FURTHER FOOD

Mentors

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Mission

Further Food has designed a solution which streamlines and reduces pre-consumer and post-consumer food waste at a university level by offering to-go meal packages and on-campus composting. We developed a regenerative system that utilizes unused food from campus dining and turns it into packaged meals located at the cafeteria during the final hours of operations. The leftover waste is taken to the on-campus composting facility. We plan on implementing compost bins around campus next to regular garbage cans to encourage student and faculty use, while keeping the nutrients cycling through campus. The compost yields social capital and educational opportunities by distributing support to the university through research projects, class curriculum, community gardens, student farms, and university landscaping. For our focused prototype, we developed a system that is a part of Grand Valley State University (GVSU) with the hope and intent to branch out with similar systems in other universities.

History

Today, the college food system is built upon a linear format where food is bought, cooked, and thrown away. In Michigan alone, 1,205,265 out of 8,862,2241 tons (13.6%) of municipal solid waste is food waste. Municipal solid waste consists of everyday items such as product packaging, grass clippings, furniture, clothing, bottles, and food scraps. These alarming statistics and our own experiences as university students are what drew us to the problem.

To understand how dining on a college campus works, we looked at GVSU in Allendale, MI. At GVSU, the campus food is sourced from Aramark, a food distribution service, which delivers to Campus Dining. At Campus Dining they cook the meals and serve them to the students. In 2019, there was about 2,803,000 lbs of compost created at GVSU. The 24,000 students and approximately 1,300 staff and faculty, average about 110 pounds of waste per person per year. Ferris State University (FSU), has a population of about 14,000 students and is located in Big Rapids, MI. The campus dining director at FSU, Scott Rossen, informs us

their campus uses a menu management system that predicts how much food to make. FSU's system takes the previous year into account when deciding how much food was made and used. This predictive system assists in lowering the food waste in a pre-consumer phase, but this process can't always accurately predict what is needed. There is still food made and wasted at both universities.

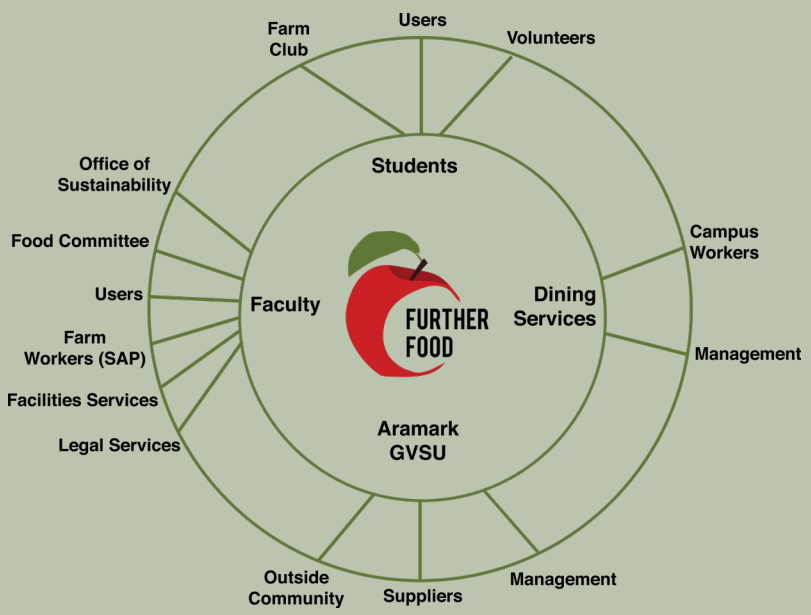
Specifically, GVSU has contracts with the companies Arrowaste and New Soil, which haul the compostable materials off-campus. The university has to buy back their own finished compost at a new rate. Since 2010, GVSU has an operating campus farm called the Sustainable Agriculture Project (SAP). The SAP consists of 5 acres and an optimal 100 acres around it for expansion. The SAP has a number of student volunteers and internship workers who help maintain the market garden, bee operation, and many different student-led projects. The campus farm has been composting its own yard and food waste through a "demo compost pile". This pile is merely for educational purposes and is not currently functional. This is why the SAP depends on compost from a local supplier and on average spends $1,000 minimum on compost per year. The SAP provides land and resources to our proposed project expansion at GVSU.

Stakeholders: Are the faculty at the university who directly oversee and run campus dining, the campus farm, and the students using the services we are providing.

Economically: Implementing food waste diversion practices such as to-go meals and an on-campus composting system would save money annually and provide a consistent stream of revenue.

Geographic: We are currently focusing on the context of Michigan universities due to different governmental policies, in the hopes to expand nationally and globally after prototyping.

Social: Growing a conscious community of students and faculty who are knowledgeable about the food cycle and are participants in the process.



Stakeholder Map

Technologically: Improving food waste management decreases the waste produced. For example, being able to utilize a pulper machine makes food waste more compact, decreases its weight and area volume, and decreases the amount of time for compostable waste to break down.

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Scope

Our wicked problem can be observed in a local environment and expanded globally. Each university student in the United States produces about 142 pounds of food waste annually. At GVSU alone, over 400 tons of waste is sent to the landfill per year. There is a necessity and capability for this number to go down. Our focus is on an institution context: big and small universities, specifically prioritizing small to mid-size schools that already have a campus farm. GVSU is the site for our prototype but we are expanding our project by collaborating with schools like Saginaw Valley State University, Western Michigan University, Marquette University, Central Michigan University, and Ferris State University.

Detailed summary

Leftover food from campus dining is diverted into two streams. The first priority is turning the unserved food into single served new packaged meals which can be purchased at a reduced cost by students in the cafeteria. Off campus students and faculty can take advantage of this program because it is based on a single packaged meal that caters to their individual needs. In the last hours of operation the packaged meals will be sold and enjoyed whenever the consumer sees fit. These meals help expand the lifespan by offering the packaged food to students to use at a later time. This supports the school's mission in assisting students to live a healthy lifestyle with well prepared meals. The meals can be a part of the unlimited cafeteria meal plan some students have. There is also the option of the meals being purchased by students, faculty, and staff that don't have an unlimited campus dining plan. These packaged meals are in compostable containers, so leftovers and even the package itself can be composted. This is where the separate compost receptacles will come into play.

An already established community partner we are working with is the GVSU organized food pantry, Replenish. They work within the GVSU community to provide packaged food and items of necessity such as hygiene products to students who are in need. If there is an abundance of Further Food meals, some can be donated to help Replenish and their mission. This community aspect is important because about 200-300 students are in the network and 800-1000 students visited Replenish this past academic year.

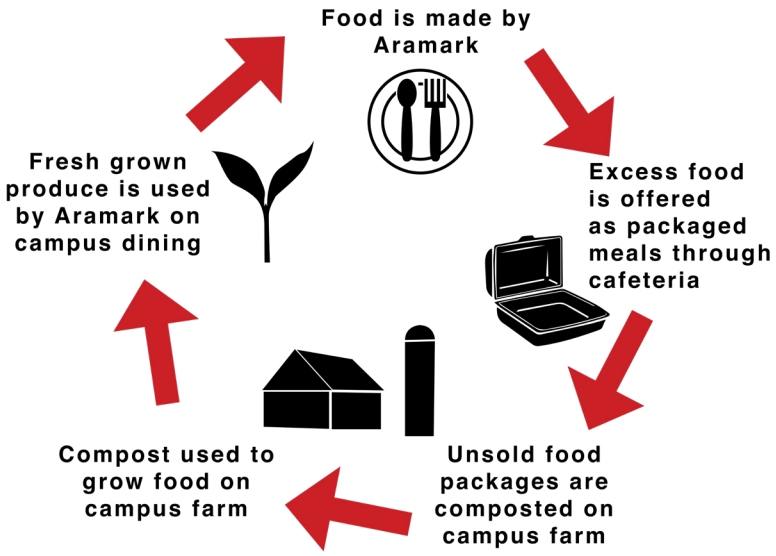
"Replenish is sustained by the generosity of the campus and alumni community and there is always a need for more. We could not meet students' basic needs without this ongoing support."

Director of Replenish,
Sharelle Arnold

These statistics demonstrate the importance of community ties and how our circular system can assist them with their goals.

Our program helps to expand the items and meals available to the students who use this resource. This is also beneficial because it keeps the products in a closed university system and allows us to monitor the food's life cycle from beginning to end. By keeping it within the GVSU community, we eliminate the possibility of the food exiting the cyclical system.

The second purpose is to turn the unviable food leftovers into compost. This is cycled back into the university's landscaping services, community gardens, and campus farm. The compost can be used to grow and effectively fertilize more produce

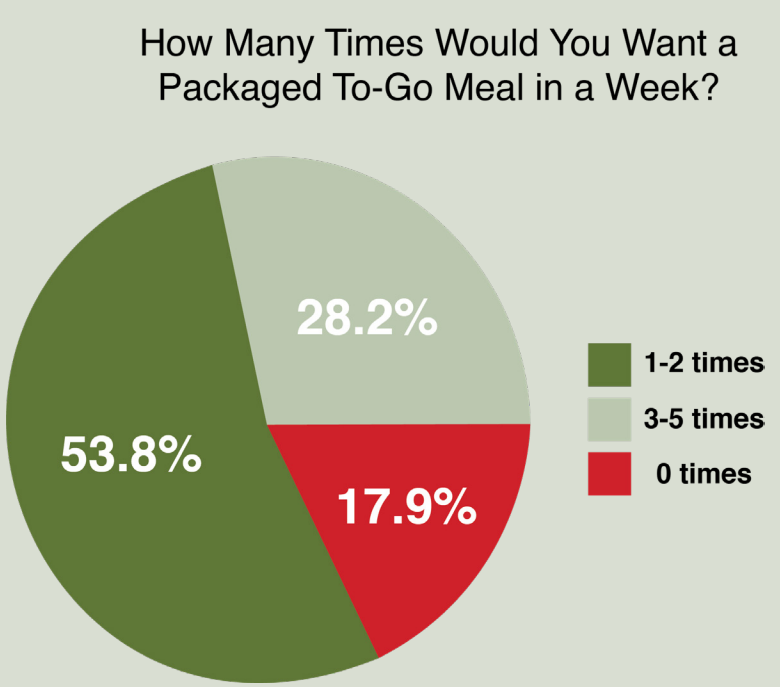


used in campus dining on the campus farm setting. Circling these nutrients back into our systems eliminates the need for transportation to a waste facility, while reducing truck emissions, labor costs, and the waste of nutrients in a landfill. This cyclical process stays within the university context because there are already systems in place. Replenish is one such example. We will work together to reach not only college students, but also those who are struggling with food insecurity.

Customer Validation

As for the sale of Further Food meals, FSU saw a 10% increase in pre-packaged sandwiches sales from making those meals themselves and not buying from a third party company. The Market, Snack Shack, and FSU cafes see an average of about 250-300 students per day. 500-600 patrons have access to these pre-packaged meals and most are aware they are for sale in the fridges of these establishments.

This solution satisfies the need to decrease the amount of waste being put into landfills. Working with the maintenance services would include GVSU's 500 acres of grounds, university farms, and gardens. By providing ready to use in-house compost it reduces the cost of purchasing soil from an outside source.



40 current GVSU students surveyed in Spring of 2020

Finally, we surveyed GVSU students to see if there was a need for this type of packaged meal. We have 40 responses validating our hypothesis and giving us a target price the population was willing to pay for the meals. Overall, the most responses indicated students wanted pre-packaged meals during the weekdays.

Effective Flows

We created a product from excess by realizing the potential in what the universities assume is unavoidable trash. With Further Food, the food will go back into the university setting where it benefits the students and faculty members, and connects the need for healthy meals for the university population. The university farm allows the compost to grow and provide fresh produce to Campus Dining. The in-house compost connects the needs to haves in this problem.

Unique Value

Our inspiration comes from Green Mountain Technologies, Meals on Wheels, and the Food Recovery Network. Meals on Wheels and the Food Recovery Network inspired our packaged food. The composting concept was inspired by Green Mountain Technologies. We combined these different ideas to show a collaborative, streamlined, and cyclical approach to addressing food waste.

Value Proposition

Our solution accelerates the transition to a circular economy by connecting the systems already in place. Further Food offers a circular business model to provide students with to-go meals after hours as well as diverting spoiled food to an on-campus composting system. Our program reduces food waste otherwise going to landfills or off-campus composting systems.

GVSU Farm, community garden, with compost 2019
Our composting and test site for this project

Prototyping

Our test site for developing our prototype is GVSU. There is a partnership between Campus Dining and the SAP we have strengthened. Our second prototype phase includes expanding our design template to other universities similar to GVSU's size, programs, and dining services.

Our goal is for the meals to be prototyped as early as September of 2020 at GVSU. In terms of composting, our goal is to have a running compost system at the SAP. This goal will be achieved by a one million grant from the Department of Environment, Great Lakes, and Energy (EGLE). With the leftover money from the grant the SAP will purchase an Earth Flow Sterilization Vessel, which will work the best for the university. The SAP is supplying us with land for the new compost system, materials such as shovels, and additional labor that will help bring our project to completion.

Digital mockup of our re-packaged meals

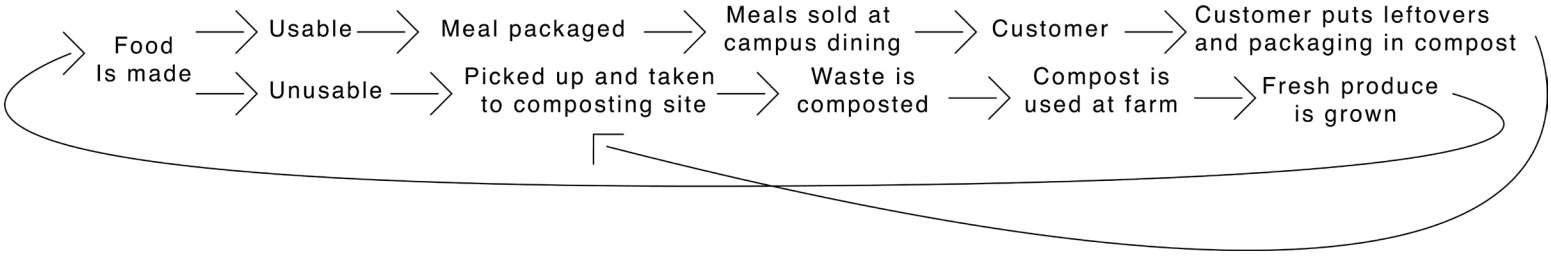
Outcomes & Incentives

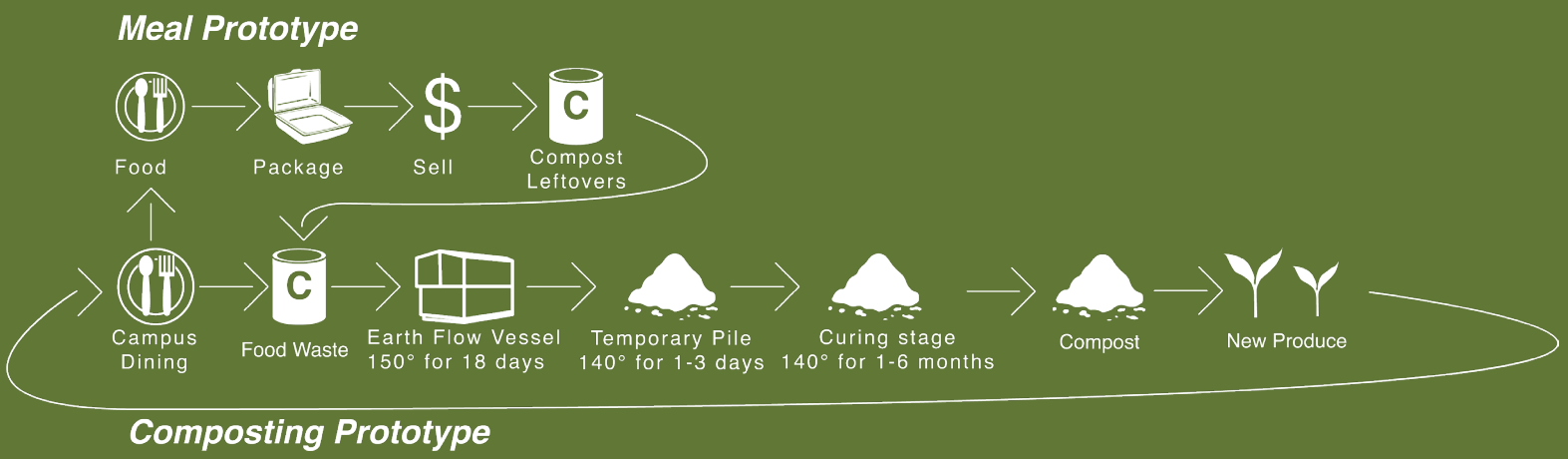
- On-the-go meals for customers
- Produces an additional profit stream for the university (Ex) GVSU creates about $23,556 a year using this program
- Increases volunteer and research opportunities
- Students work with the SAP for unique hands on experience
- Increases university social responsibility
- Creates community ties between the university and other organizations (Replenish)
- Decreases food waste, carbon emissions, & transportation costs

Barrier Acknowledgment & Risk Analysis

- Project start-up funds— one million dollar EGLE recycling grant
- Coordination of the cafeteria workers into new responsibilities—Seasonal trainings
- Collaboration between departments—Make it mutually beneficial
- Food Safety—Following food standards dependent on the type of food
- Low demand of packaged meals—Divert to compost
- Compost Contamination—Seasonal trainings and pre-consumer waste only

Product Journey





Detailed Material Analysis

Food distributor

Aramark, Philadelphia, PA

We chose Aramark as our food distributor because of the prior contracts with GVSU. They offer a supportive environment to carry out this business plan.

Meal packages

Bio-Plus

We chose these meal packages because they are compostable, microwavable, and the see through window allows the buyer to view the product

Labels

Elevate Packaging, Chicago, IL

These labels are made of all natural and unbleached sugarcane paper, and are certified compostable, supporting Further Food's brand and mission.

Composting Vessel

Green Mountain Technologies, Bainbridge Island, WA

At GVSU, we will use the Earth Flow composting system which has an automated mixing and aeration system. It is made of custom steel with a polycarbonate greenhouse roof enclosure. The greenhouse roof acts as a passive solar supply to heat and dry the compost, and provide a visual to the composting system.

Trummel

Sittler's Manufacturing, Linwood, ON Canada

Sittler's Manufacturing offers a user-friendly and low maintenance compost screener that takes out contaminations and materials like spools, wine corks, and non-compostable materials. This trummel yields 90 cubic yards per hour.

Pulper

Somat Waste Reduction Solutions, Lancaster, PA

They specialize in pulping systems that produce an economical and efficient way to reduce food waste. This system reduces transportation costs along with supporting a LEED certification, and zero waste goals.

Start-Up

Supplier	Major Components	Cost	Labor & Materials	Cost
Green Mountain Technologies	Earth Flow Sterilization Vessel- 40 ft	$90,000	Compost construction	$40,000
Somat Waste Reduction Solutions	Pulper	$55,000	Roof, pipe, & tarp	$10,000
Global Repair	Trommel	$15,000	Trommel construction	$10,000
			Barrels, bins, & hand truck	$4,000
			Spreader & compost tea brewer	$6,000
			Misc. gear	$2,000
Subtotal:	$160,000		Subtotal:	$72,000
		Total: $232,000		

Annual Operating Costs

Daily Hours	Weekly Hours	Semi-Annual Hours
Food collection & sorting — 2	Get wood chips — 1.5	Screen compost — 25
Pulping (2 workers, 2.5 hours) — 5	Empty compost bin — 1.5	Spread compost — 50
Number of Days — 200	Numbers of Weeks — 28	Equipment maintenance (outsource)
Hours Per Year — 1,400	**Hours Per Year — 532**	**Times Per Year — 2** **Hours Per Year — 150**
		Total Hours — 2,080 at $10/hr ***Total Annual Operating Cost $20,800***

Revenue

	Meals	Compost
Operating Costs (per year)	- $1,222	- $20,800
Income (per year)	+ $24,778	+ $21,000
Revenue	+ $23,556	+ $200

Net Profit: $126,178 per year

$2427 per week

Key Partners

GVSU SUSTAINABLE AGRICULTURE PROJECT

CAMPUS DINING

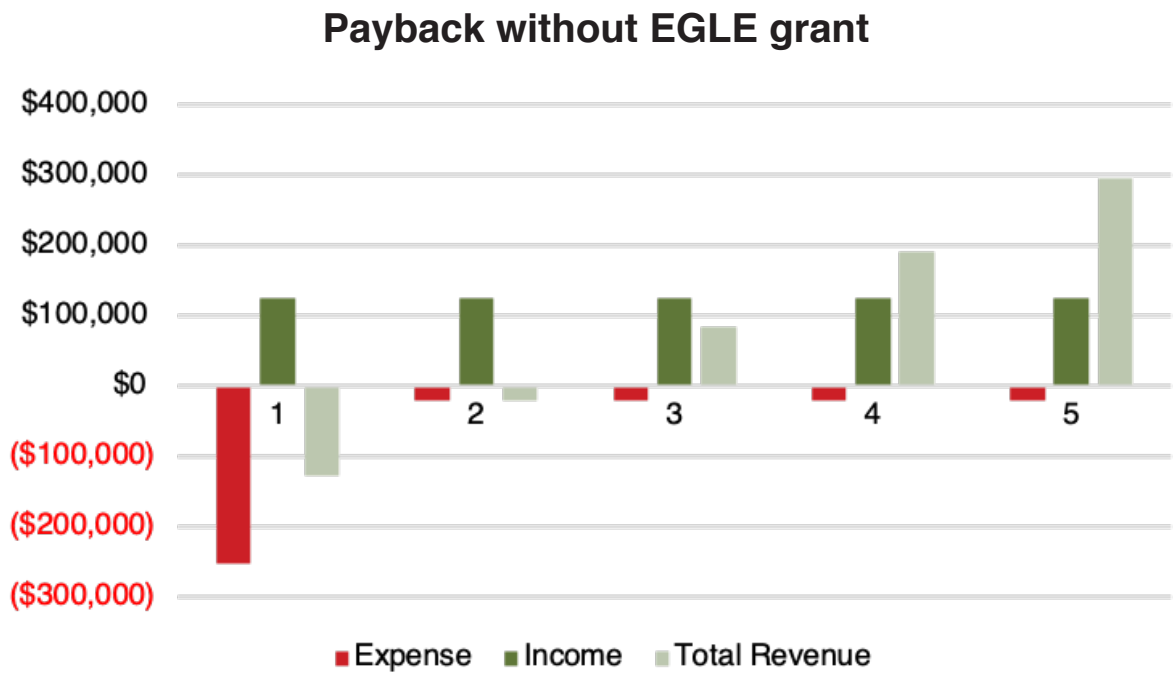
Office of Sustainability Practices

260 LMH

Payback

The funding will come from donations, external funding, and grant money. When GVSU is approved for the EGLE grant, the payback period would be instant. After the start-up costs and first year operating costs, GVSU would have $747,200 leftover which could last as long as 30 years including maintenance. Our net profit is $126,178 which surpasses our operating costs.

Without the grant, the payback period would be approximately 3 years and they would be profiting $85,022. At 5 years, GVSU would be profiting $295,778.



	Strengths	Weaknesses	Opportunities	Threats
University	•Saves $$$ •Highly profitable revenue stream •Decreases food waste on campus •Promote university brand & identity	•Start-up funds — Grant writing & external funding opportunities •Meals per week dependant on leftovers	•Volunteer, work, & research opportunities •Create collaborative partnerships within the university •Revenue source	•Food safety hazards •General maintenance and upkeep •Policy changes in compost & food safety •Students don't adapt the program
Students	•Saves $$$ •Educational opportunity for research projects, classes, & internships •Location, ease of availability	•Lack of variety •Boredom with menu offered by campus dining	•Last minute meal •Able to bring meals into their classroom	•Lack of awareness & education of the program •Food safety •Improper storage of second meals •Competition foods
Environment	•Produces nutrient rich soil •Cuts down on CO_2 emissions (less transport)	•Need space to compost •Human manpower necessary	•Fresh produce •Education on sustainable living	•Possible contamination in compost •Maintenance & upkeep funding

For a full list of recources please visit: https://bit.ly/2WwrlOF