a total of 249 deposit instances.
- **Figure 1** depicts the food waste ranges. The main concentration of the 249 deposits resides in the 80 drops between 30 ounces (1.87 lb) and 60 ounces (3.75 lb). The highest food waste weight recorded by a single individual was 129 pounds 6.7 ounces.
- **Figure 2** depicts the number of times various categories of food waste were brought by participants to the SCC. 'Produce' was the most frequently composted category. The 'Other' category consisted of write-in answers. Examples include eggshells, coffee grounds and pet hair.
- **Figure 3** depicts the number of visits by individuals with 41 repeat participants and 14 single participants, giving a total of 55 participants. As the study progressed, more and more participants were categorized from single to repeat participants.

Table 1: Total Food Waste Weight by Month and Individual Deposits

	<u>Total food waste weight</u>	<u>Food waste deposit instances</u>	<u>Mean food waste deposit weight</u>
October	114 lbs 7.17 oz	31	3 lbs 9.7 oz
November	138 lbs 14.06 oz	37	3 lbs 15 oz
December	117 lbs 14.52 oz	25	4 lbs 11 oz
January	181 lbs 1.5 oz	48	3 lbs 9.8 oz
February	403 lbs 6.06 oz	62	6 lbs 8.7 oz
March	441 lbs 10.4 oz	46	9 lbs 10 oz
Total	1397 lbs 5.7 oz	249	5 lbs 9.7 oz

Figure 1: Histogram of range of food waste weights per individual

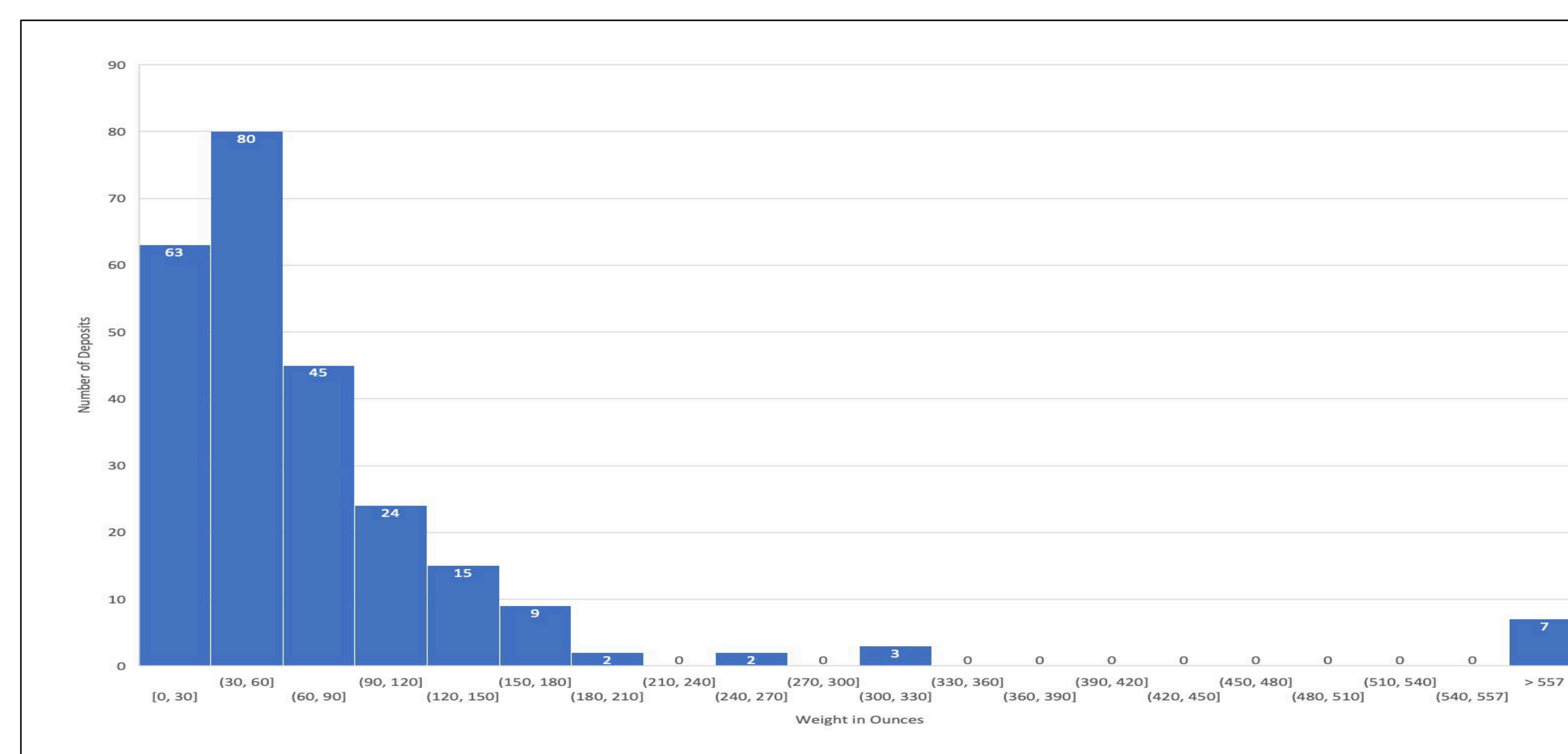


Figure 2. Frequency of Deposit by Food Waste Content Type

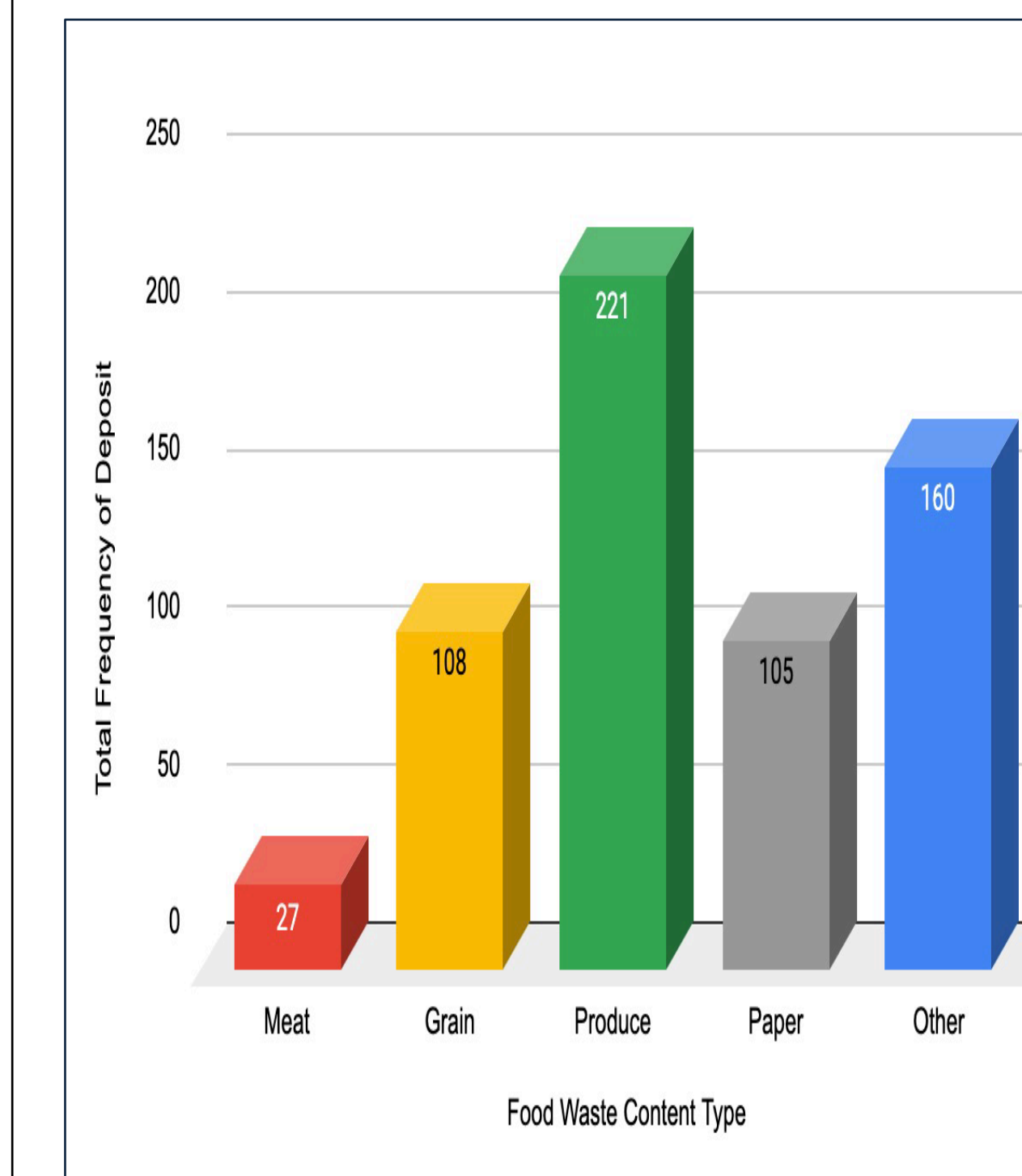
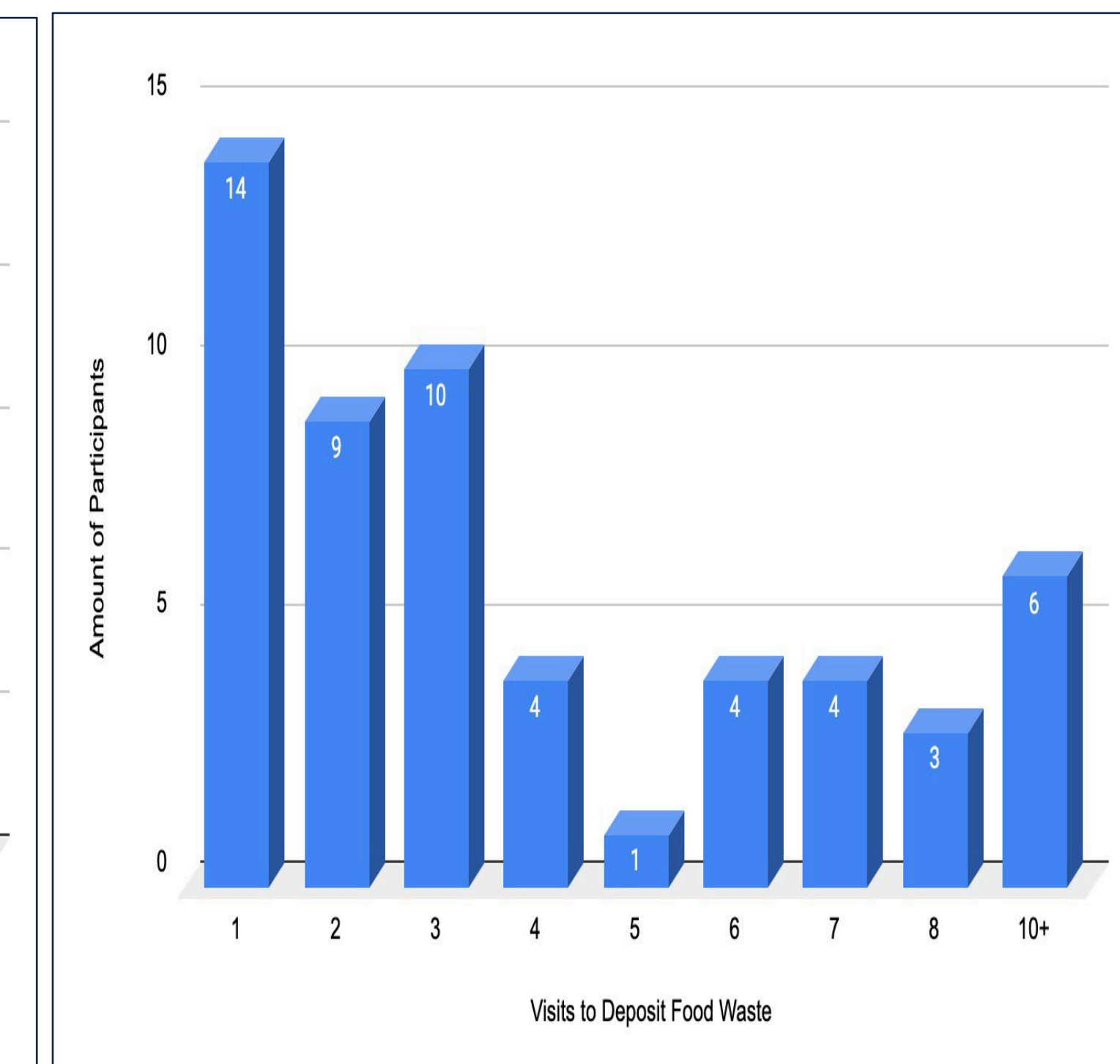


Figure 3. Participant Visits to the SCC to Deposit Food Waste



Discussion/Conclusion

A major finding in the study was the total food waste collected and diverted from a landfill was nearly ¾ of a ton. The research conducted supports previous literature findings in which produce is the most common food wasted. Benefits from the study conducted is not only the amount of food waste redirected from the landfill but also a reduction in the methane produced as a result. Most individuals don't see the full picture in how much they contribute to the total food waste weight and the lasting impacts of diverting it from landfills. The SCC facility provides a space for student composting. In total, 1,397 lbs of food waste were diverted from the landfill over the six-month period. Extrapolating to a full year, the total food waste currently diverted by the SCC is 2,794 pounds or 1.4 tons.

Future Work

This study demonstrates the potential for diverting food waste from landfills through local composting. The environmental impact would be even more significant if composting was implemented at a university or community scale.

References

1. Conrad, Z., Niles, M. T., Neher, D. A., Roy, E. D., Tichenor, N. E., & Jahns, L. (2018). Relationship between food waste, diet quality, and environmental sustainability. *PLOS ONE*, 13(4), e0195405. <https://doi.org/10.1371/journal.pone.0195405>
2. Elimelech, E., Ayalon, O., & Ert, E. (2018). What gets measured gets managed: A new method of measuring household food waste. *Waste Management*, 76, 68–81. <https://doi.org/10.1016/j.wasman.2018.03.031>
3. EPA (2022, February 27). *Sustainable Management of Food Basics*. U.S. Environmental Protection Agency. <https://www.epa.gov/sustainable-management-food/sustainable-management-food-basics>
4. FAO (2011). *Global Food Losses and Food Waste – Extent, Causes and Prevention*, 37p. Food and Agricultural Organization of the United Nations, Rome. <https://www.fao.org/3/mb060e/mb060e.pdf>
5. USDA (2022, January 24). *Food Waste and its Links to Greenhouse Gases and Climate Change*. Food Availability (Per Capita) Data System. U.S. Department of Agriculture. <https://www.usda.gov/media/blog/2022/01/24/food-waste-and-its-links-greenhouse-gases-and-climate-change>

Acknowledgements

This research was conducted for the 2021-22 CALS University Scholars Program and SWS 4911 – Supervised Research in Soil and Water Sciences, at the Bioenergy and Sustainable Technology Laboratory, Soil and Water Sciences Department, UF-IFAS.