

ZERO HUNGER | ZERO WASTE

PROPOSALS TO ADDRESS THE ISSUE OF FOOD WASTE MANAGEMENT AND HUNGER AT UC

PD 2030 | Inquiry to Innovation | Fall 2019



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INTRODUCTION

In Fall 2019, a University of Cincinnati - UC Forward - Inquiry to Innovation class was invited to partner with the Kroger corporation and its Zero Hunger/Zero Waste Foundation to focus on food waste prevention, recovery and recycling.

The primary focus of the study was to address the issues of food waste management and hunger among the students of University of Cincinnati along with neighboring communities.

Students assembled into six groups from various disciplines to develop six concepts and then design “prototype” programs to address the issue of hunger and food waste on and around campus. The process involved a rigorous effort from the students to understand and conduct reconnaissance and to document relevant best practices across the country. The student’s final concepts and prototypes offered varied from student awareness programs in new courses and campus competitions to rescue and delivery systems to move excess food from dining halls and local grocery stores to food insecure students or nearby community food pantries.



In Fall 2019, the UC Forward Inquiry to Innovation class partnered with Kroger and the Zero Hunger/Zero Waste Foundation to focus on food waste prevention, rescue and redistribution.

Class Innovation concepts targeted campus food waste and food insecurity for students and the community around campus.



It's our vision.
And we have a plan.

Source: www.krogerstories.com/zerohungerzerowaste/

ABOUT UC FORWARD

UC Forward is a re-imagining of what a university experience should be. It is a one-of-a-kind learning opportunity – pairing students and faculty of diverse majors in trans-disciplinary teams to collaborate with outside experts in solving today’s problems and developing tomorrow’s workforce in unique and relevant ways. UC Forward is an initiative that promotes opportunities for University of Cincinnati students to put what they’re learning into action while they’re learning it and in doing so, develop intangible skills through collaboration, team leadership and project management that you just don’t get from lectures. UC Forward’s Inquiry to Innovation Course is the venue for this interdisciplinary collaboration with outside partners.

ZERO HUNGER/ZERO WASTE

The Kroger family of companies supports the direction and collaborative approach of the United Nations Sustainable Development Goals (SDGs). We recognize the importance of these collective Global Goals in achieving a future toward which we all strive—where we can sustain, nourish and empower our growing world population while protecting our planet. Due to the size and nature of our business, we believe Kroger is uniquely positioned to contribute significantly to several key SDGs.

Kroger’s Zero Hunger | Zero Waste social impact plan plays an important part in our support of global sustainable development. Our bold plan shares our commitment to end hunger in our communities and eliminate waste across our company by 2025. Zero Hunger directly aligns with our target to donate 3 billion meals by 2025, which is five years ahead of the Global Goal. Responsible Consumption and Production aligns with our goals to achieve zero waste in our operations by 2020, zero food waste across our company by 2025, and to improve the sustainability of our product packaging.

Source: <http://sustainability.kroger.com/Kroger-2019-ESG-Report.pdf>

THE PROBLEM

DEFINITIONS

FOOD WASTE: According to the United States' Department of Agriculture, "food waste" is defined as "the edible amount of food, postharvest, that is available for human consumption but is not consumed for any reason."^[1] This food may be wasted as a result of improper storage within a facility, an inability to be sold or decomposition within consumer fridges. Food waste includes food scraps, leftover food, and any unconsumed food that gets disposed of via landfill. What is concerning, is that food waste is almost entirely food that could have otherwise been recycled or composted.

... 'food waste' is defined as "the edible amount of food, postharvest, that is available for human consumption but is not consumed for any reason."

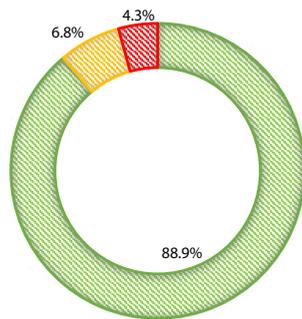


Source: <https://www.zerowastechurch.org/2017/11/01/november-reducing-food-waste/>

FOOD INSECURITY: Food insecurity can be described as the lack of consistent, sufficient food necessary to live a healthy lifestyle. Food insecurity is a very complex problem. A food insecure household is one that does not have access to enough food, especially healthy food, to meet the needs of those living within the household. This is usually due to a lack of income, a lack of nearby grocery stores, a lack of affordable transportation or a combination of all three. In 2018, about 11% of US households were food insecure at some point throughout the year^[2].

In 2018, about 11% of US households were food insecure at some point throughout the year

- Food-Secure Households
- Households with Low Food Security
- Households with Very Low Food Security



Source: <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx#foodsecure>

1. <https://www.usda.gov/oce/foodwaste/faqs.htm>
 2. <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx#foodsecure>



FOOD RECOVERY/FOOD RESCUE: Food recovery/rescue is an essential outlet that exists between when an individual discards a food item, and when that item is defined as food waste. Food waste is traditionally not consumed by humans, and most often follows routes to either feed animals, or becomes compost (ReFED). It is for this reason that food recovery must exist, and is a critical component to the food cycle. Recovery can take place through donations of safe-to-eat food from stores or by individual consumers before it is discarded.



Source: <https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy>

Recovery can take place through donations of safe-to-eat food from stores or by consumers instead of just throwing it away.

3. <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx#foodsecure>
 4. <http://sustainability.kroger.com/Kroger-2019-ESG-Report.pdf>
 5. <http://www.fao.org/food-loss-and-food-waste/en/>

NEEDLESS HUNGER

Food waste is a significant problem in the United States. It is estimated that anywhere between 30-40% of our food supply is thrown away as food waste^[3]. Hunger impacts about 12% of the population in the US, and if one third of the food that is wasted was redistributed to those who needed it, no one would be food insecure^[4]. Half of food that is wasted comes from the production and growth portion of food development. This is food that is either not picked because it is not deemed satisfactory, or its quality is impacted on its journey from location to location^[5]. The other half of food that is wasted comes from the industrial and consumer end. Industrially, there are restaurants and stores that are wasting food that either goes bad before it sells or is left over by the customer. On the consumer end of this, the food that is wasted is anything that is thrown out in the home, ranging from spoiled food, to food that just wasn't consumed. This means that food waste is created every step of the way from the farm to your table. If a part of this food was relocated to food pantries and other places of food

... food waste is created every step of the way from the farm to your table.

THE FLAWED FOOD SYSTEM



Source: Rethinking: Rebooting the Food System
 Anthony D-Christine Grillo - JH Bloomberg School of Public Health - <https://magazine.jhsph.edu/2016/summer/forum/rethinking-rebooting-the-food-system/>

As a bigger part of the issue, food waste and habits concerning food in America are partially a cultural and social concern.

redistribution, food insecurity could be much less of a problem. A major reason for food waste and the fact that only a few actions are being taken to address it can be explained by the general lack of education on the topic and the lack of awareness about the harmful impact it has on the environment and on society. Reducing this burden that we place upon ourselves as consumers is no easy task since wasteful behavior is ingrained within the American way of life. The United States is, as a whole, a food secure country. A large proportion of people are unconcerned about where their next meal is coming from, so wasting food is not an issue for them. There is also an excess of food in many grocery stores, so for most of us, the availability of food is taken for granted. But for 12% of the US population food insecurity is a constant concern.

ENVIRONMENTAL IMPACTS



Food waste has a significant negative impact on the environment.

CONTRIBUTION TO GLOBAL WARMING: Food, which is usually comprised of organic materials, emits greenhouse gasses when it begins to decompose.* Food in landfills primarily emits methane, which is considered to be a more potent and powerful greenhouse gas than carbon dioxide. In the United States, 14% of the greenhouse gas emissions are related to food production.⁶ Finally, when uneaten food reaches landfill, it breaks down and produces 25% of all methane gas emissions in the United States.

LOSS OF RESOURCES: In addition to polluting the Earth after it has been discarded, the act of producing excess food also has a negative impact on biodiversity, water, and land. Resources, like oil, that go into making the food is also wasted as the food that was produced is wasted.⁹ That is about 133 billion pounds of food every year and equates to wasting an entire meal's worth of calories per person each and every day.¹⁰ This is coupled with the fact that 25% of the freshwater resources that are used to create food are wasted

when that food is thrown away. 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. 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.⁹

"By throwing out one kilogram of beef, 50,000 liters of water that were used to produce that meat is wasted."

*Greenhouse gases prevent energy from leaving the atmosphere in the form of heat, so that heat in turn heats up the surface of the earth ("Understanding Global Warming Potentials"). The methane gas that is being produced also creates a hole in the ozone layer allowing for more UV rays from the sun to get into the atmosphere.¹¹

Food waste is the third largest producer of methane gas (after United States and China)

LOSS OF LAND: Wasted food also requires space. Roughly 300 million people in America produce 3.5 pounds of trash⁷ 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 feet. According to the United Nations, the world population is expected to continue to grow, reaching 9.7 billion by 2050.⁸ 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, thus saving the loss of land to landfills and excessive production.

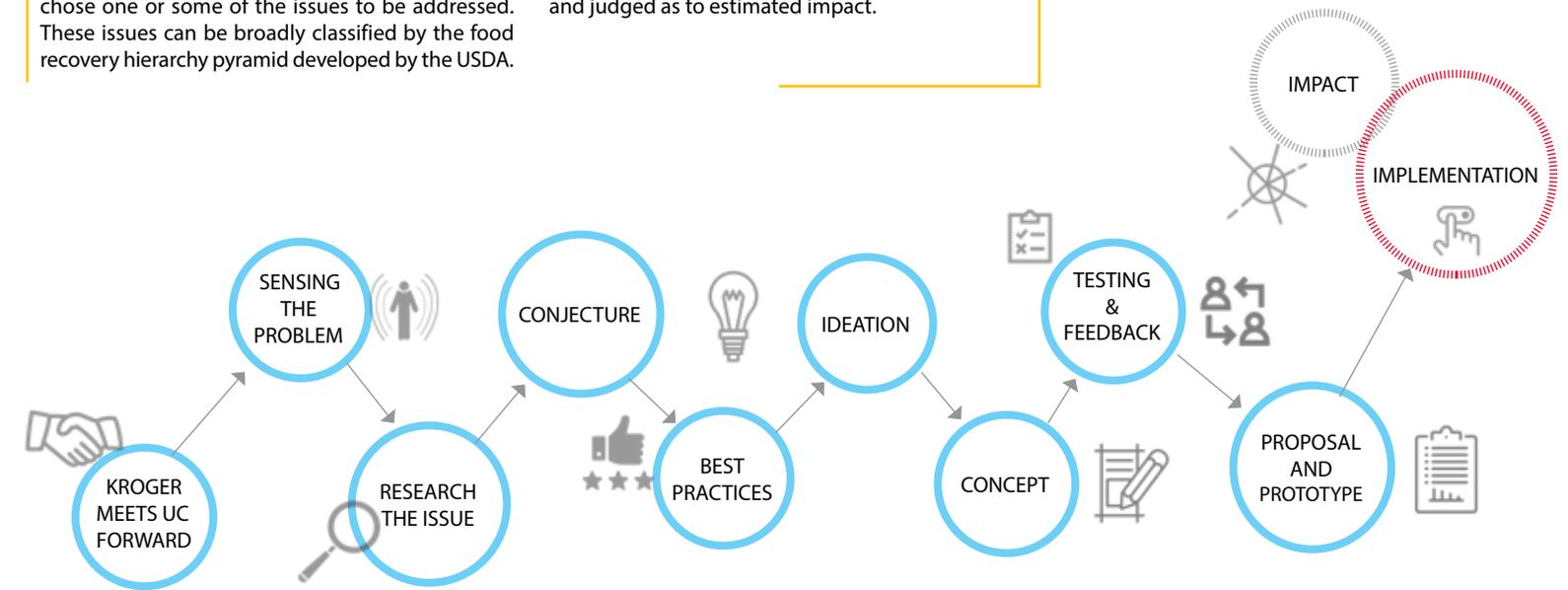


Source: <https://www.thinkeatsave.org/environmental-impact-of-food-waste-in-the-us/>

CLASS PROCESS

To begin the classwork, Kroger ZH/ZW collaborators and area food recovery advocates introduced the problem to the class. The first step for the students was to understand the extent of the issue. This included comprehension of the problem and in-depth research about its causes, results and its magnitude. Once the research was conducted, a number of issues came into focus and then students chose one or some of the issues to be addressed. These issues can be broadly classified by the food recovery hierarchy pyramid developed by the USDA.

Teams then developed a conjecture as to how they would address the observed problem on and around campus. Students documented relevant precedents and distilled best practices. Concepts were developed and then feedback was collected from a variety of on- and off campus stakeholders. This was followed by drafting of a final proposal and the design of prototype programs which were tested and judged as to estimated impact.



6. <http://www.fao.org/3/i3347e/i3347e.pdf>
 7. <http://www.ecoclean.in/whatisaveragewastegeneratedbyahumanbe>
 8. <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019>
 9. Paslowski, Dana. "The Environmental Impact of Food Waste." Move For Hunger, Move For

Hunger, 19 Aug. 2016, <https://www.moveforhunger.org/the-environmental-impact-of-food-waste/>
 10. "Reducing Food Waste." U.S. Representative Chellie Pingree, <https://pingree.house.gov/foodwaste/>.
 11. <https://www.epa.gov/ozone-layer-protection/basic-ozone-layer-science>

UNIVERSITY SCENARIO

A college campus is a unique microcosm for studying food waste and insecurity. Universities draw students from a wide variety of backgrounds; often times, you have students who come from privilege and those who come from food unsure environments living next door to each other.^[12] Every year, about 22 million pounds of food is wasted on college campuses.^[13] While this is occurring, 1 in 3 college students are food insecure.^[14]

An estimated twenty percent of students on the University of Cincinnati's campus are considered "food insecure."^[15] This could amount to 8,000 students experiencing a lack of adequate financial resources or consistent access to enough food for an active, healthy lifestyle.

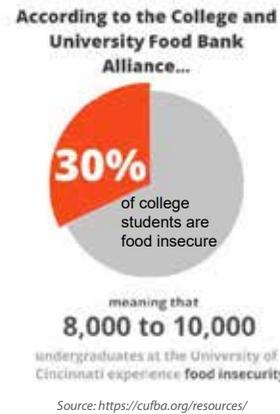
Every year, about 22 million pounds of food is wasted on college campuses

It was estimated that of the 130 billion pounds of food waste that is sent to the landfill each year nationally, 22 million pounds come from college campuses. Dividing that by each student that is in college, each student wastes roughly 142 pounds of food each year. Mathematically, if each student were to waste 90 pounds of food each year and donate the other 50 pounds, no student at the University of Cincinnati would struggle with food insecurity.^[16]

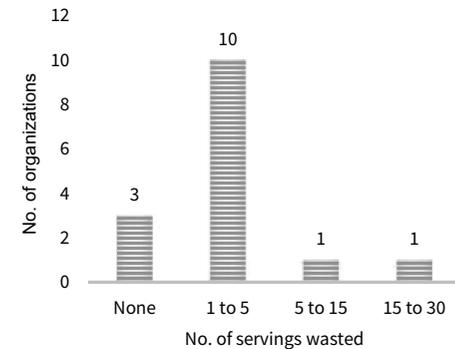
STUDENT ORGANIZATION EVENTS: There are many locations on campus that food waste can come from. Primarily, the food waste is going to come from individuals who are throwing away food they don't eat, and secondarily from the dining halls throwing out food that they don't use. Another source of food waste comes from the events organized by student organizations.

Class research estimated that as much as 4000 lbs of food are thrown away during student organization events on campus each year. This was based on 17 survey responses, that indicate that up to 95% of all student organizations produce some food waste every month, with most organizations reporting holding one or more events per month. With approximately 550 student clubs registered on University of Cincinnati's

Although a large number of college students are facing food insecurity, an estimated 4000 lbs of food are thrown away at student organization events on the University of Cincinnati campus each year.



FOOD WASTE FROM ORGANIZATIONS



student organization website this could mean that up to approximately 1700 servings of food go to waste every academic year. The survey also allowed us to gauge student organization's interest in the food waste crisis, proving that although many did not know it was a serious issue, the majority were willing to help promote awareness about food waste on campus.

However, rescuing left over food from student organization events is challenging. Not all events have a fixed location or meeting time, the amount and type of leftover food is highly variable and the food served at these events cannot typically be repackaged and stored for an extended amount of time.



CURRENT MEASURES: The University of Cincinnati's dining services wastes more than 12 tons of served and unserved food per year. UC Dining services has made significant strides in reducing food waste with "trayless" dining and most recently with "Lean Path" waste auditing system which reduces pre-consumer waste by as much as 65%. Yet an appreciable amount of unserved food at UC Dining halls remains available for rescue and consumption by food insecure students and others.

Food insecure students have access to an important resource at UC. The Bearcats Pantry is a distribution center for donated canned and dry goods established in 2016. The goal of the Pantry is to assist students in need by cutting down their grocery bills and connecting them to other resources in an effort to promote independence. The UC Bearcats Pantry provides free food, hygiene items, cleaning supplies, and professional clothing to students of all backgrounds. The pantry also provides meal vouchers donated from other students as dining hall "swipes" that can be used by needy students at campus dining halls. The Pantry also provides "To-Go Bags" that can be conveniently picked up at locations across campus. The Pantry is located inside Stratford Heights Building 16, at the edge of campus. For the Pantry's inventory, dry goods donations are received from UC faculty and students a few times throughout the year. According to Jessie Fix (Graduate Assistant at Bearcats Pantry), when the UC Sustainability Community Garden is in season, they will donate some produce to the Bearcats Pantry and store it in their mini-fridge after sending an e-mail to food insecure students. Currently the Bearcats pantry is unable to take perishable goods due to their lack of refrigeration.



Image inside the Bearcats Pantry

Donations are usually brought directly to the Bearcat Pantry, with collaborating academic departments on campus, periodically hosting a food drive and volunteers delivering the collected dry goods to the Pantry. Additionally, the Bearcats Pantry has been collecting canned goods at UC football games, with the assistance of UC President Neville Pinto, and for a period of time the Pantry used University Nightride vehicles to transport these goods to their location at Stratford Heights.

The Pantry is well served by volunteer student staff. 633 students volunteered for shift work manning the Bearcats Pantry during the 2018-2019 school year. Many more students want to volunteer, but the pantry has a limited inventory and does not currently have the capacity to manage any more volunteers.

The UC Bearcats Pantry provides free food, hygiene items, cleaning supplies, and professional clothing to students of all backgrounds with food and other insecurities. The pantry also provides meal vouchers that can be used at campus dining halls and To-Go Bags that can be conveniently picked up at locations across campus.

12. Paslowski, Dana. "The Environmental Impact of Food Waste." Move For Hunger, Move For Hunger, 19 Aug. 2016, <https://www.moveforhunger.org/the-environmental-impact-of-food-waste/>
 13. <https://www.foodrecoverynetwork.org/blog/2016/1/27/frn-featured-on-food-tank>
 14. <https://www.swipehunger.org/whycollegehunger/#the-issue>
 15. "Bearcats Food Pantry." University-Wide Initiatives, University of Cincinnati, 2019.

<https://foundation.uc.edu/02-areas-to-support/university-wide-initiatives/bearcats-food-pantry>
 16. Donachie, Pat. "Colleges Combat Food Waste through Innovation, Dedicated Buy-In." Education Dive, Industry Dive, 20 Nov. 2017, <https://www.educationdive.com/news/college-combat-food-waste/510987/>.

17. Ruiz, Lizbeth. "University of Cincinnati Study." University of Cincinnati, www.uc.edu/cdc/publications/technical_reports/food_system_reportf.pdf.

18. <https://www.uc.edu/campus-life/food/about/sustainability.html>

19. <https://www.uc.edu/campus-life/dean-of-students/bearcats-pantry.html>

CASE STUDIES

The case studies conducted by students focused on three elements of the food recovery hierarchy - reduction at source, recovery and redistribution, and composting of food waste. Each of the issues were found to have been addressed through different means. Based on the case studies, best practices were inferred which in turn helped in formulating the student proposals in the next stage.

CURRICULUM

The World Wildlife Foundation has waste prevention curriculum for students of middle and elementary school. It provides lessons, activities, and resources to share how what we eat and what we throw away impacts our planet by creating a classroom in the cafeteria. Interviews with UC course professors from environmental studies, honors program, service-learning, uc forward, and urban studies also provided models for relevant coursework.

Take Away: Best Practices for a course design - Experiential learning, service-learning, community engagement, interdisciplinary enrollment, thoughtful reflection, innovative structure, and holistic curriculum.



Source: www.worldwildlife.org/teaching-resources/toolkits/food-waste-warrior-toolkit

INFORMATICS

In 2017 University of Cincinnati incorporated a food waste measuring App called LeanPath (in two dining centers) that tracks the amount of food wasted. Food waste was reduced by 65% in less than a year.

Michigan State employed a similar service in 2012 called Clean Plates that tracks down the waste of individual students. 20% of all returned food had no waste.

Take away: IT applications exist to provide students feedback on exactly how much food waste is being generated by them.



Sources: <https://www.leanpath.com/solutions/>, <https://eatatstate.msu.edu/node/874274>

UNIVERSITY EVENTS

Penn State held an event called Food Waste Awareness Week through discussion and enlightenment of students about food waste on campus through showcasing a movie on food waste and hosting meals serving food created through sustainable means. The event was solely student run so multiple clubs were involved

Take away: Involving student organizations in sustainable dining hall practices creates awareness of food waste issues.



Source: <https://www.studentfarm.psu.edu/2018/03/13/food-waste-awareness-week/>

REDUCTION AT SOURCE

MARKETING CAMPAIGN

In 2017, UC rolled out a policy called "Tobacco Free UC." This policy's intended purpose was to prohibit the use of tobacco anywhere on campus. This policy applies to all students, faculty, staff and visitors that are within the boundaries of the campus. This policy has seen significant backing, and it has caused a dramatic change in the culture at UC.

Take away: Policies can quickly and effectively change the university culture.



Source: <https://www.uc.edu/hr/bewelluc/tobaccofree.html>



RECOVERY AND REDISTRIBUTION

NOTIFICATION APPS

The Lunchbox app is popular in six universities in Utah, and it continues to expand. It posts events on campus with free food to serve food insecure students.

The Feeding Forward program system was created in California. When corporate business events have food left over, a business representative can notify Feeding Forward. A volunteer from Feeding Forward will take the food from the event to a homeless shelter nearby, thus ensuring the food is not wasted. To date, Feeding Forward had saved over 652, 119 pounds of food

Take aways:
Use of App notifications have high potential to promote and support food rescue action.



Sources: <http://universitylunchbox.com/#about>, <https://callink.berkeley.edu/organization/feedingforward/gallery/album/36645>

PARTNERSHIPS

The University of California at Irvine has a partnership with Aramark that diverts around 80 percent of its food waste from landfill. The leftover food from dining halls goes directly to people in need in the community. The UCI staff follow Aramark's food donation guidelines to package the food and then work with The Food Donation Connection (FDC) which manages a network of local food relief agencies to redistribute food.

In 2015, Rush University Medical Center started the Surplus Project where leftover food from the hospital goes to one nonprofit that serves the homeless. Food is packaged by hospital nurses who volunteer to help. Food is assembled into meals that include a protein, starch, and a vegetable. The food is transported by Rush's shuttle to the local nonprofit. The project reduced the food waste to less than half.

Take aways:
Institutions can successfully partner with non-profits to redistribute excess food.

Using personal vehicles for transportation is contradictory to its goal of minimizing environmental impact.



Sources: <https://sustainability.uci.edu/sustainablecampus/foodservice/>, <https://www.rush.edu/news/press-releases/rush-surplus-project-feed-more-2019>

NETWORKS

Students at Case Western Reserve University (CWRU) established a local chapter of the Food Recovery Network, a national organization that seeks to establish student task forces to divert edible food waste around university communities from landfill. The CWRU Food Recovery network diverted approximately 250 pounds of edible food waste per week in 2017. The Food Recovery Network includes retail locations, such as Einstein Bagels and Dunkin Donuts, campus dining halls, and even the Cleveland Clinic. The CWRU Food Recovery Network also holds educational events about the environmental impacts of food waste.

Take aways:
Being a part of a larger network of organizations for food waste management is a good strategy to divert wasted food in universities.



Sources: <https://observer.case.edu/food-recovery-network-channels-food-waste-to-the-ones-in-need/>, <https://www.facebook.com/CaseFRN/photos/p.2488458434716972/2488458434716972/?type=1&theater>

HOLISTIC APPROACHES

The Ohio State University established the OSU Food Waste Collaborative as a coordinated effort between students and faculty to combat food waste in a variety of ways. As a student-led initiative with faculty support, the program has grown immensely since its conception. On the student side of the OSU Food Waste Collaborative, the students established a local chapter organization of the national Food Recovery Network. The mission of the OSU Food Recovery Network is to unite OSU students to recover the surplus, unsold food from campus dining halls, local farms, and local businesses to donate to food banks and charities around Columbus.

Outside of the student organization that is involved in food recovery, there are also faculty-led research initiatives regarding anaerobic digestion of food waste, among other projects, and consulting other food waste reduction efforts on best practices. The OSU Food Waste Collaborative utilizes a Nissan Leaf (an electric vehicle) to transport uneaten food waste from dining halls to nearby food pantries. Additionally, students at OSU earned \$200,000 in funding to put towards their food recovery mission. This funding came from Engie, a French energy company, and Transitus, an Ohio based non-profit focused on innovative solutions to common problems. OSU provides as a stellar example for what food recovery at UC has the potential to become, given adequate university and local support.

Take away:
A joint approach from the students and faculty, along with support from university can create an exemplary system of food waste management.

Source: Roe, B. (n.d.). OSU Food Waste Collaborative. The Ohio State University. Retrieved from <https://u.osu.edu/foodwaste/>



Source: <https://www.flicr.com/photos/146130019@N04/albums/72157676135305030/>



Source: <https://u.osu.edu/foodwaste/food-waste-photo-competition/>

OSU FOOD WASTE COLLABORATIVE



COMPOSTING

Ohio University collaborated with Rural Action and the Voinovich School of Leadership and Public Affairs as part of the Appalachian Ohio Zero Waste Initiative. OU became home to the largest in-vessel composting facility in the nation.

The University of Louisville has programs in place to help students recycle, reuse, compost, and reduce their waste, creating a highly standardized model for other universities to try and achieve.

At George Washington University student organizations are required to sign a contract, agreeing that they will donate or compost any leftover food. The campus has begun a composting initiative so students can easily bring their scraps to a central location on campus.

Harvard has begun its attempt to reduce food waste by drafting a 5 year sustainability plan.

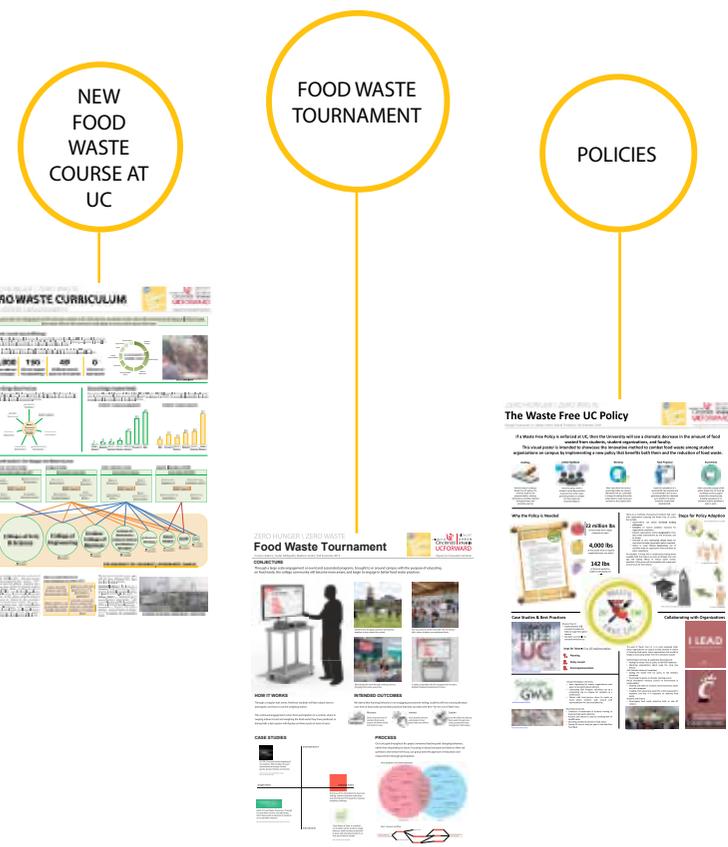
Take aways:
A large scale composting Facility is a high cost infrastructure project and thus, the university has to play a leading role in it.

Without the possibility of a reward, it is hard for most people to gain traction for an idea.

Sources:
<https://www.ohio.edu/voinovich-school/news-resources/news/ohio-epa-awards-ohio-university-grant-expand-zero-waste-efforts>
<https://louisville.edu/sustainability/operations/solid-waste-management>
<https://sustainability.gwu.edu/waste>
<https://green.harvard.edu/tools-resources/how/tactics-reduce-food-waste>

STUDENT PROPOSAL AREAS

AWARENESS - REDUCTION AT SOURCE



SYSTEMS - FOOD RECOVERY & REDISTRIBUTION



PROJECT 1

AWARENESS: CURRICULAR CHANGES AT UC TO PROMOTE FOOD WASTE AWARENESS

Akiva Kirschner, Ellie Glover, Paige Sumser



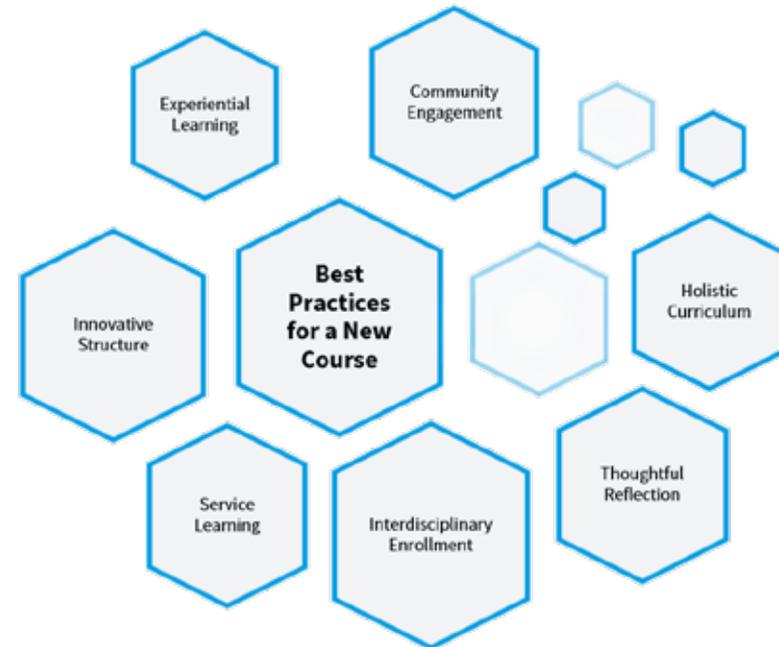
STUDENT CONJECTURE

If opportunities are integrated into the education system at UC that allow for students to learn about the environmental impacts of food waste, then they will have the awareness and ability to reduce their impact.

Currently, no courses at UC on Food Waste are available to undergraduate students

PROCESS

Students in this team conducted extensive research on existing course offerings, degree programs, micro-credentials, and general undergraduate education requirements at UC. This included documenting individual courses from the UC course catalog for content related to sustainability, food, and food waste. A student survey was conducted to determine interest and preferred course characteristics. Consultations with faculty and academic Program Directors identified barriers and provided direction for ideal course learning outcomes and curricular fit. A model shell course syllabus was developed and academic program hosting identified. A marketing and recruiting strategy was explored.



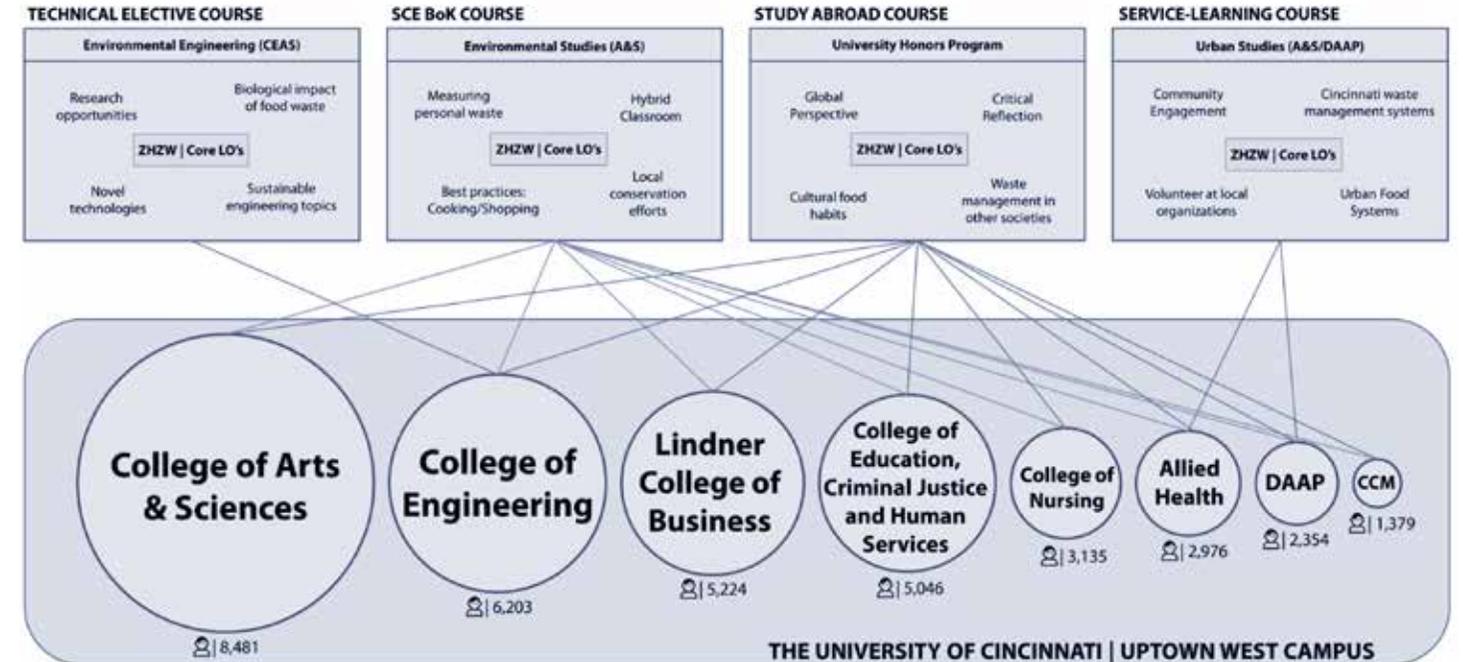
PROPOSAL

Develop special permanent course offerings in the UC curriculum that support awareness about food waste and its impact. Facilitate the special course offerings in multiple programs by developing a "shell course" with core learning outcomes that can be extended for specific

program curriculum. With UC enrollment at more than 46,000, even minimal enrollment in these proposed courses would promote awareness and lifelong best practices to reduce student food waste which is documented at 142 lbs/yr.



Develop special permanent course offerings in the UC curriculum that support awareness about food waste and its impact.



AWARENESS: STUDENT AWARENESS EVENT AND ONGOING EDUCATIONAL PROGRAMS ABOUT FOOD WASTE

Madison Grote, Sudarsana Addepalli, Conner Adams

STUDENT CONJECTURE

Through a large scale engagement or event and associated programs, brought to campus with the purpose of educating on food waste, the college community will become more aware, and begin to engage in better food waste practices.

PROCESS

Both a singular campus event and an ongoing extracurricular student program were envisioned to promote awareness of food waste at UC. Existing UC campus student events were surveyed and case studies were conducted of student focused awareness events existing at other institutions. Program content was explored and waste measurement practices were considered, including UC Dining Service's Lean Path program. Measurement and communications were designed and equipment specified for a "gaming" approach in a competition among students to minimize food waste in UC Dining Halls. A social media and communications strategy was proposed to situate the competition among first year student residence halls with the support of a recognition and awards program.

ENTERTAINMENT

- CONCERT
- FREE SWAG
- ATHLETIC
 - sumo suits
 - hamster runners
- MARIO KART/VIDEO TOURNAMENT
 - nippert
 - online?
- MOVIE SHOWING
- SOCIAL MEDIA
 - poster/fl ers
- PAC?
- ZIPLINE (HAPPENS ON SIGMA SIGMA)
- MOVIE SHOWING

- EARTH DAY?
- COOK OFF
- EDU-TAINMENT
- DOCUMENTARY ON FOOD WASTE
- COOKING HOT MEALS

- CHANGING HABITS - BEHAVIORS
- EXPIRATION DATES ARE GUIDELINES
- FOOD JOURNALS
- PROMOTE NEAT FRIDGE ETIQUETTE
- EDUCATION ON WHERE TO STORE FOOD
- PORTION CONTROL
- DEALING WITH LEFTOVERS
- FOOD WASTE FORUM
- TYPES OF FOOD TO BUY
- FRIDGE MANAGEMENT
- SUSTAINABILITY/COOK

EDUCATION



Create a student competition among UC residence halls to minimize food waste generated by student dining hall practices.



Measure

Direct measurement of students food waste impact will inform about the systemic issue.



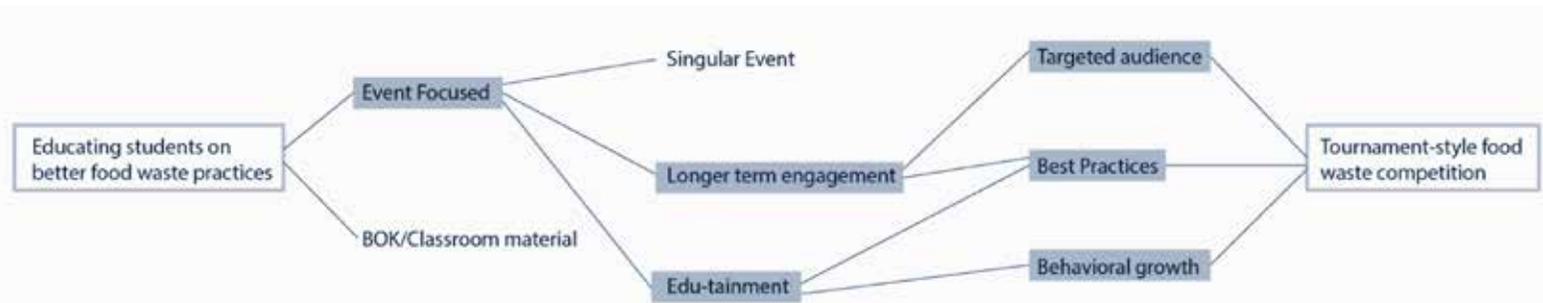
Interact

Have students directly participate in food waste reduction efforts.



Sustain

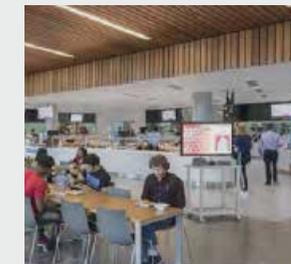
Grow the effort of reducing food waste through practicing sustainable waste management techniques.



Kickoff event: bringing residence hall students together to learn about the contest



Advertising the event through existing avenues, bringing food waste awareness



The tournament will be held within the UC dining halls, where students can participate freely



Creating competition for the engagement through a digitally displayed leaderboard contest

PROJECT 3

AWARENESS: FOOD WASTE POLICY FOR STUDENT ORGANIZATIONS

George Encarnacion, Brandi Thomsen, Addi Smith



STUDENT CONJECTURE

If a waste free policy is enforced at UC, then the university will see a dramatic decrease in the amount of food wasted from students, student organizations, and faculty, thus, creating a greener campus culture.

PROCESS

This proposal aims to change the culture of student life by raising awareness of the impact of food waste by designing and putting in place an official university policy on food waste. Students and existing student organizations were surveyed to determine food waste volume and willingness to adopt a food waste policy. Case studies were conducted of similar policies both at UC and at other institutions. Model policy form and UC implementation procedures were researched. A model policy was drafted and tested with UC administrators and student organization leadership. Finally an implementation and marketing plan was developed for branding and communications strategies for the policy.

WHY POLICY NEEDED?

 **22 million lbs**
of food waste from college campuses per year!

 **4,000 lbs**
of food waste from UC student organizations per year alone!

 **142 lbs**
of food are wasted by students individually per year!

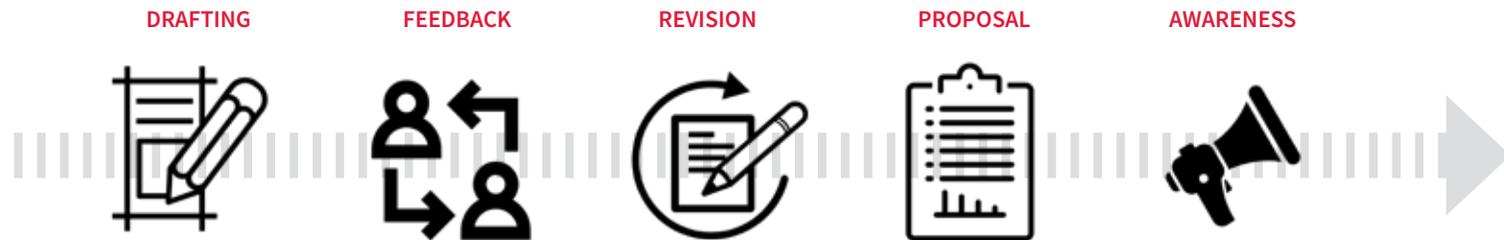


An official University policy to be adopted by student organizations of all types pledging to eliminate food waste in their events

PROPOSAL

An official University policy will be adopted by student organizations of all types pledging to eliminate food waste that results from student organization activities. The policy will be incorporated into the UC student organization handbook and the student athlete handbook. Policy implementation

will include incentives for student organizations to conform. According to student report data, about 4000 pounds of food are estimated to be wasted annually at student organization events. Awareness and a policy for student organizations has the potential to reduce this quantity.



PROJECT 4

RESCUE: ENHANCING A UNIVERSITY-WIDE MOBILE APP TO REDUCE STUDENT FOOD WASTE

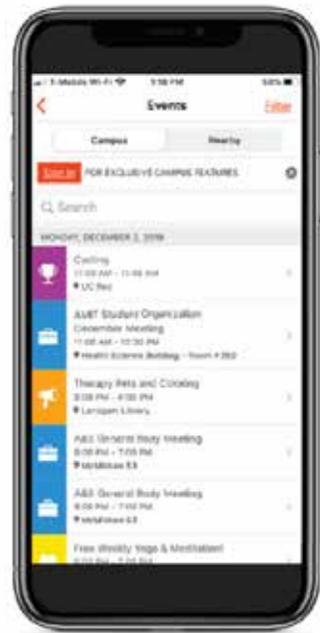
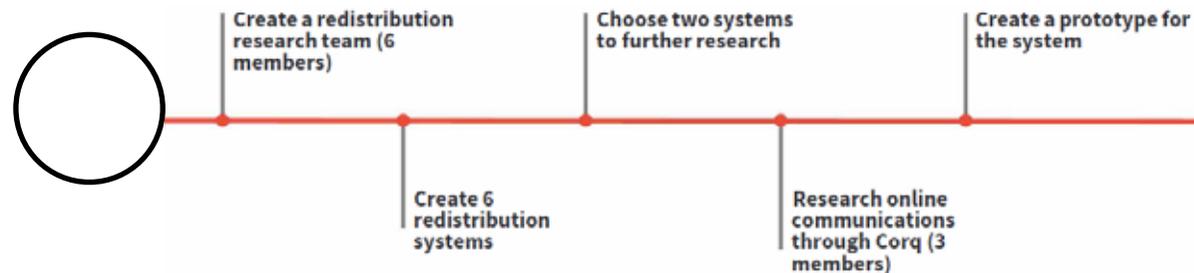
Jacob Peracchio, Grace Thomas, Quang Hoang

STUDENT CONJECTURE

If student organizations are educated to use online communications to manage their excess food, then more food can be redistributed to students and less food waste will be generated on campus.

PROCESS

Student research included identifying the extent of food waste occurring from student organization events through surveys and interviews. Case studies of similar campus communications and redistribution systems were documented. UC campus student communications platforms and mobile apps were examined for functionality and potential adaptation for use. Procedures for using the communication platform and collection of unused food were designed. Finally a concept for "shared tables" was developed for distributing left overs to collection locations throughout campus.



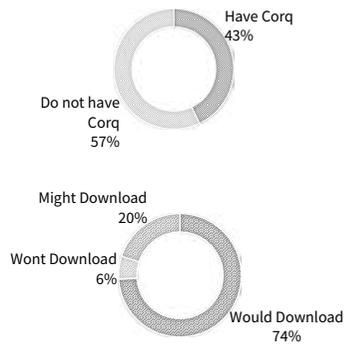
THE CORQ APP

Recently added to University of Cincinnati's campus

Place for student organizations to post about events

Can put "Free Food" tag on events

This aspect can be purposed to advertise left over food



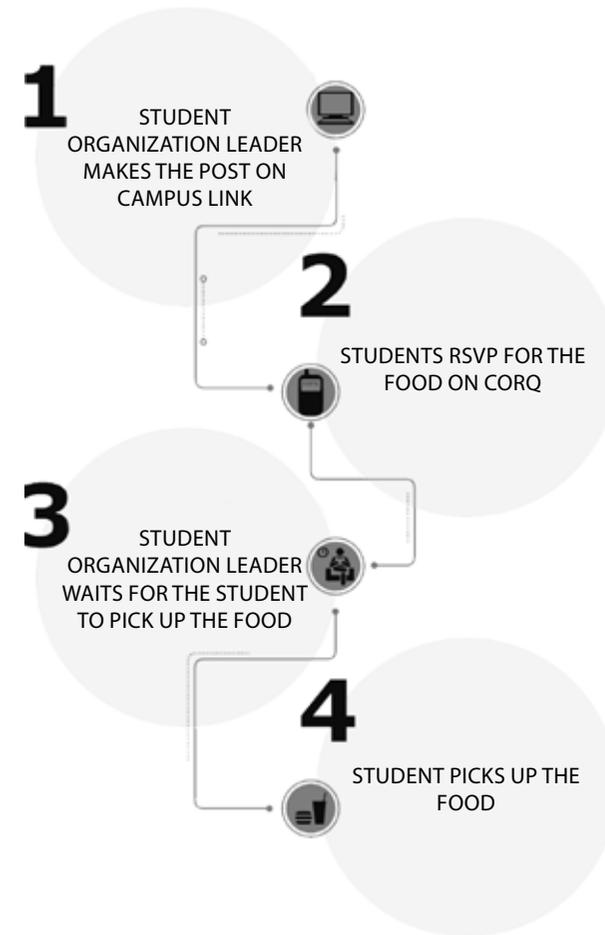
Servings Wasted	Total Org Events	% of Events with Waste
1,700	1030	95%

Yearly Estimate of events with Food Wastage

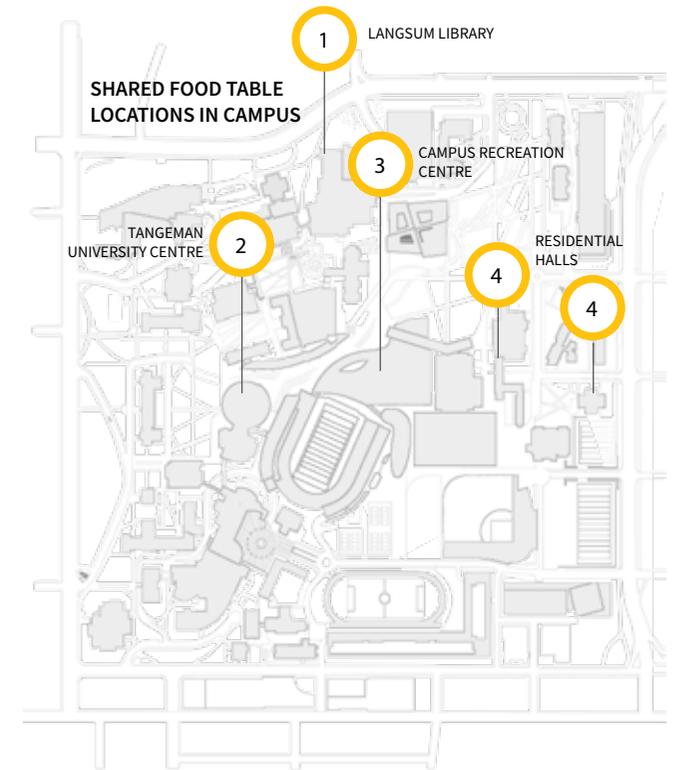
PROPOSAL

Utilize an existing student communication platform, the CORQ mobile app, to facilitate the reuse of leftover food produced by student organizations. This mobile app will allow students to post and seek availability of left-over food from student events. A network of monitored "shared tables" was also proposed to function as drop off locations throughout campus

for easy student access. According to student report data, about 4000 lbs of food are estimated to be wasted annually at student organization events. Facilitating rescue and redistribution of left-over food generated at student organization events has the potential to reduce this quantity significantly.



A network of monitored "shared tables" to function as drop off locations for food left over from student organization events



PROJECT 5

RESCUE: FOOD RESCUE AT UC DINING SERVICES FOR LOCAL NON-PROFITS

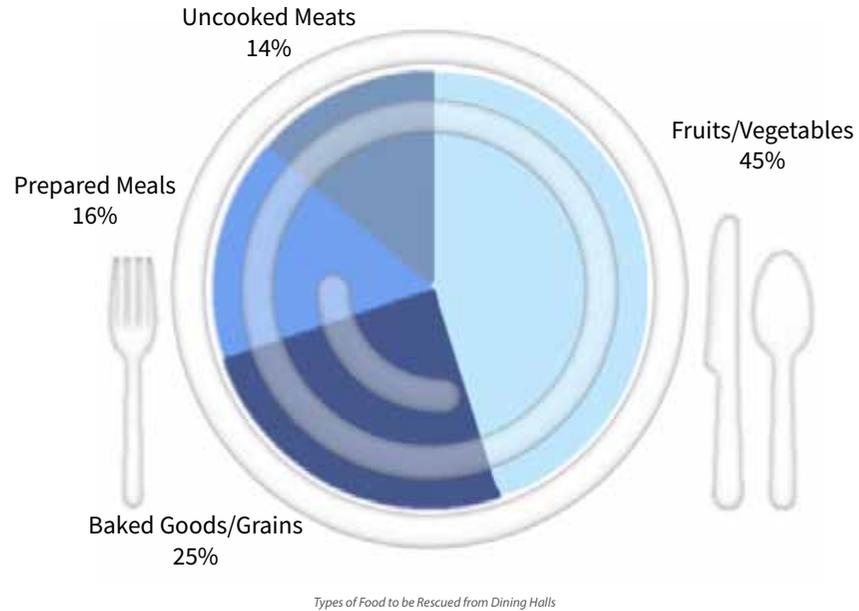
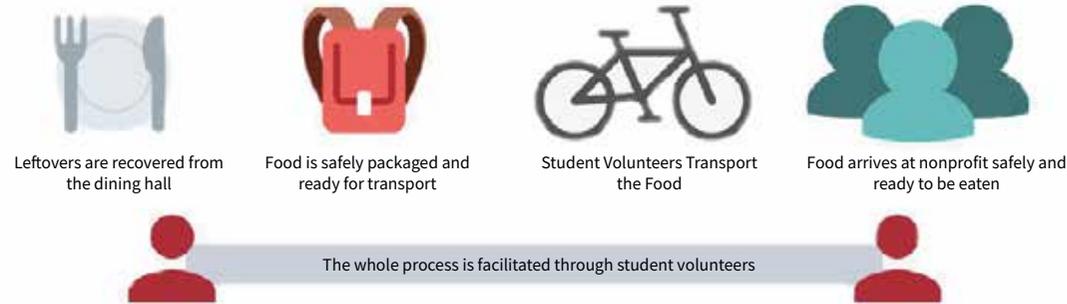
Sahaja Ampolu, Emma Duhamel, Nithya Trichy

STUDENT CONJECTURE

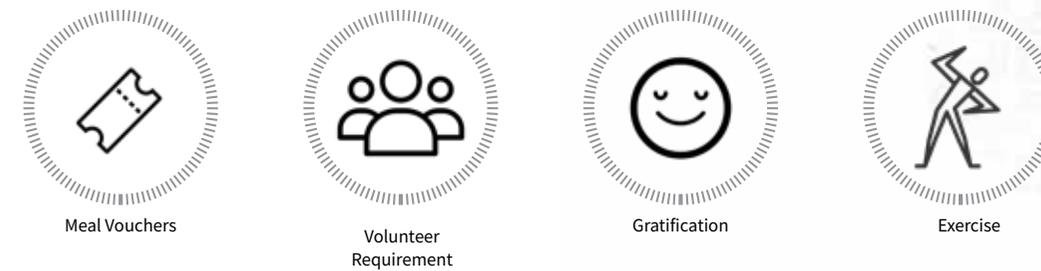
If a system involving the safe packaging of unserved food from dining halls and efficient redistribution to local nonprofit organizations is implemented at the University of Cincinnati, then the amount of food waste produced by dining halls would decrease and the amount of food available to the hungry in the greater community would increase.

PROCESS

Students studied Dining Hall practices, consulted UC/Aramark staff, and surveyed students about food waste awareness and interest in volunteering in a student organization for the redistribution process. Case studies of similar programs were considered, safe food handling processes were reviewed, along with existing regulations and limitations on food reuse. Local non-profits were profiled and solicited to receive rescued food. Finally a distribution system was designed to be operated by a student organization



Excess food is separated and packaged from Dining Halls and UC then distributed to campus proximate non-profits by student volunteers.

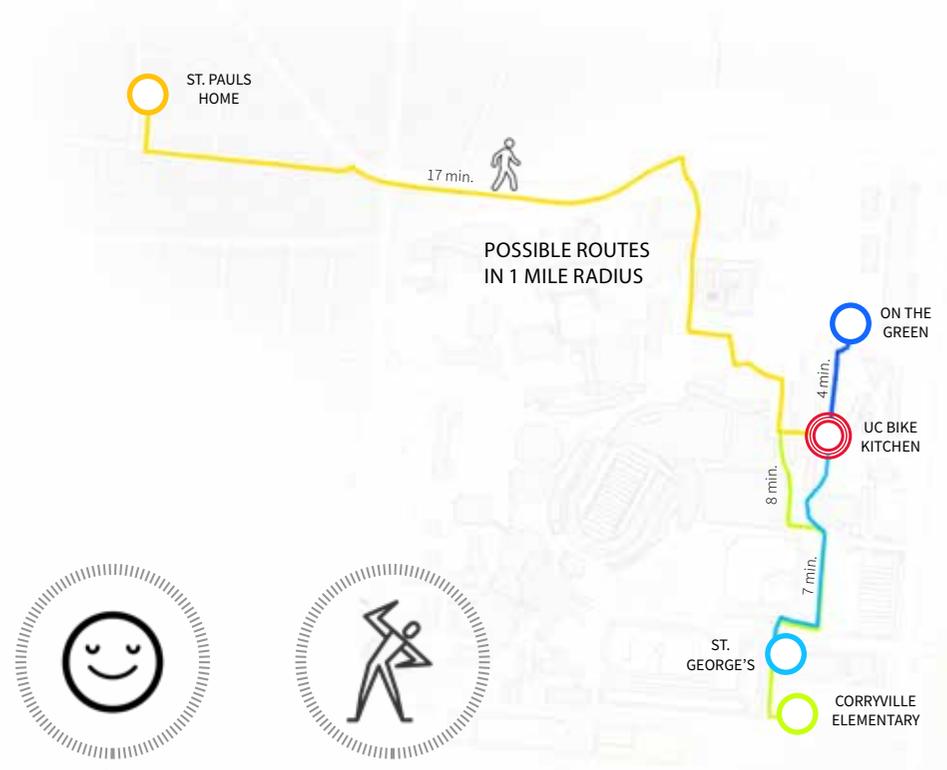


Student Initiatives

PROPOSAL

Trained and paid staff from UC Services/Aramark/Service-Learning Coop separate food to be rescued in the Dining Hall back-of-house prep and delivery area. The food is packaged, blast chilled, and stored in accordance with certified standards to await distribution. A corps of student volunteers then

make timely distribution to campus proximate non-profits that have been certified for safe food handling processes. With 2.5 million meals served annually (UC Dining Services 2019), even a fraction of rescued food available would meet or exceed the needs of receiving non-profit.



RESCUE: ENHANCING THE CAPACITY OF THE BEARCAT PANTRY THROUGH FOOD RECOVERY

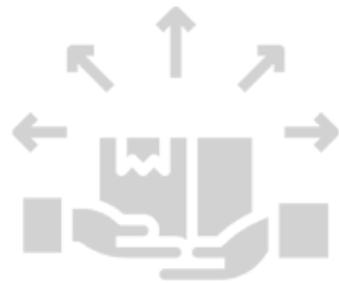
Abbi Wells, Ahmed Ashraf, Seth Reichenbach

STUDENT CONJECTURE

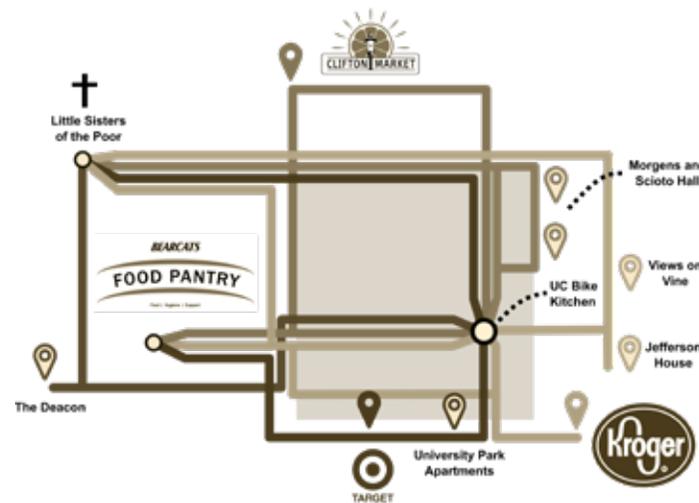
If a reliable collection and distribution system is put in place to divert potential food waste from nearby sources to the Bearcats Pantry (and local service provider Little Sisters of the Poor), then the quantity of food recovered will increase and the number of hungry UC students should decrease.

PROCESS

Students contacted two local grocery stores to determine quantities of weekly food waste. The function and capacity of the Bearcat Pantry was assessed. Students researched student food insecurity and UC student volunteer capacity. Research was conducted in potential distribution systems and transportation modes for student volunteers. Case studies were provided on similar student run campus food rescue and redistribution programs.



Volunteer supply and demand based on current volunteering metric obtained from the UC Center for Community Engagement and the estimated route times of the Bearcats Recovery Network. All routes are assumed to operate once daily seven days a week

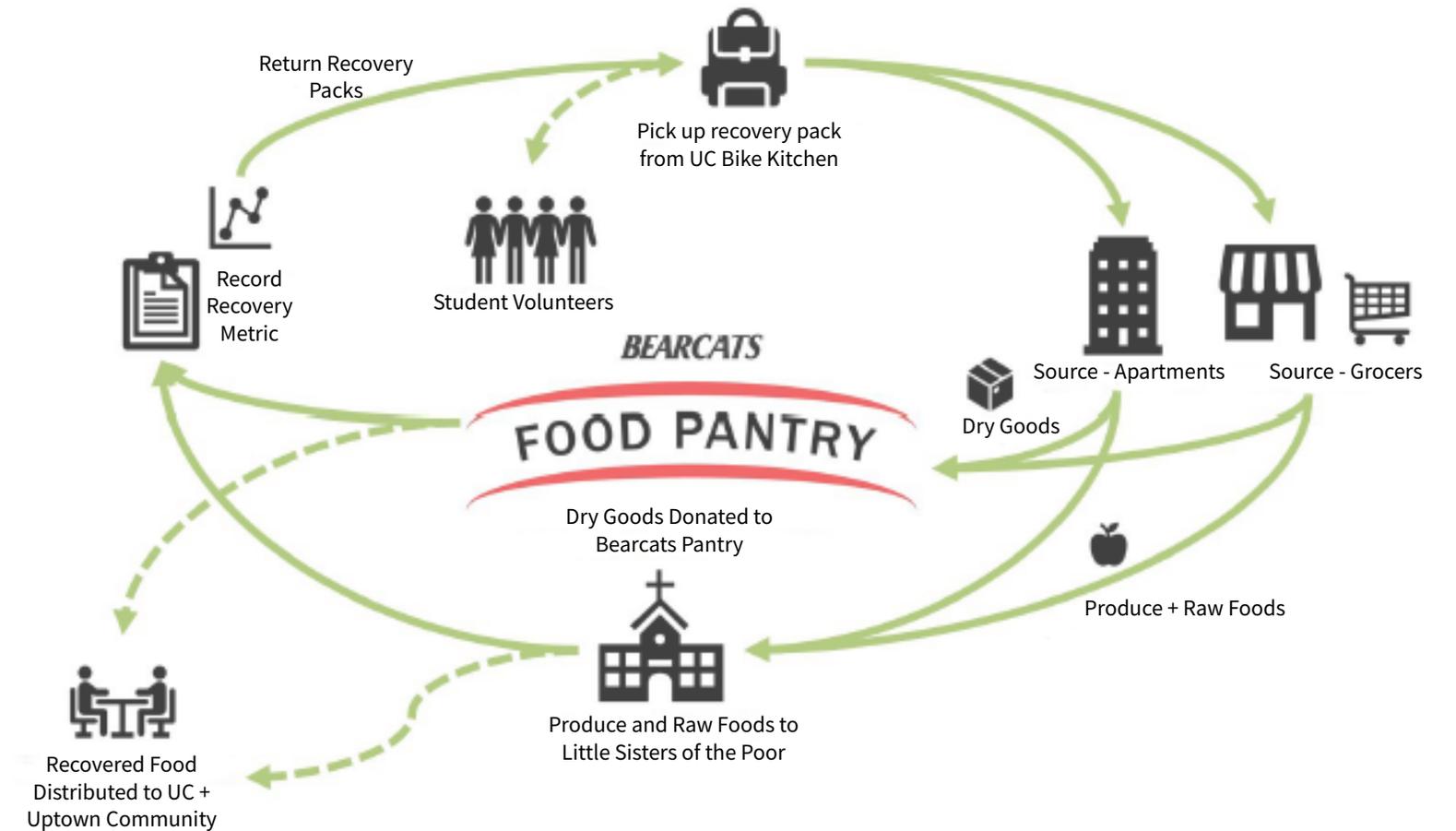


Food Recovery Routes (Distance varies from 2-3 miles)

PROPOSAL

Create the "Bearcat Food Recovery Network" (BFRN) to rescue food from retail food outlets close to campus for redistribution to the Bearcat Food Pantry. The BFRN, a volunteer student run distribution system, is designed around a regular weekly walking route schedule for student volunteers that integrates collection and drop-off around habitual student pathways to and from campus. Distribution capacity includes custom insulated branded backpacks to promote issue awareness. Students estimated that more than 80 lbs of food could be rescued daily from identified food retail sources.

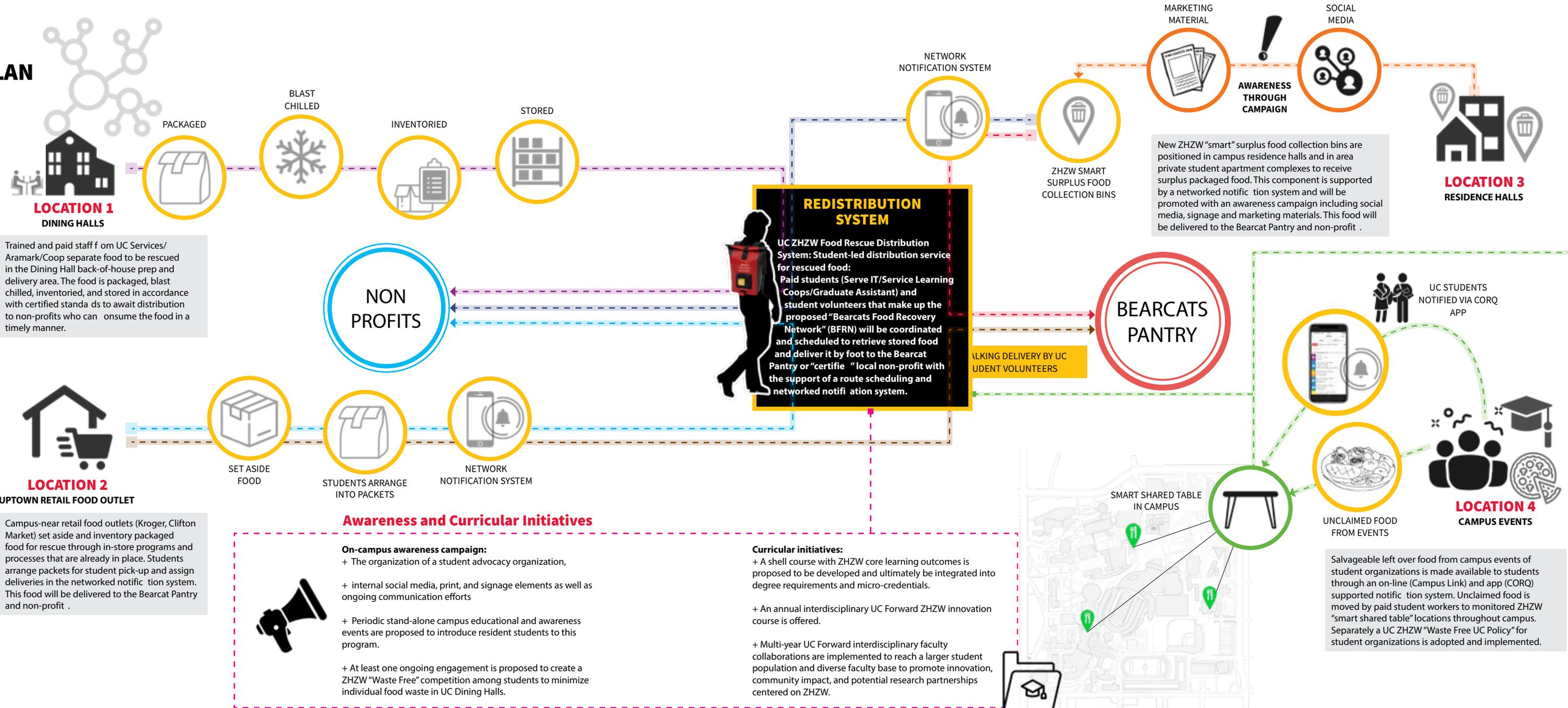
Create the "Bearcat Food Recovery Network" (BFRN) to rescue food from retail food outlets close to campus for redistribution to the Bearcat Food Pantry.



IMPLEMENTATION PLAN

ZHZW @ UC

This proposed 12 month pilot implementation project revolves around the creation of a UC student run distribution system that rescues food from multiple locations in and around campus for reuse by food insecure students, the Bearcat Pantry, and local non-profit organizations. The program will rescue and redistribute food from 4 different sources. It will be supported with a multi-platform networked inventory and notification system for distribution and scheduling. The program will also be complemented by a social media based branding/marketing campaign as well as extracurricular and curricular engagements with students and faculty that will result in a robust campus/community presence and impact for Kroger ZHZW.





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