

Dining Hall Food Redistribution

Inquiry to Innovation Fall 2019

Zero Hunger Zero Waste



Inquiry to Innovation Seminar

Introduction

Inquiry to Innovation is a series of seminars offered through UCFoward. The course focuses on addressing real-world challenges by introducing students to cross-disciplinary approaches to innovation. In the fall of 2019, one seminar was offered that partnered with Kroger, specifically the Zero Hunger Zero Waste Foundation, to address food waste in the local community.

We propose that if a system involving the safe packaging food from dining halls and efficient redistribution to local nonprofit organizations is implemented at the University of Cincinnati, then the amount of food waste produced by dining halls would decrease and the amount of food available to the hungry in the greater community would increase. This system relies on student volunteers who both package and deliver leftover, unused and uneaten food from the University of Cincinnati to a local nonprofit. In order to implement the project, we suggest the registration of a student organization that will oversee each step of the process and the strengthening of the partnership between Kroger and the students involved to help financially support the project.



Sahaja Ampolu- medical sciences major, conducted research specifics, communicated with local nonprofit organizations and created a visual aid for presentation.



Nithya Trichy- medical sciences major, conducted research, lead communications with key collaborators, and created the poster.



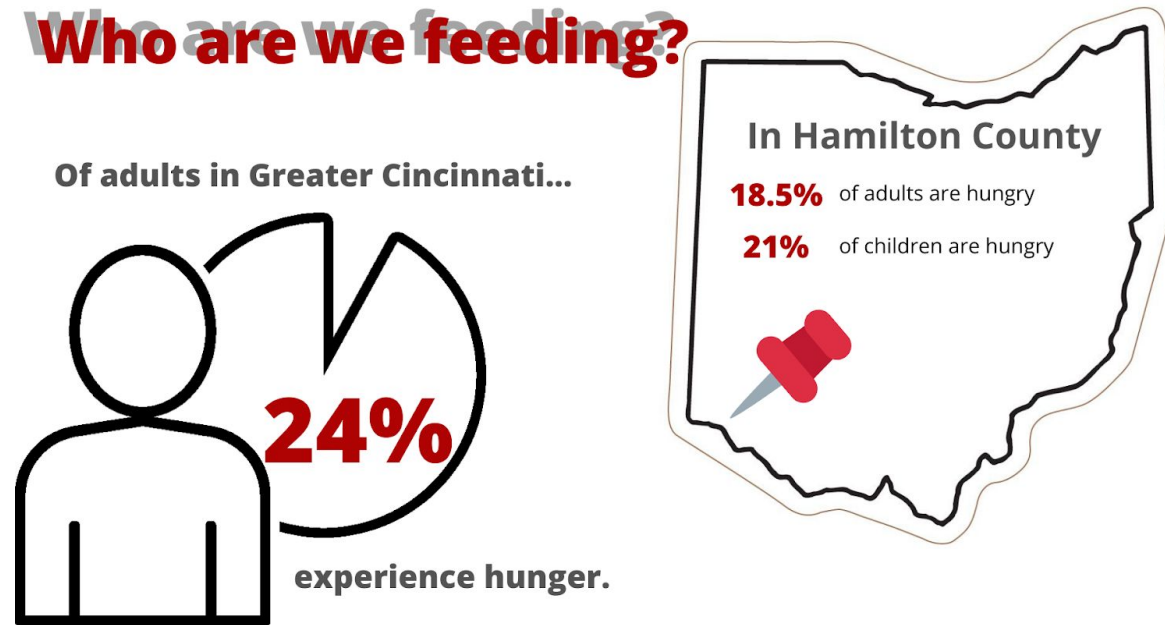
Emma Duhamel- philosophy and interdisciplinary studies double major, organized timeline for the project, created graphics for visual components of the project, author of the report.

Thank you to our collaborators

Erika Judd of 8451 | Jenelle Stephens of the Esther Marie Hatton Center | Tio Liang of Aramark | Lauren Cohen and Dave Embry of the University of Cincinnati Dining Services | Little Sisters of the Poor | Student Activities Board | University Funding Board | Jessie Fossenkemper and James Ray of the Freestore Foodbank

Background on Food Waste

In the United States alone, one in eight people (12.5%) have trouble getting enough food on the table. At the same time, the nation wastes up to 40% of its food (Balkan et al). In Hamilton County, Ohio, 18.5% of adults and 21% of children experience hunger (Facts About Hunger). That number increases to 24%, nearly a quarter of the population when looking at the Greater Cincinnati area (A Growing Hunger).



Hunger has obvious impacts on the body, including nausea, dizziness, an inability to concentrate, and irritability. The less apparent impacts of long term hunger make staying alive more challenging for many reasons beyond the lack of food. Hunger can increase the risk of a variety of mental health issues. A 2002 study from the American Academy of Pediatrics found

that, among mothers of school-aged children, those who experience extreme hunger are more than 50% more likely to suffer from post-traumatic stress disorder and depression (Weinreb et al). According to Feeding America, 58% of households that receive food from the organization have a member with high blood pressure, and 33% have a member with diabetes (Waite).

In Hamilton County, with an adult hunger rate at 21%, nearly 16% of waste in landfills is food waste (Gray). In a number of cases, that food was edible at the time of its disposal or had been left untouched by retailers or consumers. This is an indication of a waste culture, in which a majority of people are able to accumulate enough food to be able to discard any considered unwanted, while a minority is deprived of the resources and struggles to survive without food. Food waste is a contributor to hunger, as it is a symptom of a culture that sees food as a consumer good rather than a needed resource.

Food waste is also a strong contributor to environmental degradation. As food, which is usually comprised of organic materials, begins to decompose, greenhouse gasses are emitted, contributing specifically to climate change. As food waste makes up nearly 16% of the contents of a landfill, it contributes significantly those emissions, primarily in the form of methane, which is considered to be more potent and powerful than carbon dioxide. In 2017, 10% of the emitted greenhouse gasses were methane (The Environmental Impact of Food Waste).

A significant amount of water used goes towards animal agriculture, and with much of the resulting animal products going to waste, animal agriculture is a significant source of wasted water. 50,000 liters of water are needed to produce a single kilogram of beef. With every kilogram of beef that goes to waste, 50,000 liters of water go down the drain. Similarly, when a

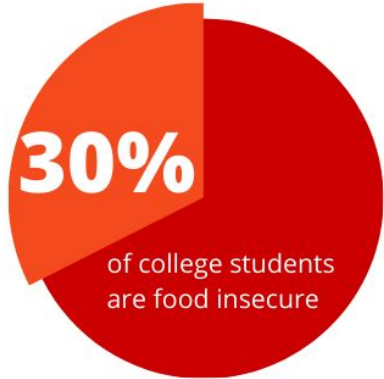
single glass of milk is dumped out, 1,000 liters of water have gone to waste. It's estimated that in order to produce the amount of food that is wasted, a volume of water three times the size of Lake Geneva is needed (The Environmental Impact of Food Waste).

Wasted food also requires space. If there are 300 million people in America who produce 3.5 pounds of trash that ends up in a landfill per day, that would create 1,050,000,000 cubic feet of waste in a day. If 15.73% of that waste is that of food, a year's worth of food waste would require 165,165,000 cubic space of storage space. According to the United Nations, the population is expected to continue to grow, reaching 9.7 billion by 2050 (Population). With an increasing number of people comes an increasing amount of waste, meaning more land will be needed to make up landfills. At the same time, more space will be needed to accommodate the increased demand for living space, meaning that between the need to gain more land for agriculture, landfills, and living space, there won't be very much green space leftover, and more people will have to live by the smelly landfills and factory farms, lowering the quality of life for, possibly, billions of people. While population growth is not able to be controlled, the other two space fillers are. By reducing the amount of food wasted, landfills will not require as much land. If less food is being bought (and subsequently disposed of) agricultural companies, factories and farms will be able to scale back production, which means that they would not need nearly as much land for expansion.

Food waste impacts the earth and the people living on it. The widespread impact food waste has makes it a larger threat to existence, while simultaneously simplifying the solution. By addressing food waste, one can address issues that connect to both environmentalism and social

issues at the same time, such as sustainable land usage, hunger, the waste of water, social stratification and inequality, climate change, and hunger. As a multifaceted and complex challenge that impacts different communities in different ways, a universalized approach to solving the issue can prove to be implausible at best. With this in mind, we found that taking a localized approach to addressing this difficulty would be the most efficient way to formulate a catalyst for significant change. A large reason the narrowing of the scope is more effective is that it is in the best interest of the community to play a role in addressing food waste. If the University of Cincinnati was to donate, rather than dispose of leftover food, they would be able to save \$0.97 in tax benefits per pound of food. In addition, a narrower approach also addresses a concerning statistic: the Greater Cincinnati area has a rate of hunger nearly double the national rate. This may be due to the city having a large population of college students, as anywhere from 20-40% of college students may be experiencing food insecurity (CUFBA).

According to the College and University Food Bank Alliance...



meaning that
8,000 to 10,000
undergraduates at the University of Cincinnati experience food insecurity



... however, some research estimates that 41% of four-year university students experience food insecurity.

Selected Issue and Conjecture

Upon acknowledging the importance of addressing food waste as it applies locally, it was decided that the most effective solution would be comprised of two very important components. Firstly, the proposed solution would need to have an impact not only on the University of Cincinnati but the surrounding area, also. This allows for the maximization of utility without sacrificing plausibility and ease of implementation. Secondly, the solution would need to address two key components of food waste specifically. Rather than talking about food waste as if it were a nebulous and abstract concept, it was decided that by identifying the specifics of what was being addressed, the desired outcomes would be measurable. Due to the staggering hunger rate in Cincinnati, the most pressing issues appeared to be the diversion of food waste from landfills and how food waste contributes to hunger.

From 2007 to 2009, the University of Cincinnati's dining services wasted around 600 tons of food per year, with none of the food being composted or diverted (Ruiz). The same study recommended that the end of the contract UC had/s with Aramark, the university's food service provider could be used to push for a more sustainable food system. In the fall of 2018, Aramark and UC opened On the Green, a dining hall that is praised for having the environment in mind. The highlight of this dining hall is the composting infrastructure, a large network of machinery that dehydrates food that students leave on their plates and turns it into a dry mulch-like substance. Aramark touted this as a major step forward. At the same time, however, Aramark and UC opened another dining hall called Varsity Club, which is advertised exclusively to

student-athletes (Inside the Bearcats: The Varsity Club). Varsity Club does not have a composting system, offsetting the progress made by On the Green.

The food providers on campus are the major producers of food waste as opposed to residence halls, especially because most residence halls do not have kitchens and most students living in residence halls have a meal plan. The addition of composting infrastructure to all dining halls is clearly an easy way to divert the unfinished food left on a student's plate, as it has already proven itself to work for the University of Cincinnati at On the Green. That isn't enough. There are other parts of the dining hall food system that produce waste. The food left on the buffet line, extra food that was prepared, rejected food (such as a misshapen pancake) and unused ingredients are still edible, so throwing those items out is throwing out what could have been a meal for someone in need. Thus, we come to the following conjecture: If a system involving the safe packaging food from dining halls and efficient redistribution to local nonprofit organizations is implemented at the University of Cincinnati, then the amount of food waste produced by dining halls would decrease and the amount of food available to the hungry in the greater community would increase.

Process and Ideation

The first step in the process was to reach out to the University of Cincinnati Dining Services and Aramark in order to get a more robust understanding of the food system. Dining Services expressed an interest in the conjecture and said they would be willing to consider the implementation of such a system when the proposal was completed. They also provided significant details on how the UC dining halls operate. Aramark did not share the same enthusiasm. In a phone call, an Aramark representative quickly rejected the conjecture, citing the health code that would make the donation of the food prohibited or the increased liability would be too much of a toll on the university and company.

CRITICAL PATH

DUE DATES: Final Conjecture (Oct 29) Draft Poster (Nov 19) Final Poster and PPT (Dec 3) Final Report (Dec 10)

Finish **PURPLE** path by November 4

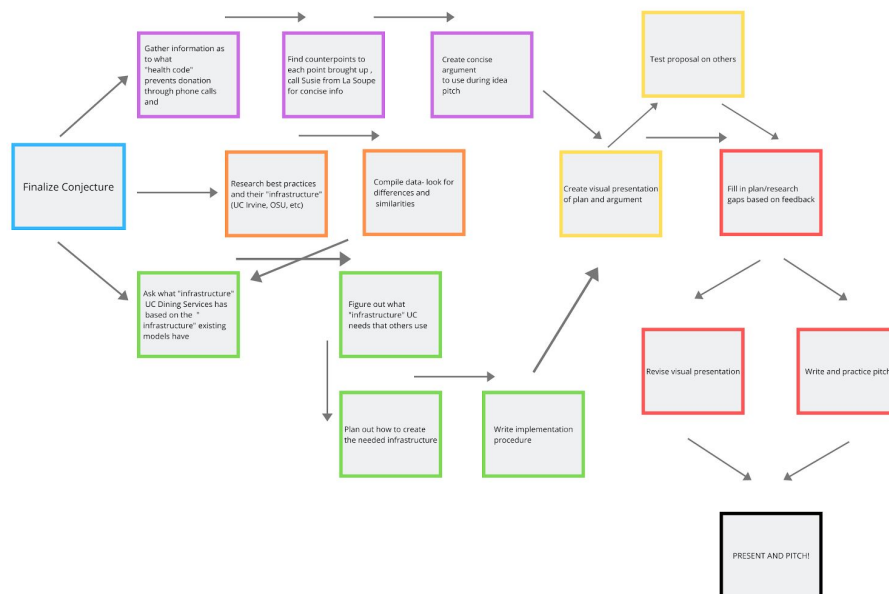
Finish **ORANGE** path by November 4

Finish **GREEN** path by November 10

Finish **YELLOW** path by November 18

Finish **RED** path by December 2

BLACK will be finished once all paths are complete.



Aramark's refusal came across as paradoxical, as our research found that they have a partnership with the University of California at Irvine that allows the university to be more sustainable by donating leftover dining hall food. Clearly, Aramark has been willing and able to work around any federal regulations in the past, so the difference was assumed to be rooted in state law. After further research, it was discovered that Aramark had no insurmountable governmental obstacles as they had claimed. In 1996, President Bill Clinton signed into law the Bill Emerson Good Samaritan Act, which encourages food donations by protecting from liability when donating to a nonprofit to redistribute food to those in need (Protecting Our Partners). Ohio Code 2305.37 reinforces the protections, even if there is not a nonprofit organization serving as the middleman (Ohio Code 2305.37). Additionally, there has not been a single lawsuit regarding food donation in history, showing that these protections are strong. After bringing that information back to Aramark, the company was more willing to listen to the proposal.

After concluding that the ultimate goal was to divert leftover dining hall food from landfills to those in need, the specifics of the project and next steps remained foggy. After a conversation with Jessie Fossenkemper and James Ray of the Freestore Foodbank, it became clear that there would be some precautions that would need to be taken to ensure the health of the food recipients. Some added infrastructure is needed, most importantly, a blast chiller. In order to guarantee safety each step of the process and to make sure the donations can be accepted, the team must have at least one member be certified through ServSafe, signifying that this member has had the proper training to maintain a high level of safe food management.

It was also decided that for each step of the process, student volunteers should be involved. From the perspective of Aramark and UC, if staff members were to package and safely transport food, they would have to work overtime, so they would have to be paid more. Many employees do not want to work overtime, as they want to be home after a long day at work. Student volunteers, on the other hand, are more readily available. The biggest scholarship program that the University offers is the Cincinnatus scholarship. In order to maintain the scholarship, students must accumulate 30 hours of service by the end of the academic year. This can be challenging for students who have limited transportation options, as oftentimes there are more volunteers than there are volunteer opportunities near the campus. By providing students with a volunteer opportunity that occurs both on and off-campus, there would be a number of people interested in being involved who are “getting paid” by working to maintain their scholarship.

Case Studies

As mentioned previously, the University of California at Irvine has a partnership with Aramark to achieve this same goal. UC Irvine's model diverts around 80 percent of its food waste from landfills. Whenever dining halls have excess leftover food, it goes directly to people in need in the community. The UCI staff follows Aramark's food donation guidelines to package the food and then work with The Food Donation Connection (FDC) who manages the network of local food relief agencies and redistributes the food. This case study helped to provide a generalized model of food redistribution (Food Service). As UCI and UC are different, the key components of UCI's model that would not work well at UC needed to be identified so they could be modified. Because of the pushback received when the idea of staff members packaging the meals was floated, it was clear that UC would not be willing to ask dining hall staff to stay overtime to package the food, or pay them for the extra time, reinforcing the need for student volunteers. Due to the close proximity, UC has too many locations that accept food donations, it is easier to cut out the middleman (in the case of UCI, the FDC) than to work through another organization.

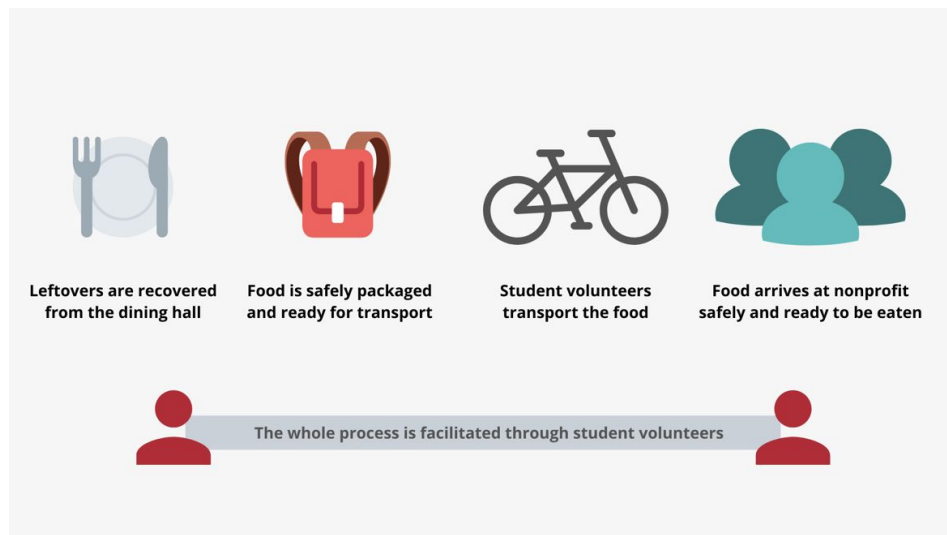


In 2015, Rush University Medical Center started a similar project called the Surplus Project. Leftover food from the hospital goes to one nonprofit that serves the homeless. Food is packaged by hospital nurses who volunteer to help. Each one is a certified food handler. Food is packaged into meals that include a protein, starch, and a vegetable. The food is transported by Rush's shuttle to the nonprofit, which is located a couple of miles away. Before the Surplus Project, the three kitchens at the Rush University Medical Center produced 75lbs of food waste per day. After implementation, it dropped to 30lbs- less than half of the original weight. The Associate Vice President of Community Engagement and Practice, Darlene Hightower, said on the topic "you get to feed people who need it, and you're also cutting down on your environmental footprint and cutting down on waste." (Vivanco). As the nonprofit that Rush donates to is not within walking distance of the hospital, a shuttle is the most effective way to transport the food. Since part of the purpose of diverting food from the landfill is to minimize environmental impact, using a vehicle for food transportation is contradictory to the goal of redistributing dining hall food at the University of Cincinnati. From this, it was deduced that nonprofits within walking distance are the best candidates to receive food from UC and that having volunteers involved in all parts of the process is beneficial.

Proposal Description and Documentation

Overview

We propose that the University of Cincinnati implement or support a program in which student volunteers are able to learn how to safely package food and then deliver said food to organizations that can distribute it to those in the most need. This process will be facilitated by student volunteers and workers. The students will arrive at the dining hall either to package food or to retrieve food that has already been packaged. Packaged food will then be taken to the UC Bike Kitchen, where insulated bags and insulated blankets will be located. The bags and blankets will ensure that the food remains at a safe temperature while being transported. Students will then take the food from the campus to a designated nonprofit, where the food will be redistributed. Students are strongly encouraged not to drive to these locations, as it would be counterintuitive to contribute to climate change through the use of a car while trying to eliminate it by diverting food waste.



Packaging Guidelines

Due to the Bill Emerson Good Samaritan Act, if the food packaged at UC causes a recipient to have an upset stomach, the students who packaged and delivered the food will not be held legally responsible. It is, however, morally irresponsible if the food is not handled carefully and safely. Within two hours of the food being deemed as leftovers, it must be cooled to 40 degrees Fahrenheit or below in order to prevent bacterial growth. The range between 40-140 degrees is called the “danger zone.” In the danger zone, bacterial growth is at its most extreme, with the number of bacteria doubling in as little as 20 minutes in some cases. To keep food at a safe temperature, a blast chiller or freezer would be needed. A food thermometer would also be needed to check the internal heat of the food. Once the food is ready to be transported, the insulated backpacks and blankets would maintain the temperature as it is taken to a nonprofit. Polypropylene bags will be used to wrap and package food items individually. Polypropylene is approved by the FDA to be food-safe, and the bags are as little as \$0.04 apiece. Additionally, all packaged food would have an allergen label on it.

Student Organization: UC Food Forward

As a way to keep the suggested system organized, we propose the establishment of a student organization: UC Food Forward. A student organization will aid in the process by providing a centralized point of contact and engaging student volunteers. It will also promote the longevity of the dining hall redistribution initiative, as the leadership will be passed down from one generation of students to another. This also opens up the possibility of growth. As more

students get involved, there will be enough of a volunteer infrastructure to find additional nonprofits to donate to, along with the potential for the implementation of other initiatives or systems while maintaining the success of this one. As all student organizations must have an advisor, UC Food Forward will have a faculty advisor who has a food rescue license badge (or is willing to go through the process to get one) so the process is streamlined.

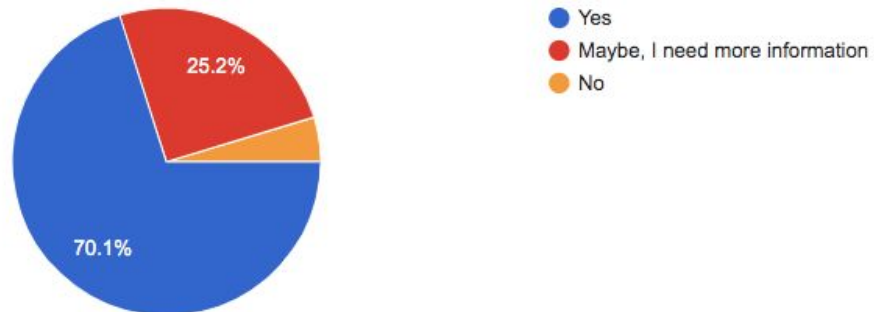
Student Volunteers

A large number of Cincinnati scholarship holders will be seeking out opportunities to acquire more hours. This in and of itself will be a motivation for many to sign up for a volunteer shift, with each shift being two hours. To incentivize more students, each completed shift will also give a student a meal voucher for the dining halls. Volunteering also benefits students personally, as the transportation process involves exercise and it has been proven that helping others can improve the mental health of the giver. The volunteers would be trained in how to package food and take the temperature of the food at different points of the process to ensure freshness.

After a poll of 107 students, it was found that a majority would be interested in being part of the volunteer force or joining UC Food Forward, indicating that enough volunteers can be organized to keep the project afloat.

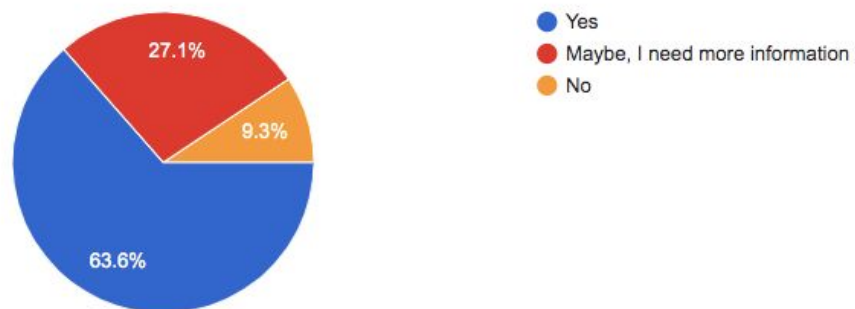
Would you be interested in volunteering for the food packaging process?

107 responses



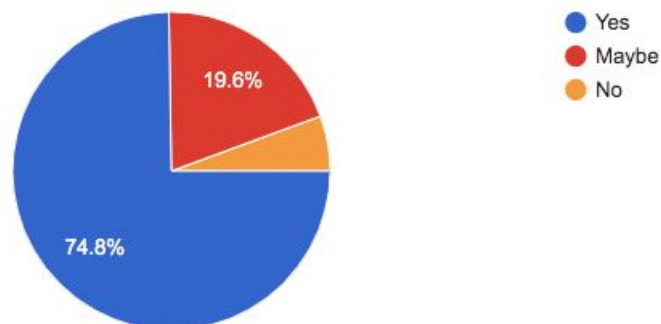
Would you be interested in volunteering for the food transport process?

107 responses



Would you be interested in joining our organization (possibly named, UC Food Forward) and sharing its mission of reducing food waste, hunger and making the campus more sustainable?

107 responses



Selected Nonprofits

There are three initial locations that volunteers will donate their food to. There were specific requirements that each one needed to meet in order to be a viable choice (see Appendix A for a list of all candidates). Firstly, to ensure that the food would be distributed by a reputable source and as not to jeopardize the legal protections, each organization needs 501(c)(3). The organizations would also be verified through the Freestore Foodbank. The nonprofits would also be able to sort through the donated food to check for any health hazards that they are trained to recognize. To prevent any more food waste, nonprofits also need to use all accepted food donations and accept most food donations that are safe to be distributed. The nonprofits also need to have the correct equipment to keep the food safe once it's in their care. Finally, all of the nonprofits must be within walking distance (no more than a mile away) of the University of Cincinnati Bike Kitchen, as students will be encouraged not to drive.

Little Sisters of the Poor is a Roman Catholic women's group dedicated to serving the elderly poor. It operates in over 30 countries and has a location in Cincinnati at St. Paul's home, located in the Clifton neighborhood, 0.8 miles away from campus. They will accept any produce or canned goods given to them (Little Sisters of the Poor). *St. George's Food Pantry* serves three different Cincinnati zip codes. Located just off of the university campus, the food pantry will accept any premade meals, along with canned goods (SGFP Admin). *Corryville Elementary School* has 501(c)(3) status, so unlike many other schools, it is eligible to accept donations. It will accept any non-perishable goods and could arrange a partnership with UC to deliver prepared meals (Welcome).

Testing, Implementation, and Impact

As mentioned previously, Aramark was initially not interested in the proposal and actively said it would not work due to health regulations. Upon sharing the evidence that contradicted their claim, they were more willing to listen. The initial resistance from Aramark is a signal of an uphill battle, but the excitement from the University of Cincinnati promises much support in the process of implementation.

Before the implementation of the project can begin, there must be a framework. By beginning the process of registering UC Food Forward as a student organization, the goal of the organization becomes known to a broader community of UC students and staff. Additionally, this allows for the possibility of funding from the University Funding Board. Establishing an official organization allows for a clearer structure amongst those collaborating to get the project off the ground, and helps to draw support and interest from the students.

One of the bigger obstacles is the funding needed for the project. Despite the low cost, bulk ordering polypropylene bags can become expensive. In addition, the combined cost of a food thermometer and blast chiller could be upwards of \$1,000. The backpacks and insulated blankets are also quite expensive. In order to move forward with the project, there would be a need for a great amount of funding. Some of that funding could be sourced from the University once UC Food Forward is registered, but it is unlikely enough to cover all expenses. Generously,

Kroger has offered some assistance in funding. To begin a proper implementation, UC Food Forward and Kroger will need to develop a defined partnership.

One meal weighs approximately 1.67lbs. If 200lbs are rescued from the University of Cincinnati per week, that would be approximately 120 meals rescued per week. This in and of itself is impressive, and it only accounts for waste generated by dining halls. This project has the potential for growth, which includes expanding the rescuing to all food service locations on campus, such as the food court in Tangeman University Center. The number of meals rescued can increase as the system is perfected and proves to be sustainable.

When the amount of food to be eaten is increased, it would be beneficial to include new nonprofit organizations in the donation network. One way of doing this could be through allowing people to drive food donations during their commute home from campus. With a large population of commuting students, this could attract more volunteers and would not contribute new pollution, as the car would be burning fuel whether or not it was dropping food off.

Estimated Budget

01	Blast Chiller	\$5,000
02	Temperature Probes	\$10
03	Plastic Bags	\$5 per week so \$260 per year
04	Backpack/ freezer blankets	\$60
Total		\$5,330

Appendix A: Possible Donation Locations

- Prince of Peace Lutheran Church
- Zion Baptist Church
- Esther Marie Hatton Center
- Cincinnati Restoration Church
- Washington UCC Soup Kitchen
- Emanuel Church of God in Christ
- Rothenberg Elementary School
- Immanuel Presbyterian Church
- St. Francis St. Joseph Catholic Worker House
- La Soupe
- Freestore Foodbank
- Walnut Hills Kitchens and Pantry

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