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Timbercreek Composting Campaign

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ABSTRACT

The problem of food waste is one that needs to be combatted. Restaurants generate an unbelievable amount of waste, which simply sits in a landfill decaying and releasing harmful methane gas into the atmosphere. Over 20% of food that is produced in the United States falls into this category. The purpose of this study is to help mitigate this problem by providing other alternatives for this food waste. Organic waste can be reused in the form of compost. Once broken down, this compost can be used for fertilizer.

Initially, one specific restaurant was examined to determine how the composting could occur. This was to be used as a model that other restaurants in Charlottesville, and in other cities in the nation, could follow to implement composting themselves. Throughout the process, the focus shifted, however, to working with a local farm, Timbercreek Organics, which already had a well-developed composting system in place. It was decided that the best way to implement composting in Charlottesville was to work with Timbercreek to develop a program to get the word out about their composting service. Several local businesses already use their service, but it could definitely be expanded to other local businesses and restaurants. A pamphlet was designed for distribution to these local businesses in order to educate them on composting in general, as well as the Timbercreek Organics Composting Project.

Several locally owned restaurants were contacted to gauge interest in the service and it was determined that there was enough interest to move forward with the project. The next steps for success are to distribute the pamphlets and talk to local business owners in order to get them on board with the program. Other measures will also be taken out to get the word out to the greater Charlottesville community, including University of Virginia students.

DEFINITION OF PROBLEM

Food waste is a pervasive environmental issue in our world today. Americans alone throw away more than 20%, equivalent to 25.9 million tons, of food that is produced for domestic consumption.[1] This waste, once collected, is usually sent to a landfill, where it sits for extended periods, sometimes years, releasing methane gas into the atmosphere. Studies reveal that the methane that is released when food rots is 20 times more damaging to the environment than carbon dioxide.[2] Studies also show that 34% of the methane that is released into the atmosphere comes from landfills.[3] If the amount of this waste is reduced significantly, it could have a very significant influence on the global warming problem.

Charlottesville, Virginia had a population of 41,487 people and 220 restaurants in 2008, which is one restaurant per roughly 188 people.[4] This is a very high concentration of restaurants in a small geographical area, demonstrating that there are large amounts of restaurant waste being produced in the Charlottesville area. Restaurants produce an average of 50,000 pounds of waste per year in the United States.[5] Hauling services, such as the City of Charlottesville and Waste Management, dump this waste into landfills, as mentioned above. This biodegradable waste is compacted, unable to begin any of the processes of decay required for breaking down into fertile soil. Restaurant waste can be broken down into three main types: 1) recyclable cardboard and metal containers, 2) plastic packaging and wrap, and 3) organic kitchen waste, such as apple cores and bread ends.[6] Furthermore, on average by weight, between 27% and 43% of waste generated by quick-serve restaurants can be composted, indicating that there is a clear problem with the current methods restaurants use for waste disposal.[7] Therefore, in order to combat the issue of ineffective waste disposal by restaurants, an extensive plan has been created to educate, build awareness, and get restaurants to dispose of their waste in more efficient and productive ways. Composting was selected as the appropriate solution.

IDENTIFICATION OF POSSIBLE SOLUTIONS

Before composting was selected, several alternative solutions were considered. In order to consider these possible alternatives to solving the food waste problem, it is imperative to establish criteria when selecting the best possible solution. The most important criterion is to reduce the amount of waste that is sent to landfills. It is the objective to reduce about 11% of waste that is taken to landfills per restaurant; this percentage was determined based off 11.2% of food waste that can be diverted from landfills when composting.[8] The ultimate goal is for a restaurant to increase the waste reduction as time progresses. Based on this criterion, several possible solutions are: composting, use of reusable dishes, and use of food waste for animal feed.

1. Real , washable plates, bowls, cups, and silverware

The first possible solution is the use of real, washable plates, bowls, cups, and silverware by restaurants in the Charlottesville area, rather than paper, Styrofoam, or plastic items. This would not eliminate the actual food waste, but it would help reduce other forms of waste generated in the restaurant, which would thereby reduce the amount of waste sent to a landfill. Reusable

dishware would be cost-effective for the restaurant. According to John Allen, an employee at Revolutionary Soup (a local Charlottesville restaurant), buying enough reusable cups, bowls, plates, and silverware for the restaurant is about ten times cheaper than continually buying products that can be thrown away. However, there is the issue of increased water usage from washing numerous dishes daily. Furthermore, customers could mistakenly throw away dishes and silverware, which would produce a small additional cost for the restaurant. Ultimately, this solution was not considered the best solution for the problem at hand, because although it reduced the amount of waste generated, it did not reduce the amount of organic waste sent to landfills (the main type of restaurant waste produced).

2. Waste used as animal feed

The second solution considered is the use of food waste as a protein source for animals. Food waste could serve as a healthy alternative for animal feed for farm animals and decrease the price of animal feed for farmers, since imported grain is costly.[9] The downside of this approach, however, would be that it is costly to recycle the waste so that it is suitable for use and there is not always nutritional value for the animals that can be received from the waste.[10] Organic waste is often comprised of about 75% water. Waste such as this cannot be used for animal feed in this form, and must be dried out, often using a machine such as a pulping machine. These machines are expensive and would add an additional cost for restaurants looking to use this method.[11]

3. Composting

The third potential solution is the implementation of a composting system to dispose of the waste. There are several different ways to accomplish composting: aerobic composting, anaerobic composting, and vermicomposting. Aerobic composting uses the air to compost the waste and is useful for large volumes of waste; this method of composting does not produce a foul smell. It is, however, very high maintenance. The waste must be turned constantly and kept at high temperatures. The anaerobic composting method does not use air. It is a very low maintenance method, but takes years to produce adequate compost material. Vermicomposting uses worms and other bugs to compost organic waste.[12] Composting will allow local restaurants to capture all of the monetary benefits of implementing a sustainable food waste disposal system, as well as the environmental benefits that can be received from composting. It will help enrich the soil, clean up contaminated soil, and prevent pollution.[13] The type of composting appropriate for the waste generated can vary, and this is an important factor to consider when beginning to compost. Multiple problems can occur when composting, however, such as the food

waste becoming smelly, overcoming red tape related to Federal and State Waste Regulations, and the fact that composting can be a costly and time consuming practice.

4. Explanation for the solution choice

After thoughtful consideration of the above solutions to reducing the amount of restaurant waste taken to landfills, the implementation of a composting plan at local restaurants in Charlottesville was determined to be the most feasible option. Given that nearly 74% of all restaurant waste can be composted, composting serves as the best solution.[14]The decision to compost on-site would require the use of vermicomposting. This method of composting waste is considered the most suitable for food waste and requires the least amount of maintenance, relative to aerobic composting. Furthermore, it fits best within possible time constraints, as it does not take years to compost like anaerobic composting. However, there are many disadvantages to composting on-site for many restaurants in the Charlottesville area. Many of these restaurants are situated in dense areas that would not allow the space necessary for composting. In addition, there would be many health regulations restaurants would have to work past, such as the attraction of pests that would likely occur due to the smell of the organic waste. The smell itself would also be a nuisance to individuals in surrounding areas.

Consequently, composting occurring at an external site appeared to be the most viable option. In order to stay with the environmental theme, it is imperative to find a composting site as close as possible to local restaurants, so as not to make the overall environmental effect of the project negative due to the release of greenhouse gases from transportation.

TIMBERCREEK COMPOSTING CAMPAIGN

Definition of Project

A local, family-owned farm, Timbercreek Organics, already has a close relationship with multiple restaurants in the Charlottesville area. Furthermore, the farm already has an established composting service, which local restaurants could take advantage of. Timbercreek Organics' well-established composting service, called the "Timbercreek Organics Compost Project," already has businesses such as Whole Foods, La Taza Coffee House, and Harvest Moon Catering involved.[15] Zachary Miller from Timbercreek Organics was the main project sponsor. He stated that this composting service provides businesses with 90-gallon containers for waste storage and collects waste on a weekly schedule, depending, of course, on how much waste is generated. Mr. Miller also said there is a $10.00 collection fee. Timbercreek Organics has a permit to collect pre-consumer material waste, which does not include Category IV waste, or waste that has been touched by customers.

Therefore, since there is already an established composting service provided by Timbercreek Organics, it is the goal of this project to spread awareness about this composting service and composting itself. It is the ultimate goal to get restaurants that do not currently compost to start composting at Timbercreek Organics and to spread awareness of the environmental harms related to current waste disposal and the benefits of composting.

Stakeholders

The main stakeholders in this project are local restaurants in Charlottesville and the Timbercreek Organics Composting Project. Local restaurants in Charlottesville will gain from reducing the food waste they send to landfills, because it will help them reduce overall costs associated with waste disposal in the long-run and the opportunity to reduce their environmental footprint. Hopefully, in the long-run, restaurants will also gain from the publicity they receive from involvement in this program. Timbercreek Organics will gain from the sale of the additional compost that they produce from the waste that restaurants and businesses new to the program contribute. However, at a broad level, everyone is affected by the release of methane gas by decomposing waste. Everyone will receive a small tangible benefit from more room in landfills, cleaner air to breathe, and fewer greenhouse gases.

Design components

In order to create the final design it was important to understand composting systems, as well as some other important components. The following items were analyzed to establish the final design: 1) University of Virginia composting system, 2) health code regulations related to storage and transportation of waste to composting site, 3) the capacity of Timbercreek Organics, and 4) restaurant interest.

1. University of Virginia (UVa) composting system

The UVa dining composting system at Observatory Hill (O'Hill) served as a great example for how composting systems work. The Sustainability Coordinator from Observatory Hill Dining Services at UVa, Kendall Singleton, explained the inner workings of the composting system present at O'Hill. The use of a pulping machine helps separate the liquid from the waste and break the waste down. The waste is then stored in sealed containers and later transported to a local farm, Panorama Pay-Dirt, where it is composted. UVa dining services was able to receive an "educational exemption" for the composting that occurs at Panorama Pay-Dirt.

2. Health code regulations

It was important to understand health code regulations, because restaurants will have to confront them when storing and transporting food waste to the composting site. Since the waste will be transported by Timbercreek Organics, restaurants do not have to worry about regulations surrounding the composting itself. This will be taken care of at Timbercreek Farms. According Jonathan Pascarella from the Department of Environmental Quality (DEQ), the Virginia Solid Waste Management Regulations (VSMR) state that the storage of food-related wastes is viewed "conditionally exempt" as long as the waste is "managed" in the appropriate containers and is stored no longer than seven days between the collection of waste and its removal for disposal. In effect, local restaurants must just make sure that the storage of their waste is not a nuisance to others and that the waste itself is not hazardous. The waste could be a nuisance if is accompanied by a foul smell, which would then attract pests to the waste. This would cause further health concerns.

Concerning the transport of solid waste, Mr. Pascarella stated that it is covered "under the Virginia Department of Transportation enforced by the Motor Carrier Division of the State Police." There are not any direct regulations with regards to the transport of solid waste, as long as it is in a closed container and it is not classified as hazardous, similar to the regulations regarding storage of the waste.

Furthermore, there are regulations with regards to the actual composting that would occur at a local farm or garden. According to Mr. Pascarella, it is a requirement in the state of Virginia to maintain a permit when composting. Timbercreek Organics has already obtained the necessary permits, since the composting system is already in place. There are 3 permits that are applicable to the type of composting a restaurant would utilize: 1) Permit-by-Rule (PBR), which is for composting operations that are smaller and process less than 700 tons per quarter of Category I, II, or III material, 2) Full Solid Waste Permit, which is a full permit for large facilities that process greater than 700 tons per quarter of Category I, II, III, or IV waste, 3) Experimental permits, which can be obtained from the Department of Environmental Quality.

3. Timbercreek Organics composting capacity

It was important to determine whether Timbercreek Organics has the capacity in their compost project to take on the food waste from other local restaurants. According to Zachary Miller from Timbercreek Organics, there are no capacity limits to the number of businesses the farm can have participating in the composting project. Instead, Timbercreek Organics favored more of an establishment of a "communal drop point," because it would ease the collection process. Because capacity at Timbercreek Organics is not an issue, it then became suitable to spread the word about this service to other local restaurants in the Charlottesville area.

4. Interest from restaurants in Charlottesville

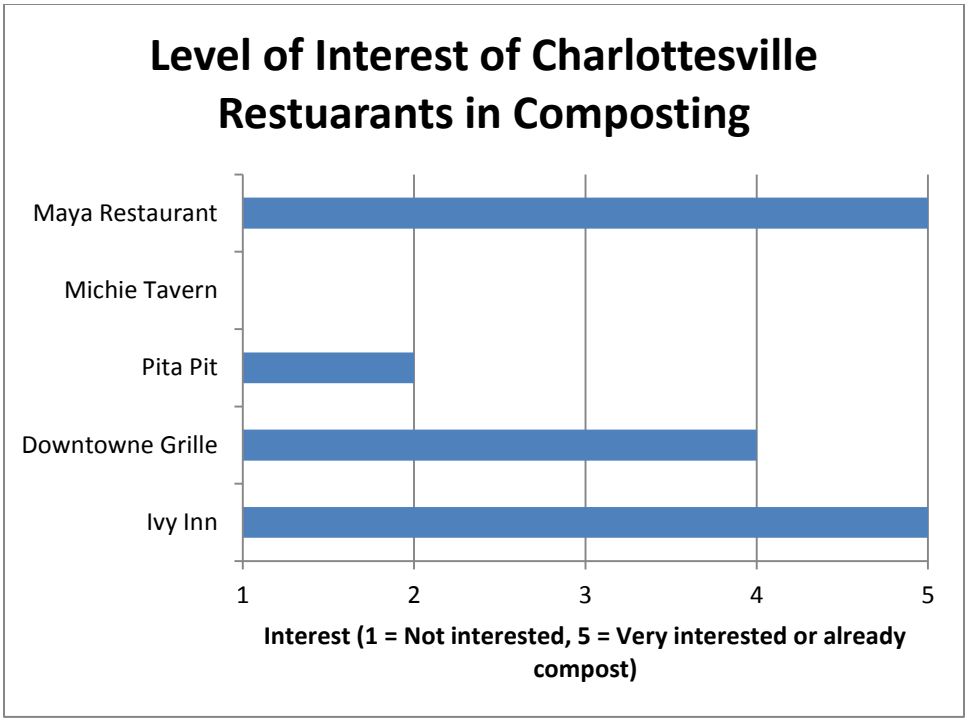
In order to determine if the project was even worthwhile, interest from local restaurants needed to be gauged. Multiple restaurants in the Charlottesville community expressed interest in the composting project. Maya Restaurant, Michie Tavern, Pita Pit, Downtowne Grille, and Ivy Inn were all asked about their potential interest in the program. The managers from Maya Restaurant and Ivy Inn said they already perform their own composting; however, they are very willing to get involved in the effort to start composting and were willing to publicize the composting service offered at Timbercreek Organics. Downtowne Grille does not currently compost, but was interested in receiving more information about the service and were very willing to help with publicizing efforts to spread awareness about the service and composting in general. Contrastingly, Michie Tavern does not currently compost and was not interested at all in the service.

There are a few reasons why restaurants might not want to participate in such a service offered by Timbercreek Organics. For instance, it would add an extra expense that some restaurants do not see as being worth their while. It would cost them more money, for what they see as no added benefit. Furthermore, chain restaurants can pose difficulties. In businesses such as these, the appropriate person is often difficult to get in contact with. These individual also often have to

go through extensive hierarchies in the corporate divisions of their companies to get approval for such programs. Pita Pit is a great example of this.

Overall, interest in the Charlottesville area for such a program seemed strong and pushed the project forward. Restaurants that are currently not interested might also become interested later once they see the benefits that participating restaurants gain.

The graph below displays the level of interest from the five restaurants contacted:



Actual Design

An important aspect of this project is to build awareness of the composting service offered at Timbercreek Organics and recruit restaurants around the area to begin composting at the farm. This awareness will be achieved through a Timbercreek Composting Campaign.

The process consists of:

- Educating local restaurants about composting and Timbercreek Organics service
- Contacting, directly, restaurants about starting to compost with Timbercreek Organics Composting Project
- Monitoring the number of restaurants that begin to participate to gauge how much publicity is needed

It is important to educate local restaurants about the composting procedure and the service offered through Timbercreek Organics. In order to educate, a detailed brochure has been created

to provide information about composting. This brochure will be distributed to restaurants in the Charlottesville area so that they can learn the benefits of composting and composting with Timbercreek Organics. Below is a budget showing how much it would cost a restaurant to participate in the service:

Restaurant Budget for Timbercreek Organics Compost Project

10$ fee per collection
Assumption: collection period every 7 days largest frequency in order to meet health code regulations

Revolutionary Soup or local restaurant costs:

4 weeks	$ 40.00
3 months	$ 120.00
6 months	$ 240.00
1 year	$ 480.00

This budget shows that it is a minimal cost for a restaurant to begin composting with Timbercreek Organics.

First, a brochure is distributed to restaurants in the Charlottesville to spread awareness about the composting service provided by Timbercreek Organics (**Appendix C** gives a detailed image of a sample brochure). These brochures educate restaurant and business owners about composting and the services that are available to them. The brochure contains information about food waste and composting, including the types of composting that are available. It also gives detailed information for Timbercreek Organics and the service that they offer.

Second, direct contact with restaurant managers complements the brochure and get restaurants composting with Timbercreek Organics immediately. Direct contact is important, because it helps build a relationship between restaurants and Timbercreek Organics. Furthermore, it provides restaurant managers with the opportunity to ask questions if necessary.

Third, progress is monitored each step of the way. Data is kept, tracking the number of restaurants that start using the service, the more the better. It signifies that more waste is diverted from landfills and used for better purposes.

Initially, locally owned restaurants are the primary targets because of the ease they have in making decisions such as whether to start composting. Restaurants in the Corner and Downtown Mall areas of Charlottesville are also good targets. These restaurants have high foot traffic based on the nature of their locations. The Corner is a popular destination spot for students because of its close proximity to the UVa grounds; the Downtown Mall is a historic tourist spot in Charlottesville, and thus attracts many guests. These restaurants are likely to be interested in lowering their costs, as well as attracting more environmentally conscious customers to their locations. Therefore, restaurants such as Asian Express, Yuan Ho, College Inn, Jimmy John's Gourmet Sandwiches, Little John's New York Delicatessen, Escafé Restaurant, and Fleurie French Restaurant are contacted first. Larger, chain restaurants such as Bodo's Bagels, Christian's Pizza, Pita Pit, McDonald's, and Taco Bell will be contacted later in the process.

Potential constraints

There are a few issues that may hamper implementation of this composting system. Timbercreek Organics charges a $10.00 pickup fee of the organic waste from their sites. While this seems insignificant, depending on how much waste is generated, this could add up to a significant cost. Since the restaurants in Charlottesville are local, they are usually smaller businesses than a national chain and this cost may not have a place in their budget. This fee might make it difficult to recruit more restaurants to the cause.

Another constraint is the responsiveness of restaurant owners and managers. In recruiting other businesses for the program, it is often difficult to get to talk to the person responsible for making these decisions. In some cases, the restaurant is a chain and a national manager must be contacted. In other cases, the manager or owner may not be around at the time the restaurant is contacted. In these instances, a restaurant may need to be contacted several times access to the correct person is achieved. Even after this person is reached, however, they are not always excited about the composting project. They may not feel they have to time to devote to hearing about the cause or the money to pay for the program.

Another possible constraint is Timbercreek Organics' capacity for waste. In recruiting other restaurants, it is important to remember that Timbercreek may not be able to take on all the waste that would come from these restaurants. Currently, this does not to pose a problem, as mentioned earlier; however, if the program gains enough popularity, this could become a serious constraint which could severely limit the impact of the project solution. In congruence with this, Timbercreek Organics does not compost Category IV waste, including post-consumer waste. This could also limit the impact of the program. This means that restaurants cannot send waste away that consumers have touched. This could constitute a large portion of a restaurant's waste and thus this waste would still need to be sent to a landfill.

Each of these constraints presents a possible hitch in the project plan. However, each can be overcome. The fee charged by Timbercreek Organics is relatively small; $40 per month is not a large cost to most businesses and thus does not appear to be a huge barrier. The responsiveness issues were combated by contacting as many restaurants as possible and by being diligent about

communications with these restaurants. Also, even though post-consumer waste cannot be sent to Timbercreek Organics, a significant portion of organic waste can still be composted. Many restaurants are dedicated to making fresh ingredients daily; if they overestimate their traffic for any given day, they will have a great amount of leftover, wasted food that can therefore be composted at Timbercreek Organics.

Future Work

After the *Timbercreek Composting Campaign* has been implemented, there are still other steps that must be taken in order to achieve the main objective of getting as many restaurants composting as possible. Therefore, after the first phase of the campaign is completed, getting Charlottesville citizens involved is the next step. More publicity must be done in order to gain this community involvement. The next phase of the campaign consists of:

1. **Creating advertisements in the Cavalier Daily & the Charlottesville Daily Progress:** this step will help further recruit restaurants and other businesses to start participating in the program. These ads will list the participating restaurants in order to gain publicity for them, as well as help to recruit more restaurants to the program.

2. **Pass out flyers and menus on UVa grounds and popular Charlottesville destination spots, such as the Downtown Mall:** the purpose of this step is to help garner support from Charlottesville citizens. This step will help pique people's interest about the program; restaurant and farm staff members would be available to answer questions and educate people about the food waste problem and what is being done to combat it. Also, this step will help establish the expectation for restaurants to compost. Hopefully, UVa students will also get involved in the campaign. Students are younger and are likely more aware of problems such as this one. They are also more likely to get involved in finding an acceptable solution. The step of the campaign will get students involved.

3. **Place long-standing signs in restaurants windows:** this step aims to differentiate composting restaurants from non-composting restaurants. This step will acknowledge the restaurants that do compost and show customers the sustainable actions of these restaurants. Customers will hopefully see these signs and become more aware of the problem, and which local businesses are involved in the solution. This should increase the foot traffic of restaurants that post these signs.

4. **Monitor the progress:** in this step, the number of restaurants that begin composting will be tracked, in order to measure the effectiveness of this phase of the campaign. It will also manage the level of community engagement in composting and the overall community sentiment towards composting.

The major objective of this part of the campaign is for community involvement to motivate remaining restaurants to start composting. Furthermore, by making people more aware of the problem and those that are helping to solve it, will lead to increased traffic at these restaurants. Consequently, more people will become interested and eat at these restaurants because they know about the good they are doing for the Charlottesville community.

Measurement of success

Criteria for success include several key factors. First, it is important to make sure that the composting solution actually reduces the waste sent to landfill. If this criterion is not met first and foremost, the project cannot be considered in any way a success. As stated before, it is also critical to gain awareness and start aligning all Charlottesville restaurants with other restaurants that currently compost. Timbercreek Farms must also increase the total amount of waste that is diverted from the landfill and composted. If other restaurants become interested and involved, the project would be considered a success from this standpoint. It is important to stay in touch with Timbercreek Organics to see how many restaurants sign up with this service. If three other restaurants begin composting by this upcoming spring, this would be a huge success. This cannot occur without publicity for the program, and thus publicity is also another goal. Increasing the awareness for this problem itself, as well as making people aware that other restaurants are involved in combating this problem are key components for measuring success. A survey of citizen's knowledge and sentiment of the problem and implemented solution will help identify if this aspect of the project was a success. Tracking the sales of the restaurant post-implementation will also identify if foot traffic is increasing.

LESSONS LEARNED

The design of this strategy to reduce food waste sent to landfills was not without modifications. The project began as a case study of one local restaurant, Revolutionary Soup. It was thought that by learning about this restaurant, a design could be created for composting that could then be applied to and used by other local restaurants to begin composting themselves. Originally it was thought that Revolutionary Soup could compost on-site. By closely examining health code regulations, however, it became clear that this would not be possible given the small space that Revolutionary Soup occupies. Revolutionary Soup simply does not have the room for its own composting system, nor the funds to obtain the necessary materials (for example, a pulping

machine). As mentioned before, health regulations regarding the smell and pest attraction of waste would also be a problem in such a small space.

The focus of the project then shifted. It became evident that the waste would have to be transported elsewhere to be composted. Several farms and gardens were contacted, as well as waste management companies, in order to see where the waste could be transported to. Then the problem was in figuring out who would do the actual transporting. Revolutionary Soup does not have the vehicles, or the funds necessary, to do this themselves. One of the farms contacted was Timbercreek Farms. It was then revealed that Timbercreek had its own composting system in place.

Due to communication inefficiencies, the focus was turned from Revolutionary Soup to a much broader target: any Charlottesville restaurant interested in composting. The idea was then devised to create a publicity campaign to attract local restaurants and businesses to the Timbercreek Organics Composting Project.

The road to the current project implementation plan was, as stated above, not a simple one. The focus of the project was changed several times, before the current plan was finalized. Each time a problem was encountered, it had to be confronted, and thus the focus shifted several times. The original goal was to start one local restaurant composting and then use that restaurant as a guide for others. The new plan, however, is much more applicable to all local restaurants and thus will have a much larger impact on the Charlottesville community.

The project process made it clear that implementing sustainable change is no easy task. Problems are encountered regularly, whether it is with governmental regulations, public interest, or finances. If doing this project over, many things would be done differently. The focus should not have started with one particular restaurant. This made the problem much more difficult to solve and not all options were explored initially. The Timbercreek Organics Composting Project could have been discovered earlier in the process if Revolutionary Soup had not been the focus from the beginning.

CONCLUSION

Based on research, it can be concluded that the composting program with Timbercreek Farms is the best way to solve the food waste crisis in Charlottesville. Throughout the process, findings have been documented and progress tracked with a timeline, photographs, and tables. Photographs will be used and collected in our publicity campaign.

The food waste problem is a huge issue globally. The more organic waste that is sent to landfill, the more methane is released into the air, contributing to global warming. By starting locally in Charlottesville, a plan has been designed to combat this issue. Hopefully, the amount of organic waste that is sent to sit in a landfill for years can be reduced significantly.

[1]Magazine, E. o. (n.d.).Food Waste and Environment - Wasting Food - The Daily Green.*Going Green, Fuel Efficiency, Organic Food, and Green Living - The Daily Green*. Retrieved October 5, 2010, from http://www.thedailygreen.com/environmental-news/latest/food-waste-environment-460110

[2]CNN, R. O. (n.d.). All About: Food waste - CNN. *Featured Articles From The CNN*. Retrieved October 5, 2010, from http://articles.cnn.com/2007-09-24/world/food.leftovers_1_food-waste-greenhouse-gas-methane-emissions?_s=PM:WORLD

[3]Magazine, E. o. (n.d.).Food Waste and Environment - Wasting Food - The Daily Green.*Going Green, Fuel Efficiency, Organic Food, and Green Living - The Daily Green*. Retrieved October 5, 2010, from http://www.thedailygreen.com/environmental-news/latest/food-waste-environment-460110

[4] Charlottesville Myths - More Restaurants Than DC? (Per Capita) | cVillain. (n.d.).*cVillain: Charlottesville News, Food and Gossip*. Retrieved November 16, 2010, from http://cvillain.com/2010/01/11/charlottesville-myths-more-restaurants-than-dc-per-capita/

[5]Green Your Dining out | GreenYour.com. (n.d.).*Home | GreenYour.com*. Retrieved November 16, 2010, from http://www.greenyour.com/lifestyle/food-drink/dining-out

[6]On-Site Composting of Restaurants--Organic Economic, Ecological, And Social Costs Benefits. (n.d.).*Scribd*. Retrieved October 5, 2010, from http://www.scribd.com/doc/7608453/OnSite-Composting-of-RestaurantsOrganic-Economic-Ecological-And-Social-Costs-Benefits

[7]Evaluate Your Waste Stream. (n.d.).*US EPA*. Retrieved October 5, 2010, from http://www.epa.gov/osw/conserve/materials/organics/pubs/started.pdf

[8] 7-II/A-3 ORGANIC MATERIAL IN-VESSEL COMPOSTING. (n.d.).*Joint Service Pollution Prevention and Sustainability Technical Library.* Retrieved November 16, 2010, from http://www.p2sustainabilitylibrary.mil/p2_opportunity_handbook/7_II_A_3.html

[9]Sugiura, K., Yamatani, S., Watahara, M., &Onodera, T. (2009). Ecofeed, animal feed produced from recycled food waste. *Veterinaria Italiana*, *45*, 397-404. Retrieved November 5, 2010, from http://www.izs.it/vet_italiana/2009/45_3/397.pdf

[10]Sugiura, K., Yamatani, S., Watahara, M., & Onodera, T. (2009). Ecofeed, animal feed produced from recycled food waste. *Veterinaria Italiana*, *45*, 397-404. Retrieved November 5, 2010, from http://www.izs.it/vet_italiana/2009/45_3/397.pdf

[11] Feeding, -. S. (n.d.).Using Food Processing By-Products for Animal Feed CD-37.*Biological and Agricultural Engineering - North Carolina State University*. Retrieved December 5, 2010, from http://www.bae.ncsu.edu/programs/extension/publicat/wqwm/cd37.html

[12]Types of Composting. (n.d.). *Benefits of Recycling.* Retrieved November 16, 2010, from http://www.benefits-of-recycling.com/typesofcomposting.html

[13] Environmental Benefits | Composting | US EPA. (n.d.).*US Environmental Protection Agency*. Retrieved November 16, 2010, from http://www.epa.gov/osw/conserve/rrr/composting/benefits.htm

[14]On-Site Composting of Restaurants--Organic Economic, Ecological, And Social Costs Benefits. (n.d.).*Scribd*. Retrieved October 5, 2010, from http://www.scribd.com/doc/7608453/OnSite-Composting-of-RestaurantsOrganic-Economic-Ecological-And-Social-Costs-Benefits

[15]timbercreek organics | Compost. (n.d.).*timbercreek organics*. Retrieved December 6, 2010, from http://tcorganics.com/compost

Appendix A: Timeline of Implementation

September 14	Formed team and identified food waste problem
September 17	Identified Revolutionary Soup as local business to work with
September 18	Started research on food waste problem and potential solutions
September 20	Began to recognize that health regulations would be a major hurdle, especially in regards to our initially desired solution of composting
October 6	Met with Revolutionary Soup manager, John, and identified him as the project mentor
October 7	Began contacting local farms (i.e. Timbercreek) about composting options, as well as researching other local farms and gardens to potentially partner with
October 14	Identified UVa Dining as a possible sustainable partner and contacted UVa Sustainability Coordinator Kendall Singleton
October 15	Called Virginia Department of Environmental Quality to get more information on health regulations
October 20 - 27	Researched other alternatives to composting, decided composting was indeed the best solution to our identified problem
October 30	Began weighing organic waste at Revolutionary Soup to determine how much waste could be eliminated by composting

November 1	Began talks with Timbercreek Farms about their Timbercreek Organics composting service
November 9	Met with Kendall Singleton and saw pulper and UVa Dining's O'Hill composting system; got more information about a system we could model after
November 11	Decided that for complete success more restaurants would have to get involved; began talking with Timbercreek about their composting capacity and solidified Revolutionary Soup's partnership with them in this respect; began calling other local restaurants regarding composting
November 22	Decided to change focus from Revolutionary Soup to Composting Publicity Campaign
December 15	Begin to publicize the composting initiative in the Charlottesville area
December 30	Begin tracking involvement at Timbercreek
January 15	Run ads in Charlottesville Daily Progress
January 20	Run ads in Cavalier Daily
January 30	Hold publicity event on Grounds and at Downtown Mall

Appendix B: Budget for Compost Publicity Campaign

Composting Publicity Campaign Budget		
Flyers		
Number of Flyers	$	500.00
[1]Kinkos cost per signature flyer	$	0.49
	$	245.00
Ad in Cavalier Daily		
[2]Cost per ad	$	8.00
Ad in Charolottesville Daily Prograss		
[3]Cost per individual ad	$	50.00

Sources:

[3]Advertise with Us | Daily Progress. (n.d.). *Home | Daily Progress* . Retrieved November 17, 2010, from http://www2.dailyprogress.com/advertise/

[1]Full Page Flyer Printing - Full Color Flyer Printing | FedEx Office. (n.d.). *Global Homepage* . Retrieved November 17, 2010, from http://www.fedex.com/us/office/copyprint/brochures/flyers.html

[2]Rates | The Cavalier Daily. (n.d.). *The Cavalier Daily: University of Virginia Student Newspaper* . Retrieved November 17, 2010, from http://www.cavalierdaily.com/advertise/rates/

Appendix C: This brochure will be distributed to local restaurants and business to garner support and participation for the Timbercreek Organics Composting Project

Why Compost?

Composting is an effective way to reduce the food waste that your restaurant or business generates. Food waste is a pervasive environmental issue that needs to be combatted. 25.9 million tons of food is thrown out each year. This waste goes to a landfill where it sits for years, releasing harmful methane gas into our air. You and your business could be among the first in the fight against this issue by sending your food to Timbercreek Organics to be composted.

UVa Global Sustainability

2245 Garth Road
Charlottesville, VA, 22901
Phone: 434-295-7600
E-mail: info@tcorganics.com

UVa Global Sustainability

Compost: From Trash to Dirt

Timbercreek Organics Compost Project

Tel: 434-295-7600

Appendix C continued:

Timbercreek Organics Composting Service

Timbercreek Farms has a composting service that we call the Timbercreek Organics Composting Project. Timbercreek Farms is located less than 10 miles from the University of Virginia. We provide businesses with 90-gallon containers for waste storage if necessary. The waste is picked up for a fee of $10 on a weekly basis, depending on the amount of waste generated.

Currently, Whole Foods, La Taza Coffeehouse, Harvest Moon Catering, Cavalier Lawn Service, along with other local businesses already take advantage of our composting service.

Which Composting Method is Right for your Business?

There are several different methods of composting: anaerobic, aerobic, and vermicomposting. *Anaerobic composting* is essentially composting without air and is very low maintenance. This method is very slow, time-consuming., and produces a foul smell. *Aerobic composting*, which is composting using air, is much more high maintenance. It requires that the waste is turned often and temperatures must remain high. This is most suitable for very large volumes of compost. Finally, *vermicomposting* uses red worms, along with bacteria, fungi, insects, and other bugs to break down the waste. This method is most suitable for food waste and requires a moderate amount of maintenance.

The Timbercreek Organics Composting Project uses a combination of aerobic and vermicomposting. Our process is very natural and requires little maintenance. We can take your food waste and create compost using this method; at this time, however, we cannot accept post-consumer material.

Regulatory Concerns Confronted

Government regulations can sometimes pose problems when composting for a business. The Virginia DEQ states that waste must be stored for fewer than seven days and must not be hazardous or cause a public nuisance, with regards to smell or the attraction of pests. Businesses taking advantage of the Timbercreek program do not have to worry about the transport of the waste, as Timbercreek Organics will pick up the waste for you.

UVa

Charlottesville, VA, 22901
Phone: 434-295-7600
E-mail: info@tcorganics.com

Appendix D: Driving Directions to Timbercreek Organics from the University of Virginia; driving reveal the proximity (about a 10 mile distance) of the farm to restaurants in the Charlottesville area

Source: Yahoo! Maps, Driving Directions, and Traffic.

Appendix E: Acknowledgements

- Zachary Miller: We would like to thank Zachary Miller from Timbercreek Organics for working with us and explaining the Timbercreek Organics composting process. He also showed us around the farm, in order to get a sense of the entire composting process on the farm.

- Kendall Singleton: We would like to thank Kendall Singleton, the University of Virginia Sustainability Coordinator. She explained the composting service at Observatory Hill Dining facility. In addition, she gave us a tour around the kitchen, to see how the pulping machine works in the whole process to gain a greater understanding.

- Employees of Revolutionary Soup: We would like to thank the employees at Revolutionary Soup because they were very helpful throughout the entire process of learning about composting. They were very responsive and expressed a lot of interest in composting.

- Jonathan Pascarella: We would like to thank Jonathan Pascarella from the Virginia Department of Environmental Quality, for his assistance with understanding the health code regulations concerning composting.

References

7-II/A-3 ORGANIC MATERIAL IN-VESSEL COMPOSTING. (n.d.).*Joint Service Pollution Prevention and Sustainability Technical Library*. Retrieved November 16, 2010, from http://www.p2sustainabilitylibrary.mil/p2_opportunity_handbook/7_II_A_3.html

Advertise with Us | Daily Progress. (n.d.).*Home | Daily Progress*. Retrieved November 17, 2010, from http://www2.dailyprogress.com/advertise/

Charlottesville Myths - More Restaurants Than DC? (Per Capita) | cVillain. (n.d.).*cVillain: Charlottesville News, Food and Gossip*. Retrieved November 16, 2010, from http://cvillain.com/2010/01/11/charlottesville-myths-more-restaurants-than-dc-per-capita/

CNN, R. O. (n.d.). All About: Food waste - CNN. *Featured Articles From The CNN*. Retrieved October 5, 2010, from http://articles.cnn.com/2007-09-24/world/food.leftovers_1_food-waste-greenhouse-gas-methane-emissions?_s=PM:WORLD

Environmental Benefits | Composting | US EPA. (n.d.).*US Environmental Protection Agency*. Retrieved November 16, 2010, from http://www.epa.gov/osw/conserve/rrr/composting/benefits.htm

Evaluate Your Waste Stream. (n.d.).*US EPA*. Retrieved October 5, 2010, from http://www.epa.gov/osw/conserve/materials/organics/pubs/started.pdf

Feeding, -. S. (n.d.).Using Food Processing By-Products for Animal Feed CD-37.*Biological and Agricultural Engineering - North Carolina State University*. Retrieved December 5, 2010, from http://www.bae.ncsu.edu/programs/extension/publicat/wqwm/cd37.html

Full Page Flyer Printing - Full Color Flyer Printing | FedEx Office. (n.d.).*Global Homepage*. Retrieved November 17, 2010, from http://www.fedex.com/us/office/copyprint/brochures/flyers.html

Green Your Dining out | GreenYour.com. (n.d.).*Home | GreenYour.com*. Retrieved November

16, 2010, from http://www.greenyour.com/lifestyle/food-drink/dining-out

Magazine, E. o. (n.d.).Food Waste and Environment - Wasting Food - The Daily Green.*Going Green, Fuel Efficiency, Organic Food, and Green Living - The Daily Green*. Retrieved October 5, 2010, from http://www.thedailygreen.com/environmental-news/latest/food-waste-environment-460110

On-Site Composting of Restaurants--Organic Economic, Ecological, And Social Costs Benefits. (n.d.).*Scribd*. Retrieved October 5, 2010, from http://www.scribd.com/doc/7608453/OnSite-Composting-of-RestaurantsOrganic-Economic-Ecological-And-Social-Costs-Benefits

Rates | The Cavalier Daily. (n.d.).*The Cavalier Daily: University of Virginia Student Newspaper*. Retrieved November 17, 2010, from http://www.cavalierdaily.com/advertise/rates/

Sugiura, K., Yamatani, S., Watahara, M., & Onodera, T. (2009). Ecofeed, animal feed produced from recycled food waste. *Veterinaria Italiana*, *45*, 397-404. Retrieved November 5, 2010, from http://www.izs.it/vet_italiana/2009/45_3/397.pdf

timbercreek organics | Compost. (n.d.).*timbercreek organics*. Retrieved December 6, 2010, from http://tcorganics.com/compost

Types of Composting. (n.d.). *Benefits of Recycling.* Retrieved November 16, 2010, from http://www.benefits-of-recycling.com/typesofcomposting.html

Yahoo! Maps, Driving Directions, and Traffic. (n.d.).*Yahoo! Maps, Driving Directions, and Traffic*. Retrieved December 6, 2010, from http://maps.yahoo.com/#mvt=m&lat=38.068555&lon=-78.5317&zoom=13&q1=University%20of%20Virginia%2C%20Charlottesville%2C%20VA%20&q2=2245%20Garth%20Rd%2C%20Charlottesville%2C%20VA%2C%2022901&gid2=3209954

Annotated Bibliography

Advertise with Us | Daily Progress. (n.d.).*Home | Daily Progress*. Retrieved November 17, 2010, from http://www2.dailyprogress.com/advertise/
This source is the Charlottesville, VA Daily Progress newspaper website; it provides information concerning current events in the Charlottesville area and advertisements rates.

Charlottesville Myths - More Restaurants Than DC? (Per Capita) | cVillain. (n.d.).*cVillain: Charlottesville News, Food and Gossip*. Retrieved November 16, 2010, from http://cvillain.com/2010/01/11/charlottesville-myths-more-restaurants-than-dc-per-capita/
cVillian.com is a local Charlottesville website that discusses the happenings in the community and a place that is open to all community members for discussion.

CNN, R. O. (n.d.). All About: Food waste - CNN. *Featured Articles From The CNN*. Retrieved October 5, 2010, from http://articles.cnn.com/2007-09-24/world/food.leftovers_1_food-waste-greenhouse-gas-methane-emissions?_s=PM:WORLD
CNN World discusses event that are happening around the world; this article, in particular, highlights the EPA's address of the environmental harms related to the release of methane gas in landfills.

Environmental Benefits | Composting | US EPA. (n.d.).*US Environmental Protection Agency*. Retrieved November 16, 2010, from http://www.epa.gov/osw/conserve/rrr/composting/benefits.htm
This source from the U.S. Environmental Protection Agency (EPA) discusses the environmental benefits of composting.

Evaluate Your Waste Stream. (n.d.).*US EPA*. Retrieved October 5, 2010, from http://www.epa.gov/osw/conserve/materials/organics/pubs/started.pdf
This source from the U.S. Environmental Protection Agency (EPA) goes through the steps of waste management and alternative methods of waste disposal such as composting.

Feeding, -. S. (n.d.).Using Food Processing By-Products for Animal Feed CD-37.*Biological and Agricultural Engineering - North Carolina State University*. Retrieved December 5, 2010, from http://www.bae.ncsu.edu/programs/extension/publicat/wqwm/cd37.html
This source from NC State University, discusses the use of animal feed and the overall use and effects of animal feed.

Full Page Flyer Printing - Full Color Flyer Printing | FedEx Office. (n.d.).*Global Homepage*. Retrieved November 17, 2010, from http://www.fedex.com/us/office/copyprint/brochures/flyers.html
This official FedEx Kinko's website talks about the services offered by fedex kinkos and

the rates for these services.

Green Your Dining out | GreenYour.com. (n.d.).*Home | GreenYour.com*. Retrieved November 16, 2010, from http://www.greenyour.com/lifestyle/food-drink/dining-out
GreenYour is a website that explains how a person can live in an environmental friendly manner; this particular article talks about how much waste is generated in the U.S. alone.

Magazine, E. o. (n.d.).Food Waste and Environment - Wasting Food - The Daily Green.*Going Green, Fuel Efficiency, Organic Food, and Green Living - The Daily Green*. Retrieved October 5, 2010, from http://www.thedailygreen.com/environmental-news/latest/food-waste-environment-460110
The Daily Green is a website the provides news, tips on how to live a green life; this particular article discusses the negative effects of food waste on the environment in the United States.

On-Site Composting of Restaurants--Organic Economic, Ecological, And Social Costs Benefits. (n.d.).*Scribd*. Retrieved October 5, 2010, from http://www.scribd.com/doc/7608453/OnSite-Composting-of-RestaurantsOrganic-Economic-Ecological-And-Social-Costs-Benefits
Scribd is the social reading and publishing company and it provides articles to be read; this particular article talks about on-site composting and the benefits of it.

Rates | The Cavalier Daily. (n.d.).*The Cavalier Daily: University of Virginia Student Newspaper*. Retrieved November 17, 2010, from http://www.cavalierdaily.com/advertise/rates/
This source is the Cavalier Daily website, and it events that are happening in the Charlottesville area and the University of Virginia community; it provides information about the rates of posting an ad in the newspaper.

Sugiura, K., Yamatani, S., Watahara, M., &Onodera, T. (2009). Ecofeed, animal feed produced from recycled food waste. *Veterinaria Italiana*, *45*, 397-404. Retrieved November 5, 2010, from http://www.izs.it/vet_italiana/2009/45_3/397.pdf
Veterinaria Italiana is a peer-reviewed journal on veterinary public health; this particular article in the journal talks about the overall effects and use of food waste as animal feed.

timbercreek organics | Compost. (n.d.).*timbercreek organics*. Retrieved December 6, 2010, from http://tcorganics.com/compost
This source is the official website of Timbercreek Organics, a local farm in Charlottesville, VA; this site discusses the services offered by the farm.

Types of Composting. (n.d.). *Benefits of Recycling.* Retrieved November 16, 2010, from http://www.benefits-of-recycling.com/typesofcomposting.html
This source is dedicated to solely talking about the benefits of recycling and it breaks down the different types of composting that are available.