University of Cincinnati Study

Academic year 2007-2009

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"The goal of education is to make people wiser, more knowledgeable, better informed, ethical, responsible, critical, and capable of continuing to learn" UNESCO.

Abstract

This paper is part of the “Cincinnati Food Congress” Project of the University of Cincinnati Community Design Center started in 2004. The research activity described in this paper was the outgrowth of the academic studio research and design work of the University of Cincinnati Niehoff Urban Studio of 2002-04 and the subsequent first stage of a greater Cincinnati food system assessment by the University of Cincinnati Community Design Center in 2005-06. This previous work of the Cincinnati Food Congress aimed to explore and comprehend the food system of the University of Cincinnati. This paper outlines the findings of the second stage of research work concerning the place of the University of Cincinnati, as an institution within the Cincinnati food system. The University of Cincinnati, as a major institution, and the region’s largest employer, is an important part of the local food system in terms of the amount of food purchased as well as the waste produced, this paper seeks to examine food management practices within the university and all the elements related to its internal food system.

This research looks at the functioning of UC’s dining services and the conservation programs provided to diminish its environmental footprint. Also, the research analyzes the University of Cincinnati in terms of food management performance, compares UC’s dining services to some other universities’ dining programs, and explores some strategies for improvement of the food system in higher education institutions. This project included some interviews, informal meetings, focus groups, and a campus wide survey which was responded by 2,495 individuals.

Some of the preliminary conclusions of this research include: (1) the end of the contract period with ARAMARK in 2010 could be an opportunity for dining services at the University of Cincinnati to improve the food system as a whole by demanding more environmentally oriented programs and making food management more efficient in terms of reducing the environmental footprint; (2) some studies and universities across the country have shown that self-management dining services are more effective than contracted ones; this could be considered a long-term
goal for the University of Cincinnati administration; (3) the University of Cincinnati, in comparison with other universities in terms of dining and food waste management, seems to be a low-performer in diminishing the footprint and the environmental impact of its food system. Universities play an important role in the education of those future leaders that will have a responsibility to understand local food systems.

Last but not least, this research has shown that the institutional food system is a subject that needs to be addressed and studied more deeply. There are multiple opportunities for future improvement in this area.
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1. Introduction

As a result of previous academic, research, and design projects, conducted at the University of Cincinnati, we have found certain weaknesses in our local food system. These weaknesses include loss of local food production capacity, lack of diversity in retail food outlets, opportunities food vending in public places, inequity/access to retail food in poor neighborhoods, and other issues.

Since we have studied the regional food system, we are beginning to understand the strengths and weakness of it. While the Community Design Center is not in a position to implement policies, we do have some recommendations regarding food policy. In developing these recommendations, we primarily aimed to understand and analyze the food system at the University of Cincinnati, as it is one of the larger institutional components of the food system within the city.

Universities and colleges consume large quantities of food and also generate a significant amount of waste. This solid waste includes not just papers, plastic, glass, and food waste, but also hazardous waste, such as chemical waste, pesticides, paints, solvents, and radioactive wastes. The direct environmental impacts generated by universities off-campus by the use of food service suppliers and the production of goods outside the institution (such as the use of pesticides on food) includes air pollution by food transportation, waste production, and landfill contamination (Hammond, 1998).

As a result, sustainable development is considered by universities and colleges as one of the biggest challenges of the twenty-first century. Numerous universities have initiated green initiatives and debates about the role of higher education in sustainability and how these institutions could integrate their university policy, organization, and activities (Van Weenen, 2000).

This paper does not attempt to discuss sustainability or sustainable development, but rather seeks to understand the food system at the University of Cincinnati, review educational programs related to food, explore some other universities initiatives dealing with food management, and make some recommendations to improve institutional performance in this sense.
1.1 Background

The Community Design Center has worked on food system since 2002. This section serves to summarize and explain the previous projects as well as their findings, limitations, and achievements.

In 2004, the University of Cincinnati Community Design Center and the Nichoff Urban Studio Program concluded an academic study of food related design and development issues in the Cincinnati area. The project was based on the study of urban supermarket design, social aspects of retail food uses, equity/access to retail food, food uses as urban development tools, food vending in public spaces, urban agriculture, the preservation of local food production, and other issues.

In 2005 the UC Community Design Center, with support from the Tilda Fund initiated a research and outreach project entitled, the “Cincinnati Food Congress” (see Fig. 1) The main objectives of this Congress were to study the feasibility of conducting a food system assessment for Greater Cincinnati. "A Community Food Assessment is a collaborative and participatory
process that systematically examines a broad range of community food issues and assets, so as to inform change actions to make the community more food secure" (Pothukuchi, 2007). This is a tool for a community to identify both its opportunities and its resources regarding food.

Through the involvement of the community and its prospective partners (such as farmers, food suppliers, stakeholders, schools, hospitals and policy councils), a community Food assessment might motivate people toward developing local solutions to local needs.

Generally, community food assessments have three basic characteristics: (1) they use an asset building approach, (2) they engage community members to help set priorities, conduct research, and develop recommendations, and (3) they have an action orientation and include recommendations for changes. Each community food assessment is unique, and the nature of each assessment can vary widely (Food Security Learning Center).

In the first stage of work the Congress convened representatives of a number of food related organizations to discuss the feasibility of conducting a food system assessment in Greater Cincinnati. Several meetings were held with organizations as diverse as The Nutrition Council, the Free Store/Food Bank, The Civic Garden Center, and others during the spring of 2005. In these meetings interested persons and groups along with the Community Design Center were afforded a joint opportunity to participate in discussions, ideas, and goals for a Community Food Assessment of the Greater Cincinnati Area.

In the second phase of work The Cincinnati Food Congress began development of a comprehensive resource database aimed at identifying various food related organizations in the Greater Cincinnati Area. Three types of database models were discussed: 1) Interest Groups; 2) Organization Types; and 3) Comprehensive. The main groups are mentioned below: (See Figure 2).

- Anti-Hunger Resources/Services: a total of 551 records were collected.
- Public Health and Nutrition: 21 records were found.
- Conventional Food System: a total of 20 records were compiled.
- Community-Based and/or Local Food Systems: 63 records were collected under this sector.
- Community Organizations/Institutions: 63 records were collected.
- Infrastructure/Transportation: limited information was gathered for this sector.
- Community Development/Economic: limited information was gathered for this sector.
Introduction

- Environmental (Food System Related Issues): limited information gathered.
- Policy: Limited information gathered.
- Media: Limited information gathered.

During the academic year of 2008-2009 the Community Design Center continued organizing “The Cincinnati Regional Food Congress” with stakeholders active in food-related issues in Greater Cincinnati. This effort hopes to bring together a diverse number of organizations active in the food system in the Cincinnati Metro area. At the Food Congress the Center plans to assess the current condition and problems in our metropolitan food system.

1.2 University of Cincinnati Study 2007-2009

The University of Cincinnati is an important part of the city’s food system not only in terms of the amount of food that is demanded, but also in terms of the amount of food waste generated. In this research study, the Community Design Center intends to explore both the food system and food management practices at the University of Cincinnati.

The food system is a network that integrates sustainable food production, processing, distribution, consumption, and waste management. The improvement of the local food system...
can enhance the environmental, economic, social, and nutrition health of its community. The objective of this research, as such, is to understand the components of the food system, conduct an analysis of it, evaluate food management, and determine how the food system could be enhanced.
2. Literature Review

Recently, concerns about the increasing rate of obesity in young people have promoted changes in university dining services regarding the variety of menus, nutrition information, organic food, and the purchasing of local farming products. The incidence of excess weight in adolescents has increased almost 200% in the last 20 years, “with the greatest increase occurring with 19- to 24-year-old young adults”, according to Martha ConkUn (ConkUn, Cranage and Lambert, 2005).

Students who eat at dining halls are often exposed to a wider variety of food than they are used to having at home, and this availability may cause overconsumption. Studies had shown that many college students put on about 15 pounds during their first year alone – the so-called “freshman 15.” Many doctors are concerned that students who gradually put on pounds are establishing a pattern of weight gain that could spell trouble if it continues (Hirsch L, 2007). By placing nutrition information on the serving line or at cooking stations, universities could help young adults to make more balanced choices and to get to know the calories and nutrients they consume.

2.1 Food and the environmental role of higher education

The word university is derived from the Latin universitas magistrorum et scholarium, which means "community of teachers and scholars” (Encyclopedia Britanica, 1911). Originally universities were centers for studying the universe. As time has passed universities have diversified and enhanced the science and subjects studies…” although traditional science has made numerous important contributions to the improvement of the quality of life of many people all around the world, it has also contributed to the creation of a very unsustainable world” (Van Weenen, 200).

Universities have to respond to the challenge of being environmentally friendly, sustainable, and responsible for educating and raising awareness of environmental issues among the students. This will be a key factor in the implementation of the changes that we need to reduce our negative impact on the earth.

2.1.1 Sustainability and environment in Higher education

Many universities have recently attempted to improve their relationships with their environments by implementing different types of environmental programs like those mentioned
above; however, “greening” initiatives in higher education institutions appear to receive far less attention in practice than environmental polices (Starik. M, Schaeffer. T, Berman. P and Hazelwood, 2002).

Universities have the infrastructure and the social capital to encourage students to think, to be proactive, to diminish our impact on the environment, and to find alternatives that improve our standard of living without compromising natural resources, our health, or future generations.

Along with building awareness and knowledge of environmental issues, there are also many ways in which universities can be involved in sustainable development, including environmental management, planning, education, research, and operations, as well as community-based services, purchasing, transportation, design, new construction, renovation and retrofitting (ULSF, 2002).

Education is a key factor in changing our behavior and improving our relationship with environment. Certainly, it is crucial that universities update their academic curriculum with topics on sustainability across all disciplines. Universities teach millions of students each year and these students’ performance as professionals, consumers, investors, and community members affects people around and the world.

These future citizens will play a critical role in handling complex social issues and providing stewardship of fragile environmental resources. Education in sustainable development means incorporating environmental, social, and economic problems and solutions into the academic curriculum, so that students' understanding of these topics grows along with their understanding of their course work and profession. If students become aware of how they use resources, they can then transform their actions in order to create healthier ecosystems, communities, and stronger economies (SCUP, 2008).

Moreover, education can be decisive in the improvement of the higher education food system in that it may increase local farms purchasing, reduce food transportation cost and distances, diminish the use of packing and non-recyclable products in dining courts, increase the amount of fresh and organic food consumed, and reduce waste (wasted heat, wasted water, wasted electricity, waste chemical and solid waste). Embracing waste reduction projects can save the university money, even though implementing some projects can require up-front capital (Hammond, 1998).
2.1.2 Conditions to determine success-initiatives

According to Hammond there are some conditions or elements that are necessary to take into consideration to guarantee the success of environmental initiatives across university campuses. These include purchasing organic foods grown by local farms, using resources efficiently, reducing waste, recycling, and buying green products.

Furthermore, the design and implementation of environmental policies across the campus often determines the achievement of goals. In order to successfully carry out actions, it is necessary to create environmental committees consisting of administrative staff, faculty, and students. This diverse participation will guarantee a decision-making commitment and tighter involvement of the university community. Along with clear environmental commitments, a key factor in the successful implementation of any green action is an understanding of how the institution works, as well as it is the main players and decision-making processes.

For universities to improve their environmental actions as a whole, one of the essential elements is to establish environmental leader positions, endowed with a responsibility for researching, fund raising, increasing awareness programs, and influencing environmental stewardship actions on campus (Hammond, 1998).

2.2 Dining Services, initiatives for improvement

The process of growing, transporting, preparing, cooking, and serving food has significant environmental consequences. Cooking and storing food consumes gas and electricity, produces solid waste, requires pesticides and fertilizers in crop production, relies on the use of chemicals in processed food, and results in gas emissions from production and distribution.

Many universities have implemented and designed dining commons incorporating cooking stations instead of one-line cafeterias. This new concept has allowed universities to increase the availability of nutrition facts, educate students to eat healthier, reduce food waste, increase environmental awareness in students, and diminish their environmental footprint. Dining services represent an opportune and rewarding place to undertake environmental stewardship programs; however, most of the initiatives require educating the consumers, vendors, dining hall staff and management, and suppliers.
Some of the initiatives that have been implemented by other campuses in order to improve the dining services and could be potentially evaluated by University of Cincinnati Facilities Management are:

\textbf{a. Loading Docks}

Dining services receive food and supplies in cardboard boxes, cases, or plastic containers. There should be an assessment team that is in charge of collecting all the recyclable materials and identifying the ways in which the loading is currently used in order to improve its management, space, lighting use, and air curtains (to reduce heat loss).

\textbf{b. Packing reduction, purchasing in bulk}

Most of the products that dining services purchases come with unnecessary packing that could be reduced by buying products in bulk or packing less. Some products’ packing simplifies handling and ensures safety, hygiene, and freshness; however, some can be eliminated. Condiments, salad dressing, napkins, sugar, flours, cereals, ketchup, concentrated juices, and stocks are some examples of products that can be purchased by universities in order to reduce packing and save money as well. Determining the products that are available in bulk can be a difficult task, but dining services can ask suppliers to help identify products that generate less waste (Hammond Creighton, 1998).

\textbf{c. Tray-less Dining}

Portion control is a job at campuses that have implemented a cooking station system in dining halls. Students often pile on their trays more food they can eat. Nevertheless, there are many universities that have implemented tray-less dining services\(^1\). Tray-less dining has been proven by some universities to reduce food and beverage waste by 30 to 50 percent. Without trays to wash, water consumption is also significantly deceased (Ellin, 2008).

\textbf{d. Organic and local food (fruit and vegetable markets, farm to college)}

Farm-to-college programs have been initiated all across the U.S. to connect colleges and universities with local producers in their area and to provide locally grown food for campus

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\(^1\) See more information about the University of Cincinnati’s tray-less pilot program in Chapter XX. The program was implemented as a pilot during Earth Week 2008 and then established since fall 2008. See http://www.uc.edu/News/NR.aspx?ID=8768 .
meals. There are 115 colleges registered in farm-to-college organization nationwide; in Ohio, there are just five: Ohio University, Case Western Reserve University, Kenyon College, Oberlin College, Otterbein College (Farm to College Organization). The three most common programs running in higher education institutions regarding the food system and farming are recycling, composting, and nutrition education (See Figure 3).

![Campus environmental initiatives that are connected with the farm-to-college program](image)

Figure 3: Environmental Campus Initiatives in the U.S. Source: Community Food Security Coalition web site.

e. **Establish a Dining Environmental Committee**

Dining services should have a committee that addresses issues across the dining halls. The group must include dining managers, kitchen staff, students, faculty, and recycling coordinators; they would establish an environmental action area for inclusion in the environmental policies and in the department’s strategic plan.

f. **Weigh food waste to reduce it**

Some schools have successfully implemented a monitoring and evaluation waste reduction program. Monitoring and evaluating the schools’ waste helps to measure not only the waste and its reduction, but also the trends in consumption among students.
Weighing food waste is necessary to track information during the evaluation period to get a real sense of the average amount of waste and to establish goals to reduce the amounts of waste. The evaluation period also tells dining services what is and is not working in waste reduction programs (EPA, 2007).

To determine the results of the program, the weight must be recorded on a tracking sheet. Annually, the evaluation of the collected information helps to determine the amount of material diverted from the waste stream, providing waste reduction results. Also, it is important to compare the baseline figures to the annual data to convert waste reduction results into a cost savings analysis of a waste reduction program.

Waste reduction can also be translated into quantifiable environmental benefits. Using the values and calculations on a school’s tracking sheet, waste reduction numbers can be compared to greenhouse gas emission reductions and energy savings (EPA, Global Warming Actions).

**g. Buy recycled products**

University Facilities Offices can ask their contracted dining services to purchase products made from recycled materials. This helps to close the recycling loop. Some of the recycled materials could be cardboard boxes, napkins, kitchen paper, bags, and so on.

**h. Compost food waste and donate excess food to pantries**

As was explained in chapter 2, composting is a biological process that transforms organic waste into valuable material capable of improving the soil quality in gardens and fields. The final product, compost, provides plants with nutrients, reduces soil diseases, increases water retention, and promotes weed and erosion control. In dining halls, often compostable materials are also recyclable and include hand towels, paper plates, napkins, wax and paper cups, wax and non-wax cardboard, and pre and post-consumer food waste, such as coffee grounds, tea bags, egg shells, fruit and vegetable waste, breads, dairy products, and jelly.

This process has been implemented by several universities in the U.S; however, it requires special considerations regarding adequate space, security operations, and supervision. In some cases, colleges do not have the infrastructure or required resources to run a composting program; nevertheless, excess food can be donated to local pantries and food waste can be turned into animal feed.
2.3 Environmental policies and solid waste management

2.3.1 University of Cincinnati Policies

The University of Cincinnati has some environmentally-oriented policies; however, the policies related to waste reduction and management tends to be specifically focused on hazardous materials from experiments, laboratories, and medical departments (See appendix 2).

Furthermore, the university’s Waste Management Program Policy is too general and does not specify the procedures and alternatives that can be implemented in terms of reducing, controlling, and transforming the food waste.

The fact that the University of Cincinnati does not have a well-defined and structured food system policy or a food scraps management manual, represents one of the biggest limitations for the university in improving its food system as a whole. The legal framework also constitutes an essential element of the system and it should be upgraded taking in consideration 21st Century’s challenges.

2.3.2 OHIO, Environment Protection Agency (EPA)

The State of Ohio has specific regulations regarding registered solid waste composting facilities. This guidance document describes the responsibilities associated with some specific waste materials and composting (See appendix 3).

This Agency has different programs, grants, and policies that help schools and universities improve their food waste management. The Ohio University was awarded in 2007 with $300,000 through the Ohio Department of Natural Resources Division of Recycling and Litter Prevention to enhance their composting project. The University of Cincinnati should find some funds that allow it to improve the food waste process. Even though the University of Cincinnati faces some limitations in this regard, there are plenty of opportunities to develop new processes and to improve the waste management and the food system in general.
3 Food System at UC, Uptown West Camp

3.1 Food Services

a. Department of Housing and Food

This Department is in charge of managing the food courts and cafeterias on-campus, controlling quality, and designing the offering strategies and regulation framework. Originally, UC dining service was self-operated; however, this service has been changed to a contracted operation since 2000 (See Figure 4).

Figure 4: University of Cincinnati Food Services Organizational Administration Flow Chart. Source: Daly, K (2007).

On West Campus, there are two main dinner centers: the Market Pointe at Sidall Hall and the Center Court in the Campus Recreation Center. According to the Director, Auxiliary Services of the Housing and Food Services Department, John Hautz the Market Pointe was completely renewed by 2002 and started operation with cooking stations instead of the traditional cafeteria concept. This new type of dining court gives to students the opportunity to choose the meal they want and thereby diminishes the waste of food. In summer 2006, this dining center was recognized by the National Association of College and University Food Services for the variety of menus and high quality standards.
The Center Court Dining Center opened in 2006 and includes the Center Court, Stadium View Café and Zia Juice, and has been nationally recognized as leader in its approach to campus food preparation. This dining center has been designed to serve 393 clients.

Both, the Market Point and Court Center offer Italian food (pizza, pasta bakes, garlic bread-sticks, pasta pomodoro and risotto with eggplant), Cincy Grill (all-American classics Burgers, Chili Coney’s, grilled specialty sandwiches and fries), Deli Sandwiches, Salads, Fresh Veggies (stir-fry, placed over a bed of rice or noodles), Rotisserie (chicken, turkey, pot pie, pastry and mash potatoes) and a wide variety of desserts. In addition, they organize international days throughout the year to allow student to taste different types of food.

Recently two green initiatives have been incorporated to the dining courts aiming to save water flow and recycle vegetable oil. In the Court Center a high efficiency dishwasher machine has been installed to minimize the water used, and at the Market Point a filter system for the used vegetable oil allows it to be sold to other companies to be transformed either in biodiesel or to be recycled.

The target population to be served by the Department of Housing and Food are full-time undergraduate students that live in the West Campus residence halls. Besides serving the resident population on campus (3,000), the two dining centers also serve regular students, staff, faculty, and other employees (See Table 1).

Table 1: UC West Campus Population.

<table>
<thead>
<tr>
<th>Population</th>
<th>UC's West Campus Data *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate Students (Freshman)</td>
<td>21,000 (6,150)</td>
</tr>
<tr>
<td>(Living on campus)</td>
<td>(3,000)</td>
</tr>
<tr>
<td>Graduate Students</td>
<td>5,490</td>
</tr>
<tr>
<td>Faculty</td>
<td>4,400</td>
</tr>
<tr>
<td>Staff</td>
<td>3,000</td>
</tr>
</tbody>
</table>

Note: (*) approximated. Data provided by UC’s Dining Services in personal meetings.
b. **Food Provider**

ARAMARK is the provider contracted for a 10 year period, since 2000. This company supplies both retail and residential meal plans. In addition, they manage the day to day operations (food supplying, distribution, safe handling, storage and preparation of meals) of dining services (See Figure 5).

According to Ian M. Sroufe, ARAMARK is also responsible for deciding what type of food to purchase and which vendors to purchase from. The main supplier is Sysco at National level and Delhi Foods in Cincinnati area. This last one purchases products, mainly, from Louville, Kentucky, at the regional level. Although, the regional supply depends on the season, the products that come from Kentucky represent about 30% of the total food consumed at UC (Soufre, 2008).

According to the College Sustainability Report Card\(^2\), the University of Cincinnati received a B- in the overall grading. However the Food & Recycling component of the rating noted that the SYSCO purchases locally grown food from 10 to 15 different regional farms and spend about 12% of its annual food budget in local items.

\(^2\) The *College Sustainability Report Card* is the only independent evaluation of campus and endowment sustainability activities at colleges and universities in the United States and Canada.
ARAMARK is also in charge of the food supply and the management of sixteen halls, courts, café shops, cafeterias and restaurants around the West Campus, Calhoun Hall, CRC Residence Hall, Dabney Hall, Daniels Hall, Turner-Schneider, Scioto-Morgens Complex, Siddall Hall, Campus View Café, CCM Café, CenterCourt, DAAP Café, MarketPointe, Mick & Mack's Café, Stadium View Café, Pizza Hut, Jump and Starbucks (See Figure 5). All vendors offer a variety of menus checked by a nutritionist. On the other hand, the franchises on campus such as Subway, Wendy’s and Gold Star Chilli, are not part of the management and administration contract, however ARAMARK is responsible to approve their licenses and sub-contracts for operation on campus.

c. Facilities Management:

This UC Division is responsible for providing repair, cleaning and support services throughout all 97 buildings on campus. The mission of Facilities Management is to provide safe, healthy, and comfortable services and environments, using service excellence to support the advancement of the university.

The division is subdivided into twelve departments. The waste and garbage are management by Rumpke which is a any outside contracted service. Rumpke Recycling offers many comprehensive recycling programs including cardboard, office paper, and single stream collection. Rumpke is in charge of collecting the recycle bins.

3.2 UC Food System Elements

3.2.1 Food Production

ARAMARK is responsible for purchasing the food and supplies and providing them to the university. The company decides on the types of products to purchase, according to the season, cost, and university requirements (Daly, 2007).

3.2.2 Food Supplier and Transportation

ARAMARK is in charge for keeping the food in its original packages and distributing on campus at least 3 times a week. The primary supplier of meat and other protein foods, frozen goods, and nonperishable foods is Sysco; dairy is provided by Trauth Dairy; and the primary
supplier of fresh produce Is Piazza Produce Company (Daly.F, 2007). If necessary, ARAMARK will contract with the vendors; however, the current agreements are non-contractual.

ARAMARK is also in charge of ensuring safe handling, storage, and preparation of all food and meals. According to Ian M. Sroufe, depending on the season, the food comes from different locations, but is mainly transported from California, Florida, South Carolina, and Georgia. Some products are also imported from Mexico, Chile, and India. According to the Green Report Card just around 12% of the food purchased by ARAMARK is from local farms, this number is not consistent with the information provided by Sroufe, who mentions about 20% in a meeting.

3.2.3 Consumption

UC Dining Courts serve about 3,000 students and, during the academic year 2007-2008, sold approximately 25,000 meals per week, at a production cost of $2 each meal (See appendix 1). Dining services offers to the resident student’s different meal plans as well as some options for independent plans too (See Table 2).

Table 2: 2008-2009 UC’s Residential Meals Plan (BBC- Bearcat Card)

<table>
<thead>
<tr>
<th>Meal Plan</th>
<th>Description</th>
<th>Cost/Quarter</th>
<th>Cost/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>209 Value Plan (19 meals per week)</strong></td>
<td>209 meals/quarter*</td>
<td>$1,239</td>
<td>$3,717</td>
</tr>
<tr>
<td><strong>154 Plan (14 meals per week)</strong></td>
<td>154 meals/quarter*</td>
<td>$1,178</td>
<td>$3,534</td>
</tr>
<tr>
<td><strong>132 Plus Plan (12 meals per week)</strong></td>
<td>132 meals/quarter*</td>
<td>$1,239</td>
<td>$3,717</td>
</tr>
<tr>
<td><strong>Platinum Independent Meal Plan</strong></td>
<td>45 meals/quarter*</td>
<td>$405</td>
<td>$1,215</td>
</tr>
<tr>
<td><em>(45 meals/quarter, returning residents only)</em></td>
<td>$100 BCC dollars**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Returning residents have two additional options within their Housing Agreement:

The Platinum Level Independent Meal Plan.
The Upper-class No-Meal Plan option.
The Platinum Level Independent Meal Plan is subject to the terms and conditions of the Independent Meal.

* Meals on the plan may be used at MarketPointe@Siddall and CenterCourt Dining Centers.
** Bearcat Campus Card (BCC) dollar amounts are added to the student’s ID as part of the meal plan. UC. Source: Housing and Food Services. Available at:
http://www.uc.edu/food/meal_plans/res_meal_plans.html
According to Ian M. Sroufe the portions served to the students are about 6-7 ounces (0.40 lb). Assuming an average of three portions per meal, per student, we have calculated an approximate total of 122 lb per month (715 tons/year). Food consumption is distributed in seven categories such as: meats (poultry, beef and fish), fruits and vegetables, groceries (flour, sugar, ketchup, salad dressing, salt, spices, eggs, etc), dairy (milk, cheese, yogurt, butter, etc), bread, beverage (coca-cola products and coffee) and miscellaneous (some specific ingredients, napkins, kitchen paper, etc). Groceries represent 23% of the total budget, meats 20%, and fruits and vegetables 17% and 18% (See Figure 6).

![Food Consumption/Per week at UC's Dining Courts (2007-2008)](image)

Figure 6: Food Consumption at UC's Dining Courts (2007-2008). Source: Ian Sroufe, UC Dining Services, Board Operation Director.

If dining services management were able to increase the amount of local fruits, vegetables and dairy, the cost of these products would be reduced significantly and part of the budget could be used alternatively to strengthen environmental audits (such as weighing the food scrap, separating food waste from non-organic waste, and researching energy reduction in food cost transportation).

There is a legal framework and regulations that dining services have to follow in order to operate the dining halls, distribute the food around campus, cook the meals, and design the menus. The Cincinnati Health Department is the institution in charge of regulating the food
operation in the dining halls, while the Dining Services Office checks the menus and their nutritional facts and coordinates and supervises ARAMARK’s management.

Figure 7: Preparation and Consumption. Sources: UC Dining Services’ meetings. Designed by: Lizbeth Ruiz

ARAMARK is responsible for the preparation of meals, keeping the kitchen and equipment according to the safety and health standards, storing the food, managing the chefs and kitchen staff, evaluating the cost of the menus, determining the menus, purchasing, and meeting the demands of their main client: the freshmen (See Figure 7).

3.2.4 Food Disposal

According to the Director of Auxiliary Services of Housing and Dining Department, John Hautz, when the contract with ARAMARK was signed in 2000, the environmental awareness was not as strong as it is now. Due to rising environmental concern and the steady increase of oil prices, decreasing the environmental impact of universities is an issue that has to be addressed. Although the contract between ARAMARK and the University of Cincinnati does not establish any responsibility or action regarding this issue, amending the contract to implement some initiatives in the future has been discussed.

The university was composting organic waste through Rumpke until 2006, when the program was stopped due to space deficit and regulations issues (information provided by Mr. Rick Wiggins, Director of Facilities Management). Since then the University is not composting. Nevertheless, the recycling program has been strengthened and now includes student
involvement and school competitions. The statistics of both programs are shown below (See Figures 8 and 9).

![Chart](chart.png)

**Figure 8:** Tons of waste composted at UC (1996-2006), not include organic waste. The decline of tons of waste composted at UC was due to space deficit and regulation issues for Rumpke, according to Rick Wiggins. Source: UC’s recycling statistics, available at UC’s web site.

![Chart](chart2.png)

**Figure 9:** Tons of waste recycled at UC (1996-2007). Information that could explain the drop in the number of tons recycled in 2007 was not found. Source: UC’s recycling statistics.

Furthermore, according to the UC’s Facilities Management Director, the budget for the Recycling Program is limited and does not include composting activities. The cost of carrying out the Recycling Program is about $70,000 annually, including labor, but its saving impacts are
still being measured. Although the amount of recycled materials almost doubled in 2007 (9,000 pounds), recycling is expensive for the campus and Facilities Management has not been able to save or make any money out of the recycling program; nevertheless, there is a plan to move recycling and composting to another scale within the city and in partnership with some local organizations.

Still, the university has reduced solid waste by 35% on campus as consequence of the increase in educational campaigns and the encouragement of the resident students. Energy consumption dropped about 8% in 2007, according to the UC’s Facilities Management Director. These results can be used as incentives to promote more initiatives regarding waste and energy management on campus. On the other hand, one of the limitations for the Facilities Management in terms of running its own composting program is that there is not space suitable and available for this activity. Despite this, the Facilities Management Office is in conversations with some organizations within the nearby likewise Cincinnati Zoo, in order to constitute a partnership that allows both parties to reduce waste, increase recycling, and compost food scrap (information provided by Mr. Rick Wiggins, Director of Facilities Management).

During Earth Week 2008 (spring quarter), the dining services ran the “Tray-less pilot program” to measure the impact of using no tray on the reduction of food waste in the dining courts. The program was operated for one week in three different dining halls. The results indicated that the food waste without trays was reduced by 35% compared to regular operation.

The reduction of food waste could be estimated at 29% during a year period, comparing the annual estimations; however, because there are not records of cooked food weight every day, the real impact in percentage cannot be calculated.

Nevertheless, based on the results, it is evident that without trays, the students tend to waste less food. This pilot program could be used as an incentive to reduce food waste and to raise the food system awareness among students.

The food waste was classified in pre-consumed food and post-consumed food\(^3\). During the first week of the program pre-consumed represented 17% of the total waste, while post-consumed was 83%. During the second week, without trays, the pre-consumed food increased to

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\(^3\) Pre-consumed food waste is the food that is disposed during the coking process or before being consumed. Post-consumer food waste includes all type of food that is dispose after is being cooked.
26% but the post-consumed food was about 74%, which is a 9% reduction. The increment on the amount of food pre-consumed was explained by Soufre as a result of special menu offer during the Earth Week. The reduction on the post-consumed food waste was a consequence of not having trays, which reduced the amount of food consumed by students. The tray-less program clearly showed an impact on student behavior and therefore a drop in waste (See Table 3, and Figures 10-11).

<table>
<thead>
<tr>
<th>Tray-less Pilot Program</th>
<th>With trays</th>
<th>Without trays</th>
<th>Reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Weight food waste/student (oz)</td>
<td>4.1</td>
<td>2.66</td>
<td>35%</td>
</tr>
<tr>
<td>Estimated Weight food waste/day (oz)</td>
<td>922.14</td>
<td>651.43</td>
<td>29%</td>
</tr>
<tr>
<td>Estimated Weight food waste/week (oz)</td>
<td>6,455.00</td>
<td>4,560.00</td>
<td>---</td>
</tr>
<tr>
<td>Estimated Weight food waste/month (oz)</td>
<td>25,820.00</td>
<td>18,240.00</td>
<td>---</td>
</tr>
<tr>
<td>Estimated Weight food waste/year (oz)</td>
<td>309,840.00</td>
<td>218,880.00</td>
<td>29%</td>
</tr>
</tbody>
</table>

Estimated Average cost/meal $2.00 $1.98 4.30%

NOTE: (**) the average per month and year were estimated based on the week’s result.
Designed by: Lizbeth Ruiz.

Additionally, this pilot program showed that the cost of the food per student can be reduced in about 4.30%. This program could impact the cost of food waste transportation to the landfill and therefore diminish the environmental footprint. During fall 2008 the dining courts took an important stewardship role by incorporating the tray-less program as part of a more sustainable food management.
Some statistics and facts about UC’s Food System, obtained from both personal meetings with UC’s Dining Services managers and UC’s web site.

- The total Budget for Housing and Dining Services is about 6 million dollars and approximately thirty percent (30%) is devoted to related food cost ($1.8 millions).
• The number of full-time students enrolled in 2007-2008 on West Campus was 17,330. Just about 17% of the full-time undergraduate students (3,000) live on campus. The number of part-time students was around 9,160.
• Freshman is the largest group using the dining halls at UC (about 6,150).
• Fifty-five percent of the students living on campus (1,650) eat between 7-15 times during the week.
• On average 2,742 meals are served per day. There are 19,200 guests per week and around 639,360 meals served per year.
• According to the UC’s Dining Services about 17% of the West Campus students eat in dining courts, so the biggest proportion of students (83%) in West Campus is eating whether at Tangeman University Center (TUC) or somewhere else of campus.
• Seventy two percent (72%) of the students are willing to incorporate local food at UC dining halls (Daly, 2007).

3.3 Colleges and Educational Programs related to food and researches

The University of Cincinnati is structuring its Environment Sustainable Committee (ESC) together with the Environmental Policy Center (EPC) to promote sustainable initiatives and policies within the campus. Through this Committee, the University seeks to incorporate the concept of sustainability into its academic and research programs, the design, operation, and maintenance of its buildings and landscapes, and its organizational structure and management. The University hopes to accomplish this while preserving safety and comfort.

While the Committee is being organized, there are some colleges and research centers that are conducting ongoing environmental programs and projects. There are about 28 courses and programs, all together, related to food production, distribution, consumption, and disposal. Nevertheless, there is not an articulated structure that congregates all of these efforts.

The need for coordinating and assembling all of the departments’ isolated efforts to work toward a unique goal is an important limitation regarding food system research and the success of related studies at UC. The lack of knowledge and awareness of each college about other projects or courses is an opportunity for improvement of the research system on campus. One of the challenges that the University of Cincinnati has to face in the 21st Century is getting more
organized in terms of environmental programs and research, sustainable development, environmental stewardship.

Below, all the courses and programs related to the food system are listed. Due to the limited information about the content and the objectives of each course, it was difficult to provide a complete summary for each of them (See Table 4).

Table 4 Sustainable Course-Programs related at UC

<table>
<thead>
<tr>
<th>Program</th>
<th>College</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Undergraduate</strong></td>
<td></td>
</tr>
<tr>
<td>Architecture</td>
<td>Design, Architecture, Art and Planning (DAAP)</td>
</tr>
<tr>
<td>Urban Planning</td>
<td>DAAP</td>
</tr>
<tr>
<td>Chemical Technology</td>
<td>Applied Science Department of Environmental Health</td>
</tr>
<tr>
<td><strong>Graduate</strong></td>
<td></td>
</tr>
<tr>
<td>MS Food and Nutrition</td>
<td>College of Allied Health Science</td>
</tr>
<tr>
<td>MS, PHD Civil Engineer</td>
<td>Civil Engineer</td>
</tr>
<tr>
<td>MS, PHD Environmental Science</td>
<td>Civil Engineer</td>
</tr>
<tr>
<td>PHD Cell and Molecular Biology</td>
<td>Inter-departmental Program Public Health Science, College of Medicine</td>
</tr>
<tr>
<td>MS Public Health</td>
<td></td>
</tr>
<tr>
<td>Environmental/green Chemistry</td>
<td>Chemistry Department</td>
</tr>
<tr>
<td>Environmental Process and Program</td>
<td>DAAP</td>
</tr>
<tr>
<td><strong>Associate Degree</strong></td>
<td></td>
</tr>
<tr>
<td>Pre- Dietetics (Nutrition)</td>
<td>Raymond Walters College</td>
</tr>
<tr>
<td><strong>Certificate</strong></td>
<td></td>
</tr>
<tr>
<td>Pre-food and nutrition</td>
<td>Raymond Walters College</td>
</tr>
<tr>
<td>Culinary Art and Science</td>
<td>Applied Science</td>
</tr>
<tr>
<td>Horticulture</td>
<td>Chemistry Department</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
</tr>
<tr>
<td>Student Culinology Competition</td>
<td>Applied Science</td>
</tr>
<tr>
<td>Findlay Market's Community</td>
<td>Interior Design DAAP</td>
</tr>
<tr>
<td>Cooking School</td>
<td>Center for Environmental Studies, involves: Biology, Geography, Geology, Economics, Planning and Chemistry College.</td>
</tr>
<tr>
<td>Sustainable University</td>
<td></td>
</tr>
<tr>
<td>Environmental Program</td>
<td></td>
</tr>
</tbody>
</table>
3.4 Associations and Students Involvement

Although UC’s Dining Services offers opportunities for the direct participation of students through an on-line survey and the Food Focus Committee (which meets every month), student involvement is limited and students do not participate in the decision making process.

There are some organizations that are aimed at improving local environmental conditions and creating a link between students and communities. The Leaders for Environmental Awareness & Protection (LEAP) intends to create alliances and unite student leaders and faculty with local environmental organizations in the greater Cincinnati area. These partnerships strive to promote environmental awareness and protection both on campus and in the community through networking, promotion of special events, open discussion and volunteerism; however, the information about this organization, its members, and its activities are limited and it was difficult to get additional information about its current projects or students involvement.

According to web site information and the meeting with Rick Wiggins, UC Facilities Management Director, the University Advisory Committee on Environmental Awareness (ESC)
has a mission of recognizing its environmental stewardship role; the University of Cincinnati seeks to incorporate the concept of sustainability into its academic and research programs. The university is in the process of developing an action plan to promote its sustainability efforts throughout the campus. The Campus Action Plan would include both ongoing and proposed efforts to reduce the university's carbon footprint. At the moment, there is neither a structured plan nor student participation in this committee.
4 Comparing other universities projects-results with UC’s

Although, there are hundreds of universities across the United State dedicated to improving their dining services and focused on the quality of their food system, this paper attempts to summarize eight of the most recognized initiatives in terms of management, best strategies for implementation, results, and community leadership.

a. University of California, Berkeley

Since 2003, UC Berkeley Dining Common (Crossroads) has been a showcase of green design and management projects. In 2004, it became the first campus facility certified as a Bay Area Green business because of its reduction of energy consumption, use of low-flow water faucets, reduction of paper use, food donation, and garden composting. In September 2005, the UC Berkeley Nutritional Science and Toxicology Department helped to complete the organic program through the creation and implementation of flow Tables and an audit trail showing how organic products would be handled from start to finish. Also, all of the organic pre- and post-consumer waste is destined to a compost program.

Food-related waste at University of California, Berkeley. 2005

Since 2006, the dining commons at UC Berkeley has been certified as the First Organic Salad Bar in America. All of the vegetables offered in the salad bar are organic. According to Jake Lewin, Director of the Landmark Organic Certification Organization, “this is huge, and it's
certainly the mark of the beginning of a trend in food service toward organic in schools” (UC Berkeley News, 2006).

**UC Berkeley’s Statistics**

- About 200 tons of food waste is composted each year.
- Since 2004 and 2007 the campus has saved 1,415 MHz, equivalent to $156,700.
- UC Berkeley’s dining menu is over 65% vegetarian.
- The campus has recently made the switch to cooking with oils free of Trans fats, an important step toward promoting good health.
- Organic waste constitutes 45% of the total food-related waste produced by the university (See Figure 12).
- A food composting worms program manages to divert 50 tons per year of organic food waste for composting into soil fertilizer.
- University Dining provides almost $50,000 annually to support Berkeley Worms.
- The recycling program has diverted between 16% -20% of used beverage containers from landfills (40 tons).
- Some campus restaurants are now using unbleached paper napkins.

**b. Brown University, Providence-Rhode Island**

In September 2002, Brown University started a Community Harvest Program aimed at increasing campus support of local producers in its region (Rhode Island). This successful initiative works together with a dairy farmers’ cooperative, serving fresh, high quality products at the dining courts. Brown Dining also became a founding partner in Farm Fresh Rhode Island, an organization that works to connect small farms and producers around Rhode Island with consumers, restaurants, schools, and food service institutions.

The Community Harvest Program seeks to increase student awareness about local farming and local food, to improve conditions of small farmers, to provide fresh and healthier options for Dining Services’ customers through purchasing local food, and to increase the role of university-supported local economic development. Some of the milestones in the Community Harvest program have included: mapping the local farms and small producers they buy from, organizing the Local Food Forum, where local farmers, chefs, schools and volunteers can
Other universities and UC

participate, organizing Farmers’ Markets that bring farmers and local artisans on campus every Wednesday during the autumn, all the coffees, teas, and chocolate consumed across campus are fair-trade certified, a Community Harvest Breakfast every Thursday serves local eggs, breads, and jams, local apples are available year-round from Hill Orchards, honey, tomatoes, and peppers (in season) are available from Mello Family Farm, weekly harvest crews bring students to farms and fresh foods back to the dining halls, student-run campus gardens provide fresh herbs and zesty meals, Brown Dining supports local families.

**Brown University’s Statistics:**
- Since spring 2006, Brown Dining has been composting 64,000 pounds (32 tons) in partnership with Red Planet Vegetables.
- Over the course of 2007, they composted about 200,000 pounds (125 tons).

c. **Ohio University, Athens-Ohio**

This university plans to establish the first full-scale composting project among Ohio colleges and universities. The project is planning on installing a solar-powered in–vessel composting unit by spring 2008. This system will be able to manage 2.5 -3 tons of organic waste per day. The project will allow the university to shrink its ecological footprint, reduce management and landscaping costs (estimated to capture 50% of the biodegradable waste stream for composting), decrease pre- and post-consumer food waste, produce soil amendment, save money in the long-term, and create new learning and research opportunities for faculty and students, among other benefits (OH, Office of Sustainability, April 2008).

Based on an article published by Biocycle Magazine, Ohio University “spends about $300,000 per year in trash disposal costs; [the] diversion of three tons per day to composting could lower that cost by $37,500 annually.” Furthermore, the system will use a solar photovoltaic array that will serve to reduce operational cost of the composting unit by generating 35 percent of the electricity needed to run the site (Outlook, April 2008). In addition, “the 6.15-kilowatt solar photovoltaic power source for the system will offset 9,000 pounds of carbon emissions each year, resulting in roughly 270,000 pounds of carbon averted over an operational period of 30 years” (OH, Office of Sustainability, April 2008).
Although recycling programs and actions have been running since the early 1990’s, the implementation of the composting project and other green initiatives have gained “momentum” with the creation of the Office of Resource Conservation less than a year ago. As Creighton suggests in the book *Greening the Ivory Tower*, the establishment of environmental leadership positions can serve as a catalyst for action and is extremely valuable for achieving far-reaching campus stewardship; however, their existence is not a sufficient substitute for the responsibility of the university community to take part in the environmental programs.

**Ohio University’s Statistics:**

- According to *Foodservice Director Magazine*, in 2007 Ohio University was the 13th largest self-operated university food service in U.S.
- According to the National Association of College and University Food Services annual benchmarking survey, O.U. Dining Services has earned the distinction as one of the most efficiently operated food services seven years in a row.
- Ohio University Dining Services has student manager and internship programs in place, which offer students the opportunity to gain management experience and earn class credit.
- Ohio University Dining Services uses trans-fat free oil for deep-frying.
- Ohio University Dining Services serves approximately 3 million meals per year.
- The annual consumption of french fries is 283,737 lbs. (30%); quarter pound hamburgers is 40,530 lbs. (4%); chicken patties and nuggets is 61,290 lbs. (7%); pasta is 45,000 lbs. (5%); fresh produce is 500,000 lbs. (53%); baked goods is 7,000 (1%) (See Figure 13).
d. University of Pennsylvania, Philadelphia

In 1992, the University of Pennsylvania founded the Food Trust. The main goal of the organization is to act in response to diet-related diseases and malnutrition and to provide healthy food access in colleges, schools, and the surrounding community. The Food Trust assists in the expansion of the supply of food resources available to low-income communities through various advocacy activities.

The University of Pennsylvania has different programs in partnership with the Food Trust, many of which are related to food and aimed at improving nutrition and encouraging local food production and consumption. For example, the Farmers Market Program sponsors healthy eating and makes fresh nutrition affordable to the university community and the residents of the city. This program is currently running in partnership with 19 farmers’ markets.

Similarly, the School Market Program engages students in the establishment of a healthy food market. These fruit markets are operated by students in different schools and are intended to promote nutrition and business skills. Eating local at Penn is an extension of the Academically Based Community Service (ABCS). “Farm Ecology” is a student-initiated organization that raises awareness around Penn’s campus about the benefits of local foods. This group seeks research opportunities and contacts local and regional food experts for advice on developing local food programs on-campus. Also, Penn Dining is part of the Hillel/UCHC Meals for the
Hungry Program by running a Soup Kitchen every Sunday. This is a charitable effort to donate food that involves students too.

e. **Tufts University, Medford-Massachusetts**

Tufts University is one of the leaders in improving environmental sustainability in higher education institutions across the United States. Since the beginning of the “Greening the Ivory Tower Program” in 1990, the university has developed a wide range of actions regarding the improvement of their food system and dining services. In terms of management, the key factor has been the high performance of their Office of Sustainability.

This office promotes environmental sustainability at Tufts. Its main objectives are to enhance the campus reputation as a leader in sustainability, to develop comprehensive projects, to promote leadership, to encourage faculty, student and staff participation towards commitments and specific goals, to identify sustainability opportunities that generate significant benefits for the educational community (financial saving, improvement of health, reduction of risk), and to integrate sustainability issues into research, scholarships, and the curriculum.

Regarding food, the university has a variety of programs that support local farms and organic growth techniques, promote equity nutrition options, and encourage the reduction of food waste and composting.

- **FEAST (Food Education and Action for Sustainability at Tufts)** is an educational program in partnership with Tufts students, the Center for International Environment, and food service operations on all campuses; it is aimed at instructing the Tufts community about the environmental, social, and health issues involved in food production, as well as promoting local farms, organic growing methods, and Fair Trade (Tufts University, 2008a).

- **Organic Food**: the dining courts offer diverse organic products from local farmers. Most of the products are vegetarian. Healthy snacks such as whole pasta, couscous, beans and legumes, brown rice, soy milk, cereals, tofu, peanut butter, and granola bars are also included (Tufts University, 2008b).

- **Local food**: farm-to-college is a pioneer program that brings local farmers together with students, faculty, and staff to provide fresh and healthy food to the university
community. Since 2004, the university has run an on-campus food market every Wednesday from May to November.

- Recycling and Composting: One of the actions taken to reduce the university’s environmental footprint is the composting of food waste.

- Food and Soil: the material composted is used to provide minerals and nutrients to the soil. The composted food combines with other nutrients and supports agricultural and landscape activities. Food waste from Tufts is picked up by Thompson Disposal and is taken to DEP-permitted compost facilities in Massachusetts (Tufts University, 2008c).

- Fair Trade: the university offers Fair Trade coffee and bananas at a number of venues on campus. Fair Trade is a response to trading commerce that endangers the livelihood of small-scale farmers as a consequence of industrialization and globalization marketing. This type of trade is based on principles such as reasonable pricing for the producer, avoiding child labor and exploitative labor force conditions, trading under direct long-term agreements, encouraging sustainable production techniques, and supporting equal employment opportunities.

- Animal Welfare: the dining services at Tufts University supports several animal welfare initiatives, which include cage-free eggs, sustainable sea food, grass-fed beef. Low animal welfare foods are not served on campus.

**Tufts’ Statistics**

- Tufts Dining Services serves approximately 2 million meals per year, 170 tons of which were composted in 2007. The total amount of food waste (pre-consumer and post-consumer) has decreased by 70 tons, which represents a 62% reduction yearly. In addition, Tufts University has decreased the amount of purchased packing products and processed food (Tufts University, 2008d).

- At Tufts, on average each person waste at least 0.44 lb per meal in dining halls, 43% is post-consumer food and 18% pre-consumer food. The waste per person per meal estimated in Tufts dining halls is show in Figure 14.
In an average month, Tufts produces about 400 tons of landfill waste, which represents about 4,800 tons a year. Disposal of landfill waste costs roughly $25,000 per month and; the dining areas in this facility alone are serving an average of 2,500 meals per day.

![Figure 14: Waste per person per meal in Tufts Dining Hall (0.44 lb.)](Image)


f. **University of Florida (Gainesville, Florida)**

In the early 1970s, the University of Florida started to administer an organic garden plot on campus. Today, 75 plots are being cultivated by 100 faculty, staff, and students each year. The University of Florida is an example of a university that has signed a declaration promising to make environmental education and research a central goal of the institution (Hanrahan et al. 1998). The university's Center for Construction and Environment is coordinating an effort to "green" the curriculum, operations, and research agenda. The methodology of "greening" the university involves holding stakeholder meetings, conducting environmental audits, auditing courses for environmental content, and creating educational publicity projects. The primary objective is to embed environmental literacy into virtually every curriculum and every segment of campus operations (UF Center for Construction & Environment).

In 2006, the University of Florida inaugurated its Office of Sustainability. The mission of this office is to achieve Zero Waste by 2015, assess the energy system of the university, and to integrate sustainability into the research programs and educational fabric of the institution.
The University Dining Service Office is working with ARAMARK in the design of an action plan for implementing principles of sustainability into food services operation. This includes green catering, waste management and diversion energy conservation, and the reduction of transportation distance by purchasing locally.

g. University of Michigan (Ann Arbor, Michigan)

At the University of Michigan, the Food Waste Compost Program has been in operation since 1997 and the vermi-composting initiative (which uses red worms) has been in operation since 2001. These programs, which are motivated by serious environmental concerns, serve as a way to reduce the negative environmental footprint of the campus. The challenge has been to "expand its leading role into the realm of environmental and social responsibility" and to deal adequately with the social and environmental challenges of the twenty-first century.

Waste Management Services is in charge of collecting pre-waste, which includes fruit and salad waste, vegetables peelings, onion skins, eggs shells, old bread, plain potatoes, plain noodles, coffee grounds, coffee filters, paper egg cartons, and paper napkins as well as pre-consumer food waste generated during meal preparation. No post-consumer waste is collected because of the composting techniques used. Currently, five residence halls participate in the food waste program. The majority of the waste collected is transported to a compost site and is mixed with wood chips or other bulk agents to form windrows. The final product is tested to assess its potential as fertilizer or soil amendment, and this product is eventually sold to local farms or gardeners.
In the fall of 2004, Waste Management Services began working with a group called Cultivating Community, which is comprised of faculty, students, staff, and community members interested in reviving the vermi-composting program (stopped in 2003 for technical limitations). This program is aimed at producing food in the garden for campus dining halls, later called Michigan Matthaei Botanical Gardens. The harvested worm castings are used to fertilize the garden plots and the fresh crops are taken to the University Club and incorporated into their dishes. One of the biggest strengths of the University of Michigan is the governance and administrative organization. Along with the Chancellor’s Advisory Committee on Sustainability, which has five full time environmental positions, there are also several environmentally-oriented committees where faculty, staff, and students can participate. The annual average food waste composted since 1999 at University of Michigan is about 42.95 tons (See Figure 15).

**h. Yale University, New Haven, Connecticut**

Yale University is one of the state of the art campuses within the U.S. regarding sustainability initiatives and environmental programs. Since 2002, the Sustainable Food Project, in cooperation with the dining services, started a holistic program aimed at changing the culture of food consumption at Yale as well as raising awareness in the student community about the university food system.

![Compost Collection Data Michigan University (tons)](image)
This institution serves food produced organically, according to the season, and uses food scrap compost to improve the soil conditions. Currently, each college serves a fully sustainable meal at Sunday brunches, Thursday lunches, and Wednesday and Thursday dinners; a sustainable entrée and side at every lunch and dinner; organic milk, coffee, yogurt, tea, bananas, granola, and tomato sauce at every meal (Yale University, 2008a).

In addition, dining services at Yale runs a program to purchase local food, which supports the preservation of farmland in the region. Additionally, dining services has designed food guidelines for all the dining halls and restaurants. These guidelines encourage the purchasing of food from suppliers within the region and closest states, and rank these suppliers in three tiers and in order of preferences.

Moreover, Yale runs a farm and its products are sold by students on campus in a market. The money spent in the farmer’s market goes directly to the farmers, which results in 80% more income compared with the returns from conventional supermarkets. CitySeed, the non-profit organization that oversees New Haven’s farmers’ markets, estimated that the purchases made at their markets kept $1.3 million in the local economy in 2006. The farm offers internship positions for students during the summer to train them on sustainability and organic food (Yale University, 2008b).

Yale is a pioneer in sustainable food systems and is exporting its sustainability models to help other schools get closer to their green goals.

**Yale’s Statistics:**

- Twenty-one courses related to food and agriculture are offered at Yale.
- Undergraduate and graduate participation in courses related to food and agriculture has skyrocketed.
- The lecture course, “The Psychology, Biology, and Politics of Food,” was one of the most popular at Yale (2006-2007), with an enrollment of more than 330.
- Over the 2005–2006 academic year, researchers at Yale’s Rudd Center for Food Policy & Obesity Study regarding sustainable food on campus, revealed that students eating a 100 percent sustainable food menu reported more satisfaction with the dining hall meals, better physical health, fewer visits to the health center, and better
Other universities and UC academic habits. *An article describing this project is now under review* (Yale University, 2008c).

To summarize, many universities across the U.S. are improving their food system and are raising awareness among their student bodies about the importance of making food systems more sustainable and environmentally responsible. The most significant achievement is that the collective concern about nutrition is being transformed into actions and positive tangible results. Each year there are more universities and schools willing to change the pattern of food production, distribution, consumption, and disposal. Due to environmental, nutritional, health, and economic concerns, universities worldwide are increasingly committed to changing their habits and improving their understanding of food systems. Transforming food systems into sustainable ones not only brings environmental benefits to the community, but also could have a significant impact in saving millions of dollars annually for institutions of higher education.

**4.1 UC’s Food Waste and other universities**

With the exception of data provided by the Earth Day pilot program, there is only limited data regarding the weight of food that the University of Cincinnati consumes every year, how much students consume per day, and how many tons are being wasted. This section intends to compare the university dining services’ performance with that of four other universities (Tufts, Ohio, Michigan and Berkeley) in terms of food waste and meal consumption.

By incorporating not only the university community, but also the neighborhoods nearby the campus, the university has a major opportunity to impact the food system in many ways. This could include purchasing from local farms, implementing vegetable and fruits market on campus open to all, creating new jobs related to food scrap collection and compost activities, teaching the community how to run yard gardens and harvest their own vegetables, and creating educational training programs in local schools to teach children about the food system. Community involvement and support are also key factors in strengthening the university food system.

Figure 16 shows the relationship between the student population and the amount of meals served in the dining courts of each university. The consumption of food in dining courts at the University of Cincinnati is very low in comparison with the total number of students enrolled. Although, as was mentioned before, the dining service at the University of Cincinnati is focused on the resident students (3,000), the amount of food served is the lowest compared with other
universities, even those small in population size. In contrast, the University of Michigan with approximately the same student population and four dining halls served 3.3 times more meals than the University of Cincinnati, with three dining halls.

Figure 16: Universities comparison in terms of student population and meals served during an academic year. Source: universities’ web sites, statistics and fact sheets.

Table 5: Comparison between student population and meals served per year (2008)

<table>
<thead>
<tr>
<th>University</th>
<th>Student population</th>
<th>Meals/year in dining courts</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Cincinnati</td>
<td>26,490*</td>
<td>639,360</td>
</tr>
<tr>
<td>Tufts University</td>
<td>12,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Ohio University</td>
<td>20,000</td>
<td>3,200,000</td>
</tr>
<tr>
<td>University of Michigan</td>
<td>36,000</td>
<td>3,000,000</td>
</tr>
</tbody>
</table>

Note: * UC's West Campus student population
Figure 17: University comparison in terms of meals served during an academic year and tons of waste produced. **Note:** It would be ideal to know the food waste to show a percentage.
Source: universities’ web sites, statistics and fact sheets.

Figure 17 shows the comparison of universities in terms of meals served during an academic year and tons of waste produced. The University of Cincinnati appears to produce less waste than other universities (estimated based on Earth Day’s Tray-less Program). This result, however, may not be accurate because the dining services do not weigh food waste on a yearly basis. Compared with other universities, UC does not produce a large number of meals; therefore the waste is considerably lower, too. The challenge for dining services in the years to come is not only to diminish this waste, but also to divert it from the landfill. Based on the information gathered from the Tufts and Berkeley University fact sheets, after implementing “green” initiatives (such as tray-less dining, organic salad bars, local purchases, and composting) they had reduced their food waste by 62% and 15%, respectively.
Currently, the University of Cincinnati is not diverting the food scrap, which puts it behind in terms of waste management and food composting. Among the other universities, Ohio University is one of the leaders. Together with University of California, Berkeley they compost about 19% and 18% of their waste, respectively (See Figure 18 and Table 6).

Nevertheless, UC’s Dining Services started to implement the tray-less program in dining courts during autumn 2008. This action has proven to reduce not only food waste but also operational cost (water and consumption involved in the dishwasher machine operation, and food
consumed). This program will also enforce food waste weight in order to track the university’s organic waste, help to reduce, keep track of the food waste produced, maintain a data base of records of waste and provide data to UC’s Facilities Management needed to design a future composting program.

To summarize, many universities across the U.S. are improving their food system and are raising awareness among the student body about the importance of making food systems more sustainable and environmentally responsible. The most significant achievement is that the collective concern about our nutrition is being transformed into actions and positive tangible results. Each year there are more universities and schools willing to change the pattern of food production, distribution, consumption, and disposal. Due to environmental, nutritional, health, and economic concerns, universities worldwide are increasingly committed to change their habits and improve their understanding of food systems. Transforming food systems into sustainable ones not only brings environmental benefits to the community, but also could have a significant impact in saving millions of dollars annually for higher education institutions.

The benefits of implementing green initiatives to improve our food systems are primarily related to our health, environment, and the upgrading of university dining services management. In addition, however, green initiatives have the ability to save millions of dollars annually through the implementation of sustainability programs that focus on energy efficiency, waste reduction and recycling, transportation management, and food production and consumption.
5 UC’s Data Analysis

5.1 UC’s Student Involvement

The Community Design Center organized several activities to encourage student participation, which had very low participation. The advertisement for the 2 focus groups sections consisted of e-mail to student organizations, and students that participated in different activities throughout the research project, posters around campus, pamphlets and Facebook groups. For the first focus group, although around 18 e-mails with students confirmation of attendance were received, only 5 students participated, just 3 faculty members, and two UC’s Dining Services managers took part in the activity.

The first focus group took place in the Community Design Center on February 17th, 2009 at 3:00 pm. Regardless of the few students participating in this focus group, this activity was aimed at explore their main complaints, general satisfaction with dining services, how they envisioned food service on campus for the next food contract period, starting in 2010; changes they liked to see on campus in this regard, and what would be a key change in the next five year period in UC’s food system. The most common complaints from students were: limited variety of food and healthy options, strong presence of fast food chains and need of more local vendors, price of dining hall facilities for students that do not have a meal plan, absence of a composting program where student can actively participate, a need to reduce waste on campus and more students involvement in decision-making, partnering with the students governance association.

Regarding how the participants envision the dining services in the next five years and the changes they would like to see, they mentioned: increased student education through participatory programs such as internships, kitchen administrative positions and environmental campaigns in dining halls; education on consumer choices and their environmental impacts, campus-wide study on waste and alternatives for composting, a more sustainable food system incorporated in the food contract with the next vendor (e.g. ARAMARK), a farm run by students with its products incorporated in dining hall meals, an increase in the number of food-related courses in UC curricula.

One of the most important outcomes of this first focus group was the need to design a food preference and satisfaction survey to be distributed to all the students, faculty and staff. Despite some of the logistical and statistical limitations, the Community Design Center designed and conducted the food survey recommended by the focus group’s participants, and the results
are presented in the next section. The recommendations and aspects commented by the participants of the focus group are summarized on Table 7.

During the second focus group section held at the Tangeman University Center (TUC) on April 21st, 2009, just four students attended the activity. This time the activity focused on three main questions in order to guide the discussion. The questions were related to the changes they would like to see at UC regarding food service, which activities they were willing to participate in order to improve UC’s food system and whether or not they would be interested in taking elective courses related to food and sustainability.

Concerning changes to be implemented, the participants mentioned the following: a composting program and strength of the recycling campaign, more local food at TUC, a locally grown products’ station at dining halls, more vegetarian and vegan options at TUC and at Center Court, and a nutrition awareness campaign to increase students’ food education. On the subject of activities associated with food system improvements, students mentioned: a farmer’s market on campus, urban gardens/farms, roof gardens on campus, running a composting program, organizing more international food fairs. Relating to students’ enthusiasm to take sustainability courses related to food, all of the participants reported being willing to take part in it, and they emphasized the importance of becoming a green university.

Table 7: Summary of focus groups’ comments and recommendations

<table>
<thead>
<tr>
<th>Focus Group 1</th>
<th>Attendance</th>
<th>Current complaints about the services</th>
<th>Expectations of dining services in the next five years</th>
</tr>
</thead>
</table>
| February 17th, 2009 | 5 students, 3 faculty, 2 UC’s Dining Services managers | • Limited variety of food and healthy options  
• High presence of fast food chains  
• Expensive dining hall facilities for students without a meal plan  
• Absence of a composting program,  
• More students involvement in dining decision-making | • Increase student education through participatory programs  
• Education on consumer choices and their environmental impacts  
• Campus-wide study on waste and alternatives for composting  
• A sustainable system incorporated in next food contract with vendor (e.g., ARAMARK)  
• Farm run by students that incorporate its products in dining halls meals  
• Increase the number of food-related courses in UC curricula |
Focus Group 2 | Attendance | Changes to be implemented in the next 5 years | Activities associated to UC food system improvement | Student’s willingness to take food related courses
--- | --- | --- | --- | ---
April 21st, 2009 | 4 students, | • Composting program and strength of the recycling campaign  
• More local food at TUC, locally grown products’ station at dining halls  
• More vegetarian and vegan options at TUC and at Center Court  
• A nutrition awareness campaign to increase students’ food education | • Farmer’s market on campus  
• Urban gardens/farms, and/or roof gardens on campus  
• Running a composting program  
• Organize more international food fairs | • All the participants expressed enthusiasm for taking part in this type of courses

Perhaps, one of the most tangible achievements of the Community Design Center’s Food Project on student involvement, has been to raise awareness among the student groups and promote their participation on policy and decision making, as a crucial element for improvement of the university food service. As a result of several meetings and discussions regarding the food system at UC, the students who are participating on the advisory food committee for the design of the RFP for next food suppliers are pushing for changes on campus focused on sustainability, more variety of food and fewer chain restaurants.

5.2 UC’s Food Preference and Satisfaction Survey
Following the focus groups a campus wide survey was conducted. Originally, the survey was intended to be conducted using a random sample. However, as was mentioned above, due to security and confidentiality restrictions, the email listserv could not be accessed and a random sample could not be selected. Although sending surveys via e-mail could imply a high rate of error for omission or no responses, the number of answers obtained was considered sufficient for this study’s objectives, and also were considered sufficiently valid to understand students’ food preferences, their satisfaction in this regard, and their willingness to participate in further food system improvement programs, regardless the statistical limitations and errors mentioned before (See Table 8).
The questionnaire has a total of 23 questions (see Appendix 9), which covered the main aspects that were identified as UC’s food system’s deficiencies in previous research studies and in meetings with students and faculty. Table 8 shows the distribution of the survey participants by percentage of total respondents and number of answers collected. The survey was sent by the Graduate Students Government Association4 through e-mail to the entire university community, including students, faculty, staff and other members. From the 2,495 responses, 69.50% are from undergraduate students. Some of the undergraduate students’ answers will be emphasized since they represent the main consumer for the UC Dining Service. Approximately 28% of the undergraduate respondents (494) live on West Campus; this represents 16.5% of the total student residents on campus. Graduate students represent 25.0%; staff 4.0% and faculty approximately 1% of the responses (See Figure 19 and Table 9).

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4 In this case the Graduate Student Government Association facilitated the distribution of the survey but the questionnaire was sent under the Community Design Center name. The questionnaire was distributed through Survey Monkey and the reports that were used for the data analysis can be found in the Appendix XXX The comments of the open questions can be obtained by contacting CDC or the Graduate Student Government Associations.
The food preferences and satisfaction survey, conducted by the Community Design Center, shows that the highest percentage of people surveyed eat one to two meals on campus each week (28.6%), with the exception of the resident students or those who have a UC meal plan (in average 10+ meals per week). The percentage of people who either bring their own food to eat on campus or do not eat on campus for different reasons represent around 37% of the respondents; together with those who eat just between 1-2 times per week (28.6%) it represents more than 64% of the responses (See Figure 20). This is consistent (in proportion) with the percentage of respondents who prefer eating off-campus: 72% of the respondents prefer to eat at home and approximately 20% prefer carry out or delivery restaurants. This trend should be
analyzed in depth by the UC Dining Service department for further improvements because it shows that a high portion of the potential food consumers are not eating on campus. Even 38% of the resident students prefer eating off-campus at dine-in local and carry out restaurants even though their meal has been pre-paid in a meal plan.

When participants were asked to rate satisfaction based on variety, quality, affordability, accessibility, convenience, healthy choices, interaction with staff, special diet options and overall satisfaction, the majority of all respondents (37%) were somewhat satisfied with CenterCourt’s service. Similarly, the majority of the respondents (41%) were somewhat satisfied with Market Pointe’s services.

Regarding TUC’s services, 32% of all respondents were somewhat satisfied while the majority (36%) was neutral. In overall, customers are somewhat satisfied with dining services at UC. However when the total of respondents that are somewhat satisfied and satisfied were added per each dining location, the largest percentage of respondents were more overall satisfied with Market Pointe’s service (57%), while CenterCourt’s total is just 47.5% (adding somewhat satisfied and satisfied). It is important to mention that based on this result, more than one third of the respondents were dissatisfied and somewhat dissatisfied with UC’s dining facilities (see

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**Figure 20:** Meals purchased per week on campus. Question #5: How many meals per week do you purchase on campus? Source: Community Design Center, Food Survey 2009.
Table 10 and Figure 21). Similarly, when analyzing the overall satisfaction of undergraduate residents, the results show that food consumers are more satisfied with Market Pointe’s services (57.2%). Additionally, when people rated TUC, the highest rate with overall satisfaction was neutral (36%).

Table 10: Overall satisfaction’s rate of West Campus’s dining halls and TUC

<table>
<thead>
<tr>
<th>Respondents/satisfaction rate</th>
<th>Dissatisfied</th>
<th>Somehow dissatisfied</th>
<th>Neutral</th>
<th>Somewhat Satisfied</th>
<th>Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall satisfaction, all respondents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center Court</td>
<td>6.8%</td>
<td>17.2%</td>
<td>28.5%</td>
<td>37.0%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Market Pointe</td>
<td>4.5%</td>
<td>10.7%</td>
<td>27.6%</td>
<td>41.1%</td>
<td>16.1%</td>
</tr>
<tr>
<td>TUC</td>
<td>6.9%</td>
<td>15.1%</td>
<td>36.3%</td>
<td>32.7%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Overall satisfaction, undergraduate students (non-residents)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center Court</td>
<td>7.8%</td>
<td>18.1%</td>
<td>28.6%</td>
<td>36.2%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Market Pointe</td>
<td>7.8%</td>
<td>18.1%</td>
<td>28.6%</td>
<td>36.2%</td>
<td>9.3%</td>
</tr>
<tr>
<td>TUC</td>
<td>5.0%</td>
<td>10.5%</td>
<td>27.8%</td>
<td>41.0%</td>
<td>15.6%</td>
</tr>
<tr>
<td>Overall satisfaction, undergraduate students (residents)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center Court</td>
<td>11.8%</td>
<td>22.7%</td>
<td>29.6%</td>
<td>28.30%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Market Pointe</td>
<td>7.1%</td>
<td>12.2%</td>
<td>22.3%</td>
<td>41.60%</td>
<td>16.8%</td>
</tr>
<tr>
<td>TUC</td>
<td>3.8%</td>
<td>10.9%</td>
<td>37.7%</td>
<td>37.10%</td>
<td>10.5%</td>
</tr>
</tbody>
</table>

Source: Community Design Center, Food Survey 2009.

Figure 21: Overall Satisfaction rate with UC’s Dining Facilities by groups (including somewhat satisfied and satisfied). Source: Community Design Center, Food Survey 2009
These categories that were mentioned by the respondents as dissatisfied and somewhat dissatisfied are detailed below. It is important to mention that these elements poorly rated show that there is room for improvement. When eating at campus dining halls (CenterCourt and Market Pointe), the percentage of respondents that show dissatisfaction and some dissatisfactions are about 24% and 26% respectively, the elements that were considered more positive among respondents were: accessibility, and convenience. Conversely, respondents mentioned affordability, special diet options, healthy choices, and quality of food as those elements which cause the highest percent of dissatisfaction in dining halls.

When eating at TUC people’s overall dissatisfaction is about 22% (including dissatisfied and somewhat dissatisfied). Respondents were also more satisfied in general with convenience and accessibility. When considering the overall satisfaction by groups (including satisfied and somewhat satisfied, see Table 10 and Figure 21) the level of satisfaction with CenterCourt and TUC decreases among residents students.

However, an important percentage of respondents shown dissatisfaction with TUC’s healthy choices, special diet options, variety and interaction with staff (See Figures 22, 23 and 24). It is important to mention that residents' answers vary slightly when compared with general results; however 34.5% of the residents seem to be dissatisfied and somewhat dissatisfied with the variety of the food and interaction with staff (see Appendix 10).

Figure 22: Main categories rated by respondents as “dissatisfied and somewhat dissatisfied” when eating at CenterCourt. Source: Community Design Center, Food Survey 2009.
Additionally, in the open-answer section when rating satisfaction with UC Dining Halls, an important percentage of students and faculty made negative comments about the quality of service in terms of taste and quality, variety of vegan and vegetarian options, and poor quality of service in terms of interaction with staff (see Table 10). The total number of comments or
complaints (462) represents about 19% of the responses. Another element that was frequently commented upon was the restricted variety of food, especially for those with vegan, vegetarian or special diets.

Table 11: Most frequent comments made by undergraduate, graduates students, faculty and staff regarding food satisfaction in UC Dining Halls.

<table>
<thead>
<tr>
<th>Most frequent comments</th>
<th>Percentage based on total number of comments</th>
<th>Percentage of comments based on total number of respondents/category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Undergraduate</td>
<td>Graduate</td>
</tr>
<tr>
<td>Bad quality of food/taste/poison</td>
<td>31.8%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Poor variety-limited vegan options—limited variety</td>
<td>22.1%</td>
<td>32.2%</td>
</tr>
<tr>
<td>Affordability</td>
<td>21.1%</td>
<td>17.4%</td>
</tr>
<tr>
<td>Poor staff service/rude/not very hygienic</td>
<td>9.4%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Few healthy options</td>
<td>7.1%</td>
<td>13.0%</td>
</tr>
<tr>
<td>Not convenient/accessible/hours</td>
<td>3.6%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Good comments</td>
<td>2.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Food is not fresh</td>
<td>1.0%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Overcrowded/light/not comfortable furniture/noisy</td>
<td>1.0%</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

Source: Community Design Center, Food Survey 2009.

Note: The percentages were calculated based on the total number of complaints (462). The cells were colored to emphasize the order of importance.

The most frequent complaint about the dining halls by undergraduates, graduate students and faculty were categorized as: bad quality of food (124 comments), not enough variety for vegan and vegetarian diets (113 comments), affordability (89 comments), poor staff interaction and hygienic concerns (43 comments) and more in particular about space aspects such as lighting, furniture and noise (17 comments). Furthermore, an important portion of the students complained about the taste of the food and several mentioned to having gotten food poisoning at the UC dining halls.

Many of the comments students wrote in this question were related to the limited vegan options and homemade style food on campus. Similarly, one of the most frequent complaints about dining halls was limited vegan and vegetarian options. These comments together with the preference of more local vendors indicate the students’ desire for more healthy food on campus.
Figure 25: Popular eateries on West Campus. Question # 7: If you purchase food on campus where do you usually purchase it? Source: Community Design Center, Food Survey 2009.

<table>
<thead>
<tr>
<th>Preference food establishment by types</th>
<th>Undergraduate</th>
<th>Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast food chains (TUC)</td>
<td>30.2%</td>
<td>34.5%</td>
</tr>
<tr>
<td>Subway</td>
<td>25.2%</td>
<td>40.9%</td>
</tr>
<tr>
<td>Dining courts</td>
<td>29.0%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Cafés–colleges–</td>
<td>15.6%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Do not eat on campus</td>
<td></td>
<td>9.4%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: Community Design Center, Food Survey 2009.

Regarding preference of food establishment on campus, the majority of people surveyed prefer to purchase food at TUC, Subway or in campus convenience stores (See Figure 25); in addition, when participants were asked about the last restaurant visited\(^5\), the most cited establishments were fast food chains. However this varies among undergraduates and graduate students. Table 12 shows the differences in percentage when comparing last restaurant visited by undergraduates and graduate students and the type of food consumed (this was a multiple choice question). Even though undergraduate students have the opportunity to eat home-made style food at dining courts, there is still a large proportion of them who eat at TUC or at fast food restaurants on campus (53.3%, including Subway). Just around 17% of the UC’s student

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\(^5\) Surveys’ responses were collected during May 18\(^{th}\) and June 12\(^{th}\), 2009.
population rely on dining halls, therefore the major percentage of students are not relying on the dining halls, but are instead eating at some of the fast-food chains at TUC.

On the other hand, the graduate students’ food options are constrained mainly to fast food establishments and cafés, due to the affordability factor of dining courts and, as many of them express, “absence of healthy food on campus apart from dining halls,” in this regard the fast food consumption is significantly higher than that of undergraduate students (75.3%, including Subway as well).

**Author commentary:** economically speaking, fast food restaurants on campus seem to be very profitable and a good source of income for dining services. At UC fast food chains not only serve those students who do not have a meal plan, staff and faculty; they also represent the biggest portion of UC’s community and offer the cheapest food options on campus. Nonetheless, what UC’s Dining Services could analyze is the high-cost of offering fast food on campus in terms of nutrition, and health impacts to the largest proportion of university’s community.

As mentioned before, scientific studies have shown that the low price of fast-food may be high taking into consideration health and the environment. Some of the most relevant authors mentioned in this research are: Michael Pollan (author of *The Omnivore's Dilemma* and *In Defense of Food*), John Ikerd, and Eric Schlosser (author of “Fast Food Nation”). It is certain that food choice is a complex process and it is related to many elements and individual factors, however if UC’s Dining Services reduced the number of chain restaurants on campus for more healthy options they could make a positive impact in the way students, faculty, and staff eat on a daily basis.
To have a better idea of what students eat frequently on campus, survey participants were asked where they ate the last time they were eating on campus. The biggest portion of the respondents mentioned Subway (29.1%). Although not all choices at Subway are healthy, the fact that Subway is the most popular food establishment on campus among students, faculty, and staff could be interpreted as a demand for more healthy options and a changing trend to consume more fresh food on campus (See Figure 26).

**Author Commentary:** due to the national shift to organic products and healthier food consumption, some universities across the country are banning fast food restaurants on campus (University of Wisconsin, University of Illinois and Kenyon College, just to mention some of them); this is a matter of education and UC’s Dining Services could play a decisive role in having a healthier and more sustainable food system. Contrary to a high fast food consumption rate among UC students, nutrition facts were pointed out as the third most important aspect for them when making food choices.

According to DeGroot (2004) in many universities across the country it seems that students are large consumers of fast food; however they are not necessarily nutrition conscious or educated to make more healthy food decisions. Undoubtedly, education related to eating habits and nutritional advice can make a big difference in the way students eat. Students might consider...
fast food as an option based on convenience, time restrictions and price. However, if educational campaigns promote healthier food habits, the trend may shift to benefit students’ health.

Figure 27: Ranking of elements valued when making food choices by undergraduate students. Source: Community Design Center, Food Survey 2009. Note: 1=most important and 8= least important.

Figure 28: Ranking of elements valued when making food choices by undergraduate students. Source: Community Design Center, Food Survey 2009. Note: 1=most important and 8= least important.
Furthermore, when respondents ranked their values in terms of importance regarding food choices (most important=1 and least important=8), price, hygiene and nutrition facts were identified overall as the most important elements. However, the rating average shows that just three of the eight elements evaluated were rated as important when making a food choice. In contrast, undergraduate students’ values when making food choice show a slight difference regarding convenience and social interaction (See Figures 27 and 28). This is supported by Professor Kelly Moore’s research in UC student food habits; according to her, the most common elements undergraduates identify on food when their make their choices are: familiarity, affordability and convenience (personal meeting, March 2008).

**Author commentary:** although price seems to be the most decisive element when food is chosen among respondents, nutrition facts are considered even more significant than convenience or portion size. There is opportunity for improvement when considering new food establishments for West Campus in terms of nutrition. Conversely, the new food vendors (Burger King and Chick-Fill-A) that will be introduced at TUC next fall 2009 do not add any nutritional value or variety to the food options on campus.

Table 13: Willingness to pay more for healthier food.

<table>
<thead>
<tr>
<th>Suggested range for increasing in price</th>
<th>Undergraduates</th>
<th>Graduates</th>
<th>Faculty</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%-5%</td>
<td>33.1%</td>
<td>29.8%</td>
<td>11.1%</td>
<td>33.3%</td>
</tr>
<tr>
<td>6%-10%</td>
<td>29.1%</td>
<td>35.3%</td>
<td>11.1%</td>
<td>21.7%</td>
</tr>
<tr>
<td>11%-15%</td>
<td>9.8%</td>
<td>11.4%</td>
<td>44.4%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Not willing to pay more</td>
<td>28.1%</td>
<td>23.4%</td>
<td>33.3%</td>
<td>28.9%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: Community Design Center, Food Survey 2009.
During the different meetings with Dining Services’ managers to discuss some of the student and faculty suggestions of incorporating more vendor with healthier food options, organic products in dining halls, and a more sustainable oriented food supplier to be in charge of the campus’ food operation. The managers expressed that their primary concern when introducing a new food vendor at TUC was based on supply, demand, and cost. Based on this, it was considered relevant to ask the UC community about their willingness to pay more for better quality/healthier food on campus. The results on this particular question exceeded our expectations; overall 32.3% of the respondents say they are willing to pay between 1% up to 5% more for healthier food on campus and 30.40% up to 10% more. Even 29.10% of the undergraduate students express their willingness to pay between 6% and 10% more for healthier food (see Table 13 and Figure 29).

In addition, at some of the vegan and home-made style restaurants around campus that students usually visit, located specifically within a walking distance from West Campus, were surveyed to get the average price of a meal around campus. The average price for a meal is $6.40 which is more than what costumers pay at UC’s dining halls ($ 7.5 without a meal plan). Furthermore, at TUC or Subway the average price for a meal is around $5.60. This could be an...
indicator of how much people are willing to pay more when the food options offered are more varied and healthier.

![Willingness to take food-oriented courses as part of students' elective credits](image)

Figure 30: Willingness to take food-oriented courses as part of students’ elective credits. Source: Community Design Center, Food Survey 2009.

Approximately 60% of the respondents were in favor of this suggestion. This result could be used by the UC’s academic planning managers to promote more food-oriented courses as an attractive incentive for new students as well as offering more educational programs on nutrition across all UC campuses. Based on the result of this survey, the willingness to incorporate more food-oriented courses in UC’s curricula seems to be high among the students (See Figure 30).

**Author commentary**: the literature review and other universities’ web sites emphasize in the importance of increasing food related courses in the university curricula. As several higher education institutions in the U.S. have augmented the food and agricultural courses, which have been incentivized by the USDA through national awards and the President Climate Commitment signage, participants were asked about their willingness to take a food-oriented course as part of their elective credits.

As discussed before, the subject of food has gained importance in many universities in the U.S., with the types of initiatives and programs varying across the country. Recently, Michael Pollan, author of two bestselling books *In Defense of Food: an Eater’s Manifesto* and *The Omnivore’s Dilemma*, declared the surge in activist work and interest in food politics and school programs as a “movement”. Many universities are not only working on garden projects, farmer’s markets, and organic salad bars in dining courts but also increasing the number of
academic courses related to food production, food systems, and sustainable practices. Incorporating more food-oriented courses at the University of Cincinnati, could have a large impact in shaping the students’ food habits as well as increasing their environmental consciousness.

![Figure 31: Changes respondents would like to see in UC’s dining services over the next 5 years (rating average). Source: Community Design Center, Food Survey 2009.](image)

Perhaps one of the most important questions of the survey was intended to explore what changes or improvement students, faculty and staff would like to see at UC in terms of dining services over the next five years (See Figure 31). Respondents classify six given options (more student involvement in food decision-making, healthier options, fewer fast food restaurants—franchises, more local vendors, more local products, more organic products) in terms of importance. The most important change was rated as “one” and the least important rated as “six”.

Overall, the largest percentage of respondents (43.4%) chose “more healthy options” as the most important change they would like to see implemented on campus over the next five years. This is consistent with the most important aspects selected by respondents when making food choices (nutritional facts, which it was ranked third). There is a clear call for increasing the number of healthier options food on campus. Along with this, more student involvement in food
decision-making was the second element most respondents (27.9%) ranked as an important change to be implemented at UC (see Table 14).

Table 14: Changes respondents would like to see in UC’s dining services over the next five years, in terms of number of responses by ranking.

<table>
<thead>
<tr>
<th>Potential changes in UC’s Dining Services</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>More student involvement in food decision-making</td>
<td>27.9%</td>
<td>22.3%</td>
<td>11.9%</td>
<td>9.3%</td>
<td>12.8%</td>
<td>15.8%</td>
</tr>
<tr>
<td>More healthy options</td>
<td>43.4%</td>
<td>23.6%</td>
<td>8.1%</td>
<td>7.7%</td>
<td>7.4%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Fewer fast food restaurants (franchises)</td>
<td>8.7%</td>
<td>13.9%</td>
<td>23.0%</td>
<td>14.9%</td>
<td>14.2%</td>
<td>25.3%</td>
</tr>
<tr>
<td>More local vendors</td>
<td>6.7%</td>
<td>16.4%</td>
<td>24.2%</td>
<td>29.8%</td>
<td>14.4%</td>
<td>8.5%</td>
</tr>
<tr>
<td>More local products</td>
<td>5.3%</td>
<td>12.2%</td>
<td>18.5%</td>
<td>24.6%</td>
<td>30.3%</td>
<td>9.1%</td>
</tr>
<tr>
<td>More organic products</td>
<td>8.2%</td>
<td>12.0%</td>
<td>14.5%</td>
<td>13.9%</td>
<td>20.9%</td>
<td>30.5%</td>
</tr>
</tbody>
</table>

Note: Shading indicates highest responses by row. Source: Community Design Center, Food Survey 2009.

During the research, students perception revealed that they do not think that their opinions are taken into consideration when UC Dining Services implements any changes in either the dining halls or at TUC. This complaint was explored through the question “Do you think your food preferences are considered when food vendors are chosen for TUC and other campus location?” Around 54% of the respondents answered no (See Figure 32).
According to the results of the food survey on Question 19 (See Figure 33: Did you know that UC Food Service offers a Food Focus Committee that meets monthly and is open to the public?), 93.7% of the respondents did not know about the Food Focus Committee. In terms of participation, the fact that people do not know the mechanism to participate and ask for improvements can certainly restrict their chance to take part in the committee limiting their opportunities to give feedback to UC Dining Services.

Author commentary: hence UC Dining Services should explore other publicity strategies to enhance the public’s knowledge about the Food Focus Committee and participation might increase as well. During the meetings with Hautz, he expressed that this low rate of students’ participation in the committee was a concern for the dining service and acknowledged that the lack of information could be playing an important role in the absence of student’s participation.

Perhaps the lack of knowledge about the participation mechanisms regarding food on campus can limit the students’ involvement. Nevertheless, when discussing with UC Dining Services’ managers, Student Government representatives, and different student organizations leaders about the reasons why students do not participate in activities organized for the improvement of the food system all the members consulted mentioned apathy and lack of interest. This is in accordance with the result of the survey, when 68.4% of the respondents expressed not being willing to participate in the Food Focus Committee (See Figure 34).
Besides, a high proportion of respondents (54%) answered that they would not be willing to participate in a student-centered activity to bring locally produced food to campus. Conversely, when participants were asked whether they would like to see a Farmer’s Market on campus, just 83.3% of the respondents were agreed with the idea (See Figure 35). It seems contradictory that students want see new green initiatives on campus, but they do not want to be directly involved in those activities.
Author commentary: in short, even if the mechanism exists, students will not be willing to participate. This can be a potential subject of study for a future research project, which could explore successful student participation mechanisms related to food that have been implemented by other campuses to develop co-responsibility in the improvement of the dining services and therefore positively impact the university food system as well. The next chapter presents and compares some remarkable initiatives undertaken on American campuses that can give an overview of student participation efforts, student movements against fast food chains and changing of administration of dining services by the university instead of by an outsourcing corporation6.

5.3 Strategies and recommendations to improve the food system

According to Van Weenen, strengthening the food system in higher education institutions requires that the physical operations of the university be taken into account. The university is assessed as an organizational unit that uses materials and energy, facilities and space (Van Weenen, 2000). Through an environmental management system the first level of "university operation" can be formalized organizationally.

Dining services must be highly interconnected and organized on different levels with all the administrative departments, faculty, and colleges within the campus. Combining university operations as part of research, education, and management would allow university management to set the conditions and mechanisms needed to stimulate, assess, and evaluate progress.

A powerful advisory body with a significant and representative number of engaged staff and demanding students is key to establishing and comprehending the university mission statement. A strong and convincingly formulated mission statement contributes to the highest and most holistic level of university engagement (See Figure 36).

There are other initiatives that need to be explored and taken into consideration by the UC dining services, such as creating student assistant positions and/or internship programs, which could offer students the opportunity to gain management experience and get involved with food-related issues on campus.

6 Some of the universities in Ohio that are changing large dining services administration by small scale dining services focused on environmentally friendly dining halls are: Xavier University and Oberlin College. Besides, Ohio State has self-administrative dining services with a high standard of success.
The strategies for improvement that can be implemented at UC can be summarized and explained through the chart above. Design a strong policy regarding food system, design a food system mission and goals; understand the complexity of the university system; identify the decision-makers in food and environment stewardship, incorporate environmental courses as degree requirements for all students; establish an ad hoc Committee on Environmental Stewardship, establish specific committees; plan and elaborate the next five years commitments; create awareness programs to engage the community, explore strategies for fund raising, establish sustainability indicators to measure the progress of the initiatives taken; create evaluation sections, and follow ongoing initiatives.

6 Conclusions

Universities have the responsibility to educate people that might become leaders in the future. As part of society’s leadership, they will have the responsibility in their hands to increase awareness, knowledge, technologies, and tools to create an environmentally sustainable future. Universities are a key in the development of the intellectual and conceptual framework needed to achieve results regarding environmental actions. Higher education institutions must play a strong role not only in education, but also in research, policy development, information exchange, and community outreach.

The main conclusions of this research can be enumerated as: 1) American universities and colleges whose dining services are operated by large corporations tend to have less nutritional food and have a negative impact on diet-related health problems; 2) Looking towards the 21st Century’s challenges, universities have the responsibility to educate and create an ecological conscience among students. Yet improving food systems in colleges and universities is highly complex. Dining services hold a key role in the promotion of a higher standard of food on campus and the education of more environmental responsible customers; 3) Currently many universities are incorporating green actions aimed to enhance their food systems toward more locally oriented ones, even those located in urban settings. Some of the American universities have also developed interdisciplinary curricula, focused on environment, sustainability and food related issues; and 4) Two of the most important conditions to improve college and university food systems is by promoting environmental stewardship and integrating students in the decision-making process as well as in the new sustainable actions. One important program to be implemented at UC would be a waste reduction program combined with composting waste management.

Continual transformation has been a characteristic of the history of the University of Cincinnati. Similarly, UC’s Dining Services has been innovative through the years, updating their practices toward national trends and becoming much more oriented to customer satisfaction services and more recently to meeting the ongoing needs of the university as a community in accordance with the UC │ 21 Strategic Plan. All these changes have put UC’s Dining Services on the front line since its beginning. However, implementations of environmental programs in
dining halls and green initiatives have been adopted slowly compared to other campuses across the nation.

Based on the results of the food satisfaction survey and the “environmental movement” at national level in universities, now is a good time for UC’s authorities and food decision-makers to rethink the service and be not only more sustainability oriented but also more open to respond to the student wishes and demands. Perhaps, this could be the best time for a big change in terms of food on campus, when president Obama and the First Lady have shown the spotlight on the importance of eating healthy and growing their own food, when USDA’s policies are oriented to promote fair, healthy and sustainable food systems, and when the food policy debate seems to be gaining momentum. This would be an excellent opportunity to promote changes in UC’s next food contract supplier, which could directly impact students’ eating habits.

The implications of rethinking UC’s food system towards a more locally oriented one would constitute a meaningful opportunity for the institution to make important changes in the way food is produced, distributed, consumed and disposed. A more local food system could enhance ecological awareness among students, reduce the university’s environmental footprint, improve nutrition and health of students, and generate important savings for UC. In the long run, improving UC’s food service could be an opportunity to become an icon at the national level in terms of sustainability, healthy eating habits, and responsible education.

Dining halls are an important space within the campus and students spend a significant amount of time there. Therefore, university dining services has a big role in contributing to the improvement of the food system by assuming responsibility for waste management and taking alleviating actions. The most effective way to improve our food system is to reduce the environmental impact of it. In order to diminish the environmental footprint, it is important that universities reduce gas emission on transportation, reduce the percentage of processed food, reduce meat consumption, increase organic and local products in the menus, reduce food waste, and increase waste management initiatives.

Some actions that need to be taken into consideration at UC dining courts to improve the food system include conducting daily trash weight reports, integrating composting into waste management strategies, buying local food in bulk, promoting refillable coffee mugs throughout campus, decreasing packaging, using food donation programs to feed poor communities, creating on-campus markets (selling fresh vegetables and fruits, as well as compost), constructing spaces
to store and process recyclables, involving student organizations, and institutionalizing a sustainable office that can coordinate all of the efforts on campus. Rethinking UC’s food system would also imply some changes in the way the university’s dining services operates. Conscious that replacing outsourced food service management might be a long term goal, a more feasible action would be to contract a more sustainably oriented small scale company that can offer new ecological initiatives and more local products.

In terms of food supply and distribution, dining services has an opportunity to reduce costs and environmental footprints by increasing regional and local food purchases. ARAMARK is a large company that supplies food to many universities and is promoting “green initiatives” in other campuses across the nation. Their management is a big opportunity to get their experiences and their consultancy to improve and enhance the university food system.

In this sense, ARAMARK worked together with dining services in the tray-less pilot program. This program indicated that there is room for improvement, for optimizing food consumption among students, and for reducing waste. In addition, food waste management needs to be strengthened by redefining the composting program and designing agreements with local organization to secure an adequate space to dispose of food scrap. The fact that the contract with ARAMARK ends in 2010 represents an opportunity for the dining services to incorporate better management programs and to promote an increase in the purchase of local food, the weighing of food waste, composting efforts and so on.

Still, the University of Cincinnati reflects some of the barriers, discussed in this paper, when transforming universities to greener institutions, such as: resistance to change, lack of commitment not only by the authorities but also by the student body, and lack of leadership and initiative to change the current situation, specifically in terms of dining services. The new Sustainable Coordinator should catalyze environmental actions related to dining halls working together with UC Dining Services authorities and with students. Additionally, UC Dining Services authorities should incorporate new strategies to encourage students participation as well as involve them in the decision-making process regarding food on campus and therefore in the improvement of the service.

This research not only provides detail information on the University of Cincinnati’s food systems and precedent studies that have been implemented across the nation in other higher education institutions regarding dining halls and sustainable practices. This study also showed
that there is plenty of room for improvement at the University of Cincinnati, regarding food system, that need to be address in order to become a more sustainable oriented campus.

To sum up, some of the findings related to the UC food system can be summarized in five principal points.

- Universities play an important role in the education and awareness of the future leaders that will have the responsibility to create an environmentally sustainable future and to radically change the way we eat and understand local food systems.

- Due to the traditional organization of universities into disciplines, it is difficult to incorporate all the students into environmental courses and research projects. Consequently, an important environmental stewardship for the University of Cincinnati would be to create a Sustainable Environmental Department or authority to coordinate all environmentally-related efforts and initiatives in order to improve not only its food systems, but also to diminish the university’s environmental impact.

- University dining services can have an enormous role in contributing to the improvement of the food system by assuming responsibility for waste management and taking alleviating actions such as composting, purchasing local food, and reducing waste.

- The University of Cincinnati, in comparison with other universities in terms of dining and food waste management, seems to be a low-performer in diminishing the footprint and the environmental impact of the food system.
7 Methodology

7.1 Critical path

The path followed during the research process in order to organize the information and write the final report is been shown in Figure 37.

![Critical Path- Research](image)

**Figure 37: Research’s Critical Path.**

7.2 Qualitative research

This research project was conducted at the University of Cincinnati, particularly in the Uptown West Camp, and will be based, primarily, on information gathered on what environmental initiatives are being developed by the different organizations, students, staff, or administrative offices. The main qualitative data collection techniques surveyed in this study were: interviews, focus groups, UC’s reports and documents.
a. **Meetings and in-depth interviews**

Interviews of key members of the campus community will provide information about how key players perceive needs as well as how willing they are to change and what obstacles they foresee. All those points are important to take into consideration in order to design realistic and feasible programs. Furthermore, interviews give us anecdotes and observations about how the problem has been handled, past actions, and the relationship between people involved in the programs.

Besides collecting the right data, matching the data with the objectives of the research is important in identifying the most important actors for our interviews. The most important participants within these programs are:

- Facilities Management, Administration and Finances offices. They are in charge of administering dining services and monitoring the contracted firm who provides the food and manages the staff. They are a key to providing statistical and quantitative data about the food waste on Campus.
- UC’s Community Design Center. They can provide us with information about the food system in the city and how the campus can impact it.
- Department and college representatives that provide programs or courses related to food, nutrition, and environmental interests as part of previous research. Some faculties are teaching environmental programs that can provide initiatives and be a way to implement some actions to improve the situation.
- On campus residents and off campus students. The students are the biggest population on campus and also the biggest food consumers at UC. Their opinions and the actions they take within environmental organizations are key to understanding consumption patterns, implementing new educational programs, designing sustainable initiatives and participating in the reduction of food waste.
- Other governmental and environmental agencies can give guidelines about new policies and successful environmental programs implemented at other universities.

During the research, contact was made with some UC Facilities managers as well as professors that are working on food research projects and teach related educational programs and some organizations in Cincinnati that deal with agriculture and food waste. The questionnaire designed for the interview is included in the appendix 4.

Some of the people interviewed were:

i. J John Hautz. Director, Auxiliary Services. UC Housing and Food Services.

ii. Ian M. Sroufe. Board Operation Director (ARAMARK’s UC Manager). UC Dining Services.
iii. Spyros Gravas, UC/ARAMARK Food Service Director.
iv. Rick Wiggins, UC Facilities Management Director.
v. Bill Duncan. Manager, Special Projects. UC Facilities Management, Administrative 
   & Business Services.
vi. Bob Bauer. Operations. Assistant Director FM. Director, GMT. UC Grounds, Moving 
   & Transportation. Facilities Management
vii. Margaret J. Kupferle, PHD, PE. Assistant Professor. UC Department of Civil and 
   Environmental Engineering.
viii. Ming Ming Lu. Associate Professor. UC Department of Civil and Environmental 
   Engineering.
ix. Deanne Maus. Agriculture Business Specialist. Center for Innovative Food 
    Technology. Cincinnati.
x. Kelly Moore, Assistant Professor, UC Department of Sociology. Course taught: 
   Sociology of food, Environmental Sociology, Introduction to Sociology, Sociology of 
   Science and Social Movements.
xi. Ezgi Akpinar, Graduate Student Governance Association President.
xii. Steve Klosterman, Environmental Engineering Graduate Student Association. Officer 
    1 / President.
xiii. Shaun Finley, UC’s Sustainability Coordinator.
xiv. Russell Best, PACES- President’s Advisory Committee Environment and 
    Sustainability.
xv. Brigitte Cronier, Co-President of LEAP- Leaders for Environmental Awareness 
    Protection Action.

b. Focus Groups
Focus groups are typically used in marketing studies in order to gain a large amount of 
qualitative data from multiple individuals. First utilized in the 1950s, this technique was mainly 
used to get information about a product among a target group. However, focus groups are a 
common method of data collection in evaluation research or to measure success, strengths and 
weakness in order to explain what is not working; also this method is useful in developing the 
content of new programs (Hesse-Biber and Leavy, 2005). The main difference between 
interviews and focus group sections is the degree of interaction; the group interaction gives more
For the objectives of this study, the information gathered during the focus groups was collected by the Community Design Center; however the researcher participated in both. Two focus groups sections were conducted to gather information about how students, faculty and staff perceive the need of a more local and sustainable food system and how they evaluate the current system function. The questions presented to the group are enclosed in the Appendix 5, 7 and 8.

c. UC’s documents and reports

Progress on campus environmental initiatives could be measured in different ways (Creighton, 1998). Qualitative data will help us measure progress or decline on the implementation of the initiatives, compare historical results, and analyze future tendencies (see box 2). Some examples of the data needed for the project are volume of food waste produced in Residence Halls and Dining Services Courts, volume of meals served per quarter, volume of pre-consumed\(^7\) food and of post-consumed food, final disposal for food waste, types of materials recycled, volume of composted material, and so on.

The main method of research compared strategies and correlation analysis of implemented programs in relation to other universities (for example, the creation of a waste reduction committee, redefinition of the environmental policy, and increasing the number of bins to recycle organic food.

In conclusion, this study surveyed the UC food supply, distribution patterns, consumption patterns, and waste disposal system, as well as proposed guidelines for the implementation of food waste recycling initiatives by: (1) describing the actual recycling program taking place at the university, (2) analyzing actual environmental management practices, (3) exploring some successful initiatives regarding food waste in higher education institutions across the U.S., and (4) designing guidelines to promote and ensure that a suitable and sustainable food waste recycling programs could be implemented.

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\(^7\) Pre-consumed food waste is the food that is disposed during the coking process or before being consumed. Post-consumer food waste includes all type of food that is dispose after is being cooked.
7.3 Quantitative research

Quantitative data will be necessary to understand and measure the impact of the food system on campus. The main qualitative data collection techniques surveyed in this study was a survey.

a. Survey

Quantitative data relies most of the time on surveys. The survey is a quantitative instrument which in this case was originally meant to be conducted to a specific number of respondents. The data obtained from the survey will be translated into numbers, percentages, rates and graphs. The researcher’s interpretation of the survey will be based on a set of variables, which were predefined when the questionnaire was designed. This research project applied a semi-structured questionnaire, which consists of both open-ended and closed questions. The results can be presented in the form of statistical data (Hesse-Biber and Leavy, 2005).

Originally, based on the total of full-time students, full-time faculty, and staff population (West Campus), a random sample population was estimated. Taking into account a 5% margin of error, 95% confidence, an estimated population of 25,000, and a response distribution\(^8\) of 40% (this percentage was assumed based on information of rate of response of interview conducted by other university’s departments). Based on those variables and according to the random sample formula, the recommended sample size to be surveyed was 379 people\(^9\). The questionnaire was designed by the Community Design Center at UC, taking into account three main objectives: perception of food service, willingness to incorporate more local products and sustainable initiatives on campus, and student participation and involvement level. The promotion strategy of this survey was done through a series of meetings with student groups prior to the release of the questionnaire, distribution of posters and pamphlets around campus, and an advertisement email to provoke thoughts prior to the delivery of the actual survey. The questionnaire is shown in Appendix 9.

\(^8\) The response distribution is the percentage of questionnaires expected to be responded.

\(^9\) The website used to estimate the random sample is available at: \url{http://www.raosoft.com/samplesize.html}
7.4 Limitations
Some of the major limitations found during the research process were:
- Lack of a source of information about research project and data regarding food system such as: cost of food transportation, average of consumption per students per meal.
- Information regarding educational programs and courses offered by the University related to food consumption, waste, nutrition, and environment is limited. In addition, there are a few precedents for research on this matter on campus.
- Lack of measurement and weight of the food that is purchased and the food waste.
- Time and schedule were a limitation to set the interviews and get the data required.

Presented below are some concepts that are related to food system and make it easier to understand.
8 Concepts related

a. Local Food

The "local food" movement is aimed at raising the ecological awareness of consumers and producing dairy, vegetables, and meats from farms within a defined state, region, or portion of the country. The exact definition of local food varies depending on the parameters (i.e. grown within a 30 mile radius) and the borders of a county or a state. Some even use the concept of an eco-region, or "food shed", to determine local food boundaries.

Local food strengthens the local economic base and promotes sustainability. Moreover, sustainable food production, processing, distribution, and consumption can be further integrated to enhance the economic, environmental, and social health of a particular place (Feenstra, 2002). Based on direct sales alone, without intermediaries, local food systems improve the local economy and encourage employment.

Community Supported Agriculture (CSA) continues to emerge as an interest across the nation. The advantages of encouraging local food practices consists of reducing processing and packing plants, producing on a smaller scale, promoting local farms productions instead of transporting products from great distances, saving in transportation costs, and diminishing air pollution (Flint, 2004).

According to Pioneer Valley Grower Association (PVGA), the average distance food travels from farms to groceries has increased over the last four decades, varying from 1,500 to 2,500 miles. By reducing the distance food travels to the consumer, local food programs can cut down on transportation costs, fuel costs, and green house gas emissions.

The food industry, on a regular basis, is fueled primarily by natural gas, although electricity meets 15% of industry needs. About one-half of all energy used in the food industry is used for processing, which includes heating and cooling, refrigeration, mechanical energy, and electro-chemical processes. Preserving food also requires energy for freezing and drying. By contrast, increasing local food production and consumption hold promise to diminish these energy costs and reduce the environmental repercussions.

b. Organic Food

United State Department of Agriculture (USDA) certification, guarantee consumers that organic crops are produced without the use of chemical pesticides, synthetic fertilizers, genetic
modification, or sewage sludge, and processed without the use of food additives or irradiation. Furthermore, certification guarantees that organic meat, poultry, eggs, and dairy products come from animals that are raised without the use of sub-therapeutic antibiotics or growth hormones.

As a result, organic growing techniques diminish water, soil and air pollution by decreasing the amount of artificial pesticides and fertilizers used in agricultural production. Organic production also encourages wildlife by including forage crops in rotation and by retaining fence rows, wetlands, and other natural areas (USDA).

c. Recycling and composting
Recycling involves taking a useless product or material and turning it into a usable raw material in order to make another product. On the other hand, composting involves using organic waste to produce nutrient-rich fertilizer for the soil. This conserves the landfill space and could also be used to generate energy.

One of the keys to successful recycling and composting of food wastes is the ability to turn a profit or to demonstrate social and environmental benefits for the community. Recycling and composting could create new infrastructure, jobs, and an entire new segment of the economy (Solid Waste Plan, Massachusetts).

d. Sustainability
According to The United State Environmental Protection Agency (EPA), the common use of the term “sustainability” began in 1987 with the publication of Brundtland’s report *Our Common Future*. Sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Therefore, sustainability takes into consideration all those initiatives that encourage protecting the environment and promoting positive economic growth and social objectives while improving our quality of life.

e. Farm-to-college programs
Less than 2% of the U.S. population is involved in farming. In fact, according to the federal Census Bureau the number of farms is “statistically insignificant”. Conversely, while farmers' financial situations are slimmer, students nationwide are experiencing an epidemic of obesity.
Obesity is associated with high risks of hypertension, diabetes, cancer, heart disease, and strokes. The absence of fresh and healthy food choices, the lack of awareness of where and how food is grown, and the lack of understanding of how unhealthy food choices lead to health problems are some of the issues that face dining services at universities and colleges. Dining food service departments have an important influence over students' eating habits and health.

Farm to college projects offer opportunities to increase farmer income, support the local economy and the environment, and improve students' eating habits. By purchasing directly from local farmers, university food services can help a local farm stay in business and keep dollars in the local economy. Moreover, typically, locally produced foods are raised with fewer chemical insecticides, herbicides, fertilizers, and other synthetic additives than foods shipped in from other parts of the country or world (Community Food Security Coalition).

The Environmental Protection Agency defines waste as “any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled, but does not include a substance which is explosive” (Bates and Phillips, 1999).

The trend among higher education institutions and schools is to minimize and recycle waste. Waste minimization means to reduce the consumption of resources and the environmental impact.

Reducing the environmental cost of the waste is linked to four basic processes: elimination, reuse, recovery, and disposal. Although this hierarchy of waste management frequently depends on the institution’s sustainable priorities, the emphasis is most often placed on reducing the amount of raw material used. “The aim of current waste management strategies is to reduce the burden of waste on the environment and so move further up the hierarchy towards waste reduction, and away from filling landfill with it, this was also the rationale behind the introduction of the landfill tax” (Bates and Phillips, 1999).

According to a recent study about food system wastes by The University of Wisconsin’s Department of Regional Planning, nearly 30 percent of all solid wastes are related to food consumption, with half of that being from food packaging. Such wastes can be fed to hogs, composted and reapplied to the land, or converted into renewable energy through anaerobic digesters.
8.1 Some Food System’s statistics

- About 80% of the energy used in the U.S food system is related to processing, packing, transporting, storing, and preparing food.
- Animal agriculture represents 18% of the world’s greenhouse gases emissions and compared to transportation, CO₂ emissions are about 5% higher. Over 25 billion animals are killed for meat consumption each year in U.S.
- Food system studies have shown that local food purchasing can save up to 3,000% in energy and result in 87% less carbon dioxide emissions.
- As a result of intensive milking and chemical manipulation, dairy cows’ bodies produce 10 times more milk than they naturally would.
- Alfred University, Saxon, New York, has reduced food and beverage waste by 30-50% since they implemented tray-less dining in January 2008. This represents more than 15 tons in solid waste kept from the nation’s landfills.
- Schools running farm-to-school programs spend annually an average $223,104 on local products.
- Sixty-six percent (66%) of the Food Services operations in U.S universities are contract- managed (Food Community Coalition).
- Even though about 60-70% of processed foods sold in America contain genetically modified organisms (GMO’s), only roughly 20% of Americans realize that they consume GMO’s on a regular basis (UCB – Food Assessment, 2000).
- Nearly 30 percent of all solid wastes are related to food consumption, with half of that being food packaging (UW, 1997).

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# Appendix

## Appendix 1: Meals sold in UC’s dining halls

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Appendix 2: UC’s Policies, Waste Reduction

To see policies and details look at [http://www.ehs.uc.edu/Advisories/Advisory_7_2.PDF](http://www.ehs.uc.edu/Advisories/Advisory_7_2.PDF)

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UNIVERSITY OF CINCINNATI

Environmental Health and Safety

ADVISORY NO. 7.2: WASTE REDUCTION

HAZARDOUS WASTE DISPOSAL CAN BE MINIMIZED BY THE FOLLOWING:

Planning experiments - the planning of every experiment should include consideration of the disposal of leftover starting chemicals and of the products and byproducts that will be generated.

Elements to consider are:

- Recovery and reuse of materials.
- Acquisition of chemicals only in quantities needed.
- Replacing a hazardous reagent with one that is less hazardous (see Appendix 7.2A).

Reduction of the scale of experiments - the use of microtechnology in the study of chemical reactions can lead to significant savings in cost of chemicals, energy, apparatus, and space. Such technology makes it possible to optimize on a small scale the conditions for a reaction that is to be carried out on a preparatory scale so that the latter gives a high yield with minimal byproducts. It is now technically feasible to run many reactions with much smaller quantities of chemicals than were needed 25 years ago. Some of the technical advances that have made this possible are:

- Fast microprocessor-based, top loading balances that are sensitive to 0.1 mg.
- Chromatographic techniques that can clean, separate, and purify milligram quantities of substances.
- Sensitive spectrometers that can analyze milligram and microgram quantities of substances.
- Micro-scale glassware for handling reagents and reaction products.
- Flow and transfer systems based on small internal diameter metal and plastic tubing that make it possible to study flow-type reactions, catalysts and multi-step reactions on a very small scale, even under pressure.

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Appendix 3: UC’s Environmental Policy

See [http://www.eh.uc.edu/epc/#Home](http://www.eh.uc.edu/epc/#Home)
Appendix 4: Interview questionnaire

The questions asked to some of the people interviewed in this research were:
1. Which proportion of the Dining Services budget is invested on food?
2. How many meals are being served during the year? How many tons?
3. How many tons of food is bought, cooked, consumed and waste? Per month/year
4. Is there any statistical information or historical data regarding consumption and disposal of food and packaging? Do you have any data about the energy we are consuming bringing food to campus and taking the waste away? How much it costs?
5. What types of food are we eating and proportions: processed vs. organic, meat vs. vegetables?
6. How is food waste disposed? Tons per month/year?
7. What are the wastes generated by a process, experiment or treatment
8. Is there a food security management process? Explain
9. Do we donate or sell food waste? If so, to whom?
10. Are there any food scrap management alternatives being explored?
11. Is there any effort to divert food packaging for recycling purposes?
12. Do we have any procedure to separate food waste in dining courts? Meat scraps from other types of food waste?
13. Are we composting right now? If is not, why?

Management
14. Explain the benefits in terms of food pre-consumer and waste reduction with the implementation of the dining court (different menus stations and all you can eat concept) compare to the one line (tons reduced).
15. Explain management and functions of Dining Services and ARAMARK.
16. Where is the food we receive at the University of Cincinnati distributed from (city, state)?
17. Where are the producers located? Major producers.
18. What are the food processors (any and all intermediate steps between production and distribution)?
19. What is the mode of transportation for the products between each of these locations?
20. Do the producers you buy from change with the seasons?
21. Does any of your produce come from local farms (in the OKI region or Midwest)?
22. Have you considered farm to college or composting initiatives?
23. What kinds of packaging do you use to distribute goods?
24. Talk about student organizations and Food Focus Committee.
Appendix 5: Poster for focus group

HAVE YOU EVER THOUGHT...

- Where does the food at UC come from?
- How much energy is used to produce food for campus?
- Am I contributing to greenhouse gas emissions when I eat?
- What proportion of the food served on campus is local?
- Where can I get a vegetarian meal at UC?
- Are there truly healthy options for food on campus?

- Why do other campuses across the country have more sustainable-friendly food systems?

- Did you know the UC's food supplier contract is coming to an end next year?

The Community Design Center at University of Cincinnati is conducting research related to our Food System. As a consumer, you are one of the most important parts of our food system. We invite you to participate in a focus group session on

APRIL 21 | 3 - 4:30pm @ TUC 417

For more information please contact foodproj@uc.edu.
Appendix 6: Flyers-Survey promotion

Appendix 7: Focus Groups, questions

- What are the main three changes that would you like to see regarding UC’s Food System?
- What type of student activities regarding food you would be willing to participate in?
- Would you be willing to take a course (elective) about food and sustainability?
Appendix 8: Focus Group’s presentation slides