Composting at UCBA

Jake Beggs and Ren Weller

University of Cincinnati
Blue Ash College

Waste has always been a huge issue in the United States. Accounting for the highest level of consumer waste, the U.S. waste infrastructure is markedly different from other developed countries. Before the 1920's people would slaughter their own animals as sources of food and use all elements of the animal such as the hide, bones, and all of the organs. After the 1920's, due to the evolution of technology, it became easier to manufacture packaging. When pre-cut deli meats became a mainstream method for families to get their meat, the knowledge and skill needed to deal with food waste became absent in the minds of most members of society. Instead, most people were left to deal with the disposable packaging their food would come in. The packaging for food and many other products now would join the same waste stream as production by-products.

The Post War economy thrived from consumption, and the U.S. adapted to a "throw away" culture as convenience containers, such as bottled beverages, became a standard form of consumption. When the bottled beverage was introduced in the late 18th century, it was typically made from glass or stoneware and the companies that manufactured them had deposits to return bottles as they were single serving and not resealable. As the market expanded and branding increased, it discouraged bottle return during the 19th century. As the cost to manufacture bottles increased, companies ended up making little to no profit. Deposits slowly phased out as technology for production and transport evolved, making manufacturing more profitable. In the 1930's new forms of bottles emerged and were promoted as convenience with no requirement to return them and the focus shifted to the consumer. Plastic became more profitable for corporations. As people started to become more aware about the increase of waste in the mid 1960's due to urbanization, a recycling movement emerged in the 1970's in coinciding with the establishment of Earth Day. Despite the emergence of the environmental movement, consumerism grew much faster than progressive tactics to protect the environment.

This has created an "out of sight, out of mind" behavior in American society. Currently, over 28% of all garbage comes from packaging, equating to 82 million tons that is usually thrown out after the goods are purchased, used, or opened. Producers and manufacturers have little to no incentive to build sustainable products, use less packaging, or make packaging easy

to reuse, to recycle, or to compost. It is more profitable for the producer to make goods that are intended to be used once because consumers will continue to buy more after the first use. Producers, distributors, and waste haulers all have a financial stake in the U.S. waste management system to remain the same and have lobbied against change to current operations.

The U.S. produces more than 12% of the entire planet's trash, while hosting only 4% of its population. A large majority of the trash that the U.S. does produce, can be recycled, reused, or composted. Organic materials that can be composted, like yard trimmings, which account for 12.1% of national trash, and food waste sits at 21.6%. When both of these compostable wastes are combined, they make up 33.7% of national waste. In 2016, China was bringing in half of the world's recyclable waste with the goal to feed its manufacturing sector. In that same year, the U.S. gave 16 million tons of recyclables to China. After China banned imported recycling in 2018, the U.S. began exporting waste to other Asian countries. Those countries then instituted bans on imported plastic waste. Now, the U.S. diverts its waste to Cambodia, Bangladesh, Ghana, Laos, Ethiopia, Kenya and Senegal — countries with cheap labor and lax environmental regulations. Ninety-one percent of U.S. plastics were found in landfills, other countries, or incinerated.

In terms of recycling, the U.S. currently has no federal recycling program put in place, and there is little to no investment for recycling infrastructure. Instead, recycling is left to the choices made by 20,000 different communities and programs spread amongst 50 states, where all recycling programs do not operate the same or have the same amount of funding. Another issue with waste is the number of times a container can be reused: glass and metal are the most efficient and can be recycled an infinite number of times. Paper can be recycled five to seven times, but plastic can only be recycled once or twice. Some states are still choosing to act and promote change. Almost a dozen states have banned single-use plastic bags. New Jersey's plastic bag ban is one of the strictest where businesses can be fined up to $5,000 a day for offenses. Several states have banned recyclables from landfills, and in 2020 Vermont became the first state to ban all compostable material from landfills. Nevertheless, without federal aid, sustainable waste management is very inconsistent in the U.S.

A large number of organic materials end up in landfills. This is a problem because when organic waste is added to a landfill, it becomes trapped and doesn't get the air it needs to break down. When landfill waste doesn't break down, two things happen: combustible methane gas is released, and methane is the main cause of landfill fires Those gasses also release into the atmosphere. In addition, organic waste produces a liquid that trickles down through the landfill pile. The bottom layers of trash soak in this liquid and because some of it – like plastic – contains poisonous chemicals, over time a toxic black liquid is formed called "leachate". Leachate can leak out of the landfill and into rivers, lakes, and groundwater.

A way to avoid this contamination is through composting this problematic organic waste.

Composted soil can provide nutrient-dense soil for plants/crops. Composting presents an opportunity to lessen pollution, grow prosperous plants, and save money spent on synthetic fertilizers. Currently, 351 college campuses have established composting programs. College campuses that do compost share a lot of common problems. Waste management companies have a high staff turnover rate. This makes it difficult to coordinate with campus composting programs so student involvement is essential.

Berea College has excelled in this practice and has a work study program as well as student volunteers who coordinate the college composting program. Often this volunteer work is done by patrolling composting stations throughout campus, removing waste from stations, and transporting that waste to the campus main composting station. The volunteer work isn't just manual labor. For example, Fort Lewis College emphasizes the importance of education on campus. A few times a week, the student body that leads the composting project will set up a small presentation on campus. The presentation teaches students about their project, informs people as to why it's important, and offers various ways they can help.

Waste is not avoidable at most college campuses. The average college student produces 640 pounds of solid waste each year. Challenges at UC Blue Ash College (UCBA) consist of packaging, recycling, and the source of where products come from. The products that come from the vending machines and the cafe originate from a third party company, which makes it difficult to track down alternatives for dealing with the waste that might be cheaper. Waste is organized at UCBA, and it is collected three times a week by Rumpke. According to Jason Rutledge, UCBA's Building Operations Manager, recycling is also handled by a combination of student volunteers, faculty, and staff. The facilities department is understaffed at UCBA, and maintenance of the campus' waste is handled by a third party as well. Increasing the amount of recycling bins would result in an increase of labor for the facilities department.

Two proposals for a solution to decrease waste on campus are a) decreasing the amount of plastic on campus, and b) introducing a compost pile. We have attempted to investigate the university budget to see how much is being spent on plastic containers and to see if there is a cheaper, more sustainable option for recycling plastic. A compost pile would allow for a reduction in organic waste by using organic material to break down over time and be used for soil in various landscaping areas. Because we know labor of the facilities department is an issue, we have investigated different ways to reduce labor for them. Two members of our group, Jake and Ren, are in the Sustainability Club. We talked to our fellow members about the maintenance and collection of compost from bins around the campus. Everyone stated that they would like to be involved.

Implementing a campus-wide composting program is a daunting task, initially. Doing a "soft launch" with environmental or biology classes and finding a way to add a composting educational experience into the curriculum would be a more realistic starting point. When the

class curriculum aligns with the composting pile, students can gather their organic waste and add it to the compost pile. As part of a participation grade, students can mix the pile when needed. After a week or two the class can return to the pile to find new organic composted soil. We also got the chance to speak with Susan Willis and the Vice President of the Sustainability Club about keeping a pile by the college pollinator garden. There can be “compost days” a couple times a week where students can go to the pile and mix up organic waste with tools, which wouldn't be too time-consuming. This experience can make an impact on a smaller scale and can educate students with the goal to add this into their lives at home or even expand this program throughout campus. In addition, we talked to Mark Otten about potentially integrating the presence of the compost pile on campus for BIO 1082 lecture and lab. Professor Otten said once the compost pile was implemented, he could suggest it as a source for the field research project. Also, because UCBA has dozens of flower beds, once the organic waste is broken down into usable soil, it can be collected by students and spread over the flower beds. If implemented into a curriculum, this can serve as a graded assignment or extra credit that will incentivize students and see first-hand the benefits of composting. This student involvement will also save the grounds keeping division of UCBA money on buying mulch and labor for the employees. The composting pile doesn't necessarily have to be a part of the curriculum. However, we can talk to professors about simply mentioning it in class when applicable.

While composting can be applied to organic waste, plastic remains a problem. Given the issue of finding answers on the budget because they come from a third party, we are still coming up with ideas on how to reduce plastic on campus. If we can find out how much money is spent on plastic utensils used in the cafe, we want to investigate if it would cost more or less to use biodegradable products. This option could be applied to the packaging that some foods come in like salads. We also want to explore if it would be possible to limit the number of plastic bottles sold at the cafe and in vending machines. Plastic bottled drinks, like soda or iced tea, could be replaced with canned drinks. Aluminum and glass are much more recyclable than plastic and could be a less environmentally harmful option. If obtaining information on the university budget is not accessible because of the involvement of the third parties, we could have a conversation to see if switching to a different third party that has more sustainable products could be a solution.

Our first step to execute this plan will be to build three 3ft by 3ft bays for the stages of compost— material collected to begin compost, matured compost after a week, and nearly ready to use soil. This project would take place over the summer to be ready by the beginning of the fall semester and will be built by the sustainability club. As stated before, the compost pile will be by the pollinator garden adjacent to Walters Hall. Ten wood pallets will be used to construct the bays and can be obtained from Home Depot, Walmart, or facilities at UCBA that have been used. Each bay will be wrapped in chicken wire to keep wildlife out and organic materials in. Bay #1 will contain two separate piles of brown and green organic material that is ready to begin the decomposition process; because it will be fresh organic waste, it will have additional chicken

wire on top to better contain the material. Bay #2 will be where composting begins by creating alternate layers of brown and green material. Shovels will be used to chop and break down the materials into smaller pieces for more efficient composting and to turn the pile every three to four days. Once bay #2 has matured for approximately a week, it will be transitioned to bay #3 for its final stage in converting to usable soil. Bays #2 and #3 will have a tarp laid over the top that is secured down by carabiner hooks. The tarp will contain heat as well as moisture and allow the piles to compost more efficiently. Tools to construct and maintain the pile will be brought by individuals in the suitability club. The materials that are needed to construct the bays would cost roughly $155.

The materials and their costs consist of:

- 10 wood pallets (no extra cost)
- 50ft of chicken wire ($35)
- 2 tarps ($8)
- 12 corner brackets with screws ($40)
- 6 hooks and latches ($8)
- 6 door hinges ($24)
- carabiner hooks (no extra cost)
- 12 pieces of rebar ($15)
- 2 shovels (no extra cost)
- 2 bins ($25)

Our implementation of waste reduction at UCBA is to compost food waste, paper towels, cardboard, and yard waste. At the beginning of the fall semester, the sustainability club will help create awareness for the newly established composting program. There will be two bins for collecting food waste introduced on campus, one in Muntz and the other in Walters, as they have the most foot traffic by students, faculty, and staff. The bin in Muntz will be placed in the café, and the bin in Walters will be placed on the first floor by the entrance, both having convenient access. During the first week of the semester, the sustainability club will take turns monitoring the bins, educating people on what can be composted, and increasing awareness of composting on campus. We plan on collaborating with the UCBA Communications office to include an excerpt about the composting program.

After the first week, infographics on what can and cannot be composted will be placed by the bins. The club will also implement a collection and pile maintenance schedule while working with the Facilities Management Office to coordinate the collection of paper towels, cardboard, and yard trimmings. After the first composting pile is successfully converted to usable soil, the sustainability club will have an event to distribute the soil on campus, encouraging student involvement outside of the club.

During this semester we have learned how important systemic change is and that it can be difficult to implement. This proposed composting program is something that is not only

inexpensive but will be relatively easy to maintain. The goal for this project is to start small and eventually get to a point where most of UCBA's organic waste is being composted. This will ultimately be a student-led initiative. However, as it grows, we hope to have the university's support so that the responsibility doesn't fall on a handful of people. As students come and go, members of the Sustainability Club will make efforts to recruit new students, and more ideas can come to light on how to make this system happen on a larger scale and continue to maintain the compost pile. We know that implementing a composting program at UCBA won't solve the problem of waste on campus, in the country, or even the world, but it will help the university shift to more sustainable technology while educating the student body.

Works Cited

Jørgensen, Finn Arne. *Making a Green Machine: The Infrastructure of Beverage Container Recycling*. Rutgers University Press, 2011.

Jørgensen, Finn Arne. *Recycling*. Massachusetts Institute of Technology, 2019.

Samantha MacBride."Curbside Recycling Collection", Recycling Reconsidered: The Present Failure and Future Promise of Environmental Action in the United States, 2011

Friedel, R. (2014). American bottles: The road to no return. *Environmental History*, *19*(3), 505–527. https://doi.org/10.1093/envhis/emu061

Rutledge, Jason. Personal Interview. 28 February 2023. Otten,

Mark. Personal Interview. 09 March 2023.

"On Campus Composting - Western Michigan University." *On-Campus Composting: How to Start, Evolve, and Overcome Challenges*, 2023, https://wmich.edu/sites/default/files/attachments/u2182/2019/OnCampus%20Composting_%20How%20to%20Start%2C%20Evolve%2C%20and%20Overcome%20Challenges%20%20FINAL.pdf.

"Trash in America." *Environment America Research & Policy Center*, 15 Aug. 2022, https://environmentamerica.org/center/resources/trash-in-america-2/.

Seema. "Food Waste Is Not Garbage!" *Trash Hero World*, 25 Nov. 2019, https://trashhero.org/food-waste-is-not-garbage

"Maze Compost Tumbler 65 and Combo Cart: Gardener's Supply." *Www.gardeners.com*, https://www.gardeners.com/buy/maze-compost-tumbler-and-combo-cart/8609198.html?channable=411875696400383630393139381a&g_adtype=none&g_campaignid=16882280383&g_adgroupid=&g_network=x&g_campaign=%5BPLA%5D%2B%5BPMax%5D%2BComposting%2B%7BNormal%2BMargin%7D&g_keywordid=&g_keyword=&g_adid=&g_acctid=543-582-4261&SC=GGLPLA&gclid=CjwKCAiAr4GgBhBFEiwAgwORrdeICL6sEmflSDBkkWv_NjP_ULkSna7d96zApuq_cgoW-JZQRwhinBoCbCcQAvD_BwE.

"Composting." *Denny McKeown's Bloomin Garden Centre*, https://bloomingarden.com/composting/.

Laico, Steve. "Zero Waste Campus: How Schools Can Reduce Waste and Costs." *Great Forest*, 4 Sept. 2019, https://greatforest.com/sustainability101/zero-waste-campus-how-schools-can-reduce-wast e-and-costs/#:~:text=According%20to%20Dump%20and%20Run,others%20across%20all%20school%20facilities.

Our Campus Composts - Cdn.ymaws.com. https://cdn.ymaws.com/www.compostingcouncil.org/resource/resmgr/produce/our_campus_composts/uscc_white_paper.pdf.