

UBC Food System: Framework for Assessing Sustainability

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*UBC Food System:
Framework for Assessing
Sustainability*

Group 11

AGSC 450, Spring 2003

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Abstract

The global food system is a huge industry that has a major impact on environmental, social, and economical sustainability. The UBC food system represents a microcosm of the global food system, similarly impacting the sustainability of UBC. We believe that the UBC Food System (UBCFS) [REDACTED]

[REDACTED] is currently unsustainable. Significant amounts of solid waste are being produced annually, resources are not being adequately utilized, and healthy food is not being provided at a reasonable cost.

The UBC Food System, defined as the area west of Wesbrook Mall, faces numerous challenges. Efforts are being made to improve the sustainability of the system by the UBC Sustainability Office, however to date no projects have been published regarding the sustainability of the current food system [REDACTED]

[REDACTED] The objective of this project is to develop a framework for assessing the sustainability of the UBC food system, which can be taking up and implemented by AGSC 450 students over the next four years. To this end we propose using 6 indicators, which integrate issues of ecological, social and economic sustainability. It is our hope that this project will serve as a stepping stone for future projects aimed at promoting a more sustainable UBC food system.

1. Introduction

The global food system is a multi-billion dollar a year industry that has a major impact on environmental, social, and economical sustainability ¹. The UBC food system represents a microcosm of the global food system, similarly impacting the sustainability of UBC. We believe that the UBC Food System (UBCFS) is currently unsustainable ██████████ The UBC student body has increased by over 5000 in the last four years ² and this kind of population growth will intensify the pressure on the system.

Significant amounts of solid waste are taken away annually, 70% of which is compostable ³. Resources such as the UBC farm are not being adequately utilized, and healthy food is not being provided at a reasonable cost. The UBC Food System faces numerous challenges. While efforts are being made to improve its sustainability no projects have been published regarding the sustainability of the current food system. It is our hope that this project will serve as a stepping stone for future projects aimed at promoting a more sustainable UBC food system. The objective of this project is to measure the sustainability of the UBC food system and assess its place on a continuum from unsustainable to sustainable. We are participating in the early stage of a five-year assessment of the problem. We will be designing a framework for assessing the sustainability, which can be taken up by future groups to measure the system.

2. Problem Definition

a.) An unsustainable UBC Food system:

In an unsustainable food system, the level of consumption exceeds the carrying capacity of the land. The population depletes the resources faster than nature can replenish them and produce more waste than the land can absorb. In an unsustainable food system, the social, economic and ecologic components operate in a way that may lead to a breakdown of the system. Access to, and affordability of healthy and diverse food is distributed inequitably.

People in the community ██████████
██████████ may be unaware of the components of the food system such as production, processing, or distribution; they may be unaware of institutional efforts to implement alternative methods to increase sustainability. The food system is economically unsustainable and vulnerable when it operates inefficiently, wastes resources and depends on outside funding, production and enterprise. It is also unsustainable if profits are sapped from the system and not reinvested in the community. In an unsustainable system, food is unaffordable for many members of the community and employees are paid wages that do not enable them to maintain an adequate standard of living. Large amounts of waste and pollution are produced, composting and recycling programs are absent and food is not produced locally. In short, a highly unsustainable UBC food system has an ecological footprint ██████████
██████████ that exceeds the actual land resources available to UBC by many times. ██████████
██████████

b.) Intermediate system

In an intermediate stage between healthier food is provided that is more affordable and accessible. Information on food production methods is readily available and is understandable to the majority of consumers. Contracts with multinational corporations (e.g. Coca Cola), no longer dominate the supply and distribution of food to UBC; they are replaced by a more diverse system. The level of freshness and nutrition of the meals offered at UBC food outlets are higher due to an increase in local and organic produce. The UBC administration has reformed regulations to switch from the focus on buying the most cost efficient and often environmentally degrading foods, to a more value-oriented economic system, that favors environmental sustainability and relationships between farmers and consumers ⁴. ██████████

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Some waste reduction projects are introduced such as reusable dishes and reduced packaging of food. Up to 50% of the total organic waste is composted. About 50% of the total food purchased is from BC farmers. Only a small percentage of food is imported from other countries. The UBC Farm and forested areas are being preserved and exempt from development planning [REDACTED]

[REDACTED]

Students, faculty and staff of different departments exchange information on a variety of sustainability issues including food, and many faculties offer courses on sustainability. More than half of the UBC community members report in surveys that they are aware of the UBC Sustainability Office's efforts to improve sustainability on campus and report being aware of the UBC Farm, Food Coop and the services that they provide.

c.) Definition of a sustainable UBC food system:

A sustainable food system is a crucial component of a sustainable community. A sustainable UBC food system would have strong food security, where food is healthful, diverse, accessible and affordable for all members of the food system ⁴. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Another vital component is an economic system that is efficient and viable. It must also focus on environmental sustainability, fairness, equity, local production and enterprise, and

further strong relationships between all members of the community⁴. The economic transactions regarding the food system are based on the concept of “moral economy”⁵. Rather than being bought and sold in an anonymous market system with only economic profit in mind, food is exchanged on a non-profit basis between the UBC players (UBC Farm, UBC food outlets and institutions, UBC consumers) and focuses on the needs of the community.

Environmental sustainability is the central goal for all [REDACTED] system interactions. In a sustainable food system pollution is minimized, efficiency is promoted, recycling, composting and local resources are maximized, and waste and transportation distances are minimized. All the food outlets and residences have composting facilities that reduce waste and give fertile soil back to the system. On-campus food production is encouraged and a variety of members participate in this production. Local production on the farm supplies organic, fresh and healthy foods to the food outlets and residents. A large share of the food is purchased from the Vancouver and Lower Mainland farmers and processors. A total of 80% of the food on campus comes from within BC [REDACTED]

[REDACTED]

[REDACTED]

In this sustainable system, members are knowledgeable and active in the community and are aware of food sustainability issues. The members have strong relationships amongst each other and the food system; they share information and work towards a common goal. All undergraduate degree programs require at least one interdisciplinary course in sustainability, which provides all students and faculty the opportunity to be involved in courses and research on sustainability. There are opportunities to participate in sustainable local production, preparation and distribution (UBC Farm, student kitchens, community dinners, Food Co-op). A

sustainable food system resembles a living system in which human, natural and economic elements are interdependent and draw strength from each other ⁶.

2. UBC Sustainability Office

The sustainability office's mission is to "promote, coordinate, and implement the most effective sustainability practices possible". Taking advantage of the physical and intellectual resources UBC has to offer they are "working to develop positive solutions for today's ecological challenges" ⁷.


Ecology, economy and society are the interconnected priorities that need to be balanced in order to achieve sustainability. The Sustainability Office highlights eight specific factors that must be managed for a sustainable UBC system. The UBC Sustainable Resource Strategy Framework consists of humans, materials, food, water, finance, energy, air and land (*see Appendix A*). By creating and managing this interconnected system, the coordinators hope to provide UBC with a consistent income, a safe and convenient neighborhood, and an environmentally friendly community.

Currently, the Sustainability Office and its partners are working towards defined sustainability goals for each of the factors that influence the UBC community's system. The Sustainable Energy Management program for example, is working to reduce energy use on campus. The UBC Waste Management program's focus is on reducing waste through increasing composting, recycling and litter reduction. Other projects include Waste Free UBC, which offers discounts if the consumer uses their own mugs and dishes, and a sustainable transportation systems program which is a focus of UBC Transportation Planning Department.

A variety of programs and projects are operating to realize UBC's sustainability goals holistically. The Social, Ecological, Economic Development Studies program (SEEDS) is bringing together students, faculty, and staff in projects that address sustainability issues, such as

wastewater treatment alternatives. These programs and initiatives are important steps towards a more sustainable UBC, because they integrate more than one of the factors that influence the community. Most of the efforts have been in improving the energy, materials, air, water and land components of the system.

Measuring success and progress is vital to the process of achieving an increase in environmental, economic, and social sustainability. Administration, students, volunteers, and staff must be able to visualize and articulate what areas require attention, where resources and effort are being wasted, what options and opportunities exist, and how effective measures have been. Specific, measurable, and realistic indicators are necessary for interested parties to make effective policy and project decisions. UBC's steps towards sustainability are currently being measured using indicators such as kW/h energy used on campus, percentage of single-occupant vehicles entering UBC, liters of water consumed on campus, number of sheets of printing and copy paper used, and pesticide use on campus. In an age of increasing demands on the earth and its denizens, steps to measure, articulate, and act on sustainability are crucial ⁷.

Policy makers in the UBC community have only begun to address the food system, one of the most important components of the UBC system. Nutrition, food cost, food waste, food origins, eating habits, transportation, packaging, and other issues confront members of the UBC community. Aside from the efforts aimed at increasing composting and reducing garbage however, no projects have yet been published that directly address the food system's sustainability.  This paper is a step towards improving the food sustainability of UBC.

3. UBC Food System map

For our purposes, the geographic boundary of the UBC food system is Wesbrook Mall. This means that the village and the fraternities, although within the UBC property, will not be included in our definition of the UBC food system (*See Appendix B*).

The components of UBC food system are those involved in food production, processing, consumption and food waste processing. The main components involved here are the consumers themselves, the restaurants or food services that retail the food, (such as UBC food services and AMS), the Food Coop as well as the UBC Farm (which produces unprocessed foods). The waste generated as a result of food consumption is also part of the system.

The UBC food system is linked to the national and global food systems through wholesalers or other companies that are outside of UBC. AMS, for example, obtains their raw ingredient from Sysco-Konings Wholesale⁸. Waste generated at UBC is transported off campus by local waste handlers. Currently, some of the compost is recycled at the UBC farm, but few UBC food outlets and residences compost food wastes. The food system interacts globally by importing products from around the world in order to buy products at lowest cost, and to supply ethnic diversity and a wide selection of foods all year round.

4. Assumptions

Personal experiences, interests, values, and ideals influence the way we perceive situations; they shape our paradigms. Education plays a major role in this awareness by exposing us to different ideas and theories we have not encountered before. On a continuum from individual freedom to community responsibility, our group strongly adopts community responsibility. We value social considerations above independence; community benefits have higher priority than do individual benefits. Our commitment to the community is reflected in the nature of social indicators. We do not believe the UBC food system should make money off of students. ██████████
Collective awareness of the UBC food system and its components are important to us. Does

our community have access to affordable food? Who are the different parties of the UBC food system? How do they contribute and why? Where does our food come from?

While the community-based approach is unanimous, we are of different opinions on the continuum between eco-centrism and anthropocentrism. A big part of the group is weakly anthropocentric, recognizing the moral validity of human utility. This part of the group puts human needs ahead of the environment, but not to the extent where all wants and desires are met at the expense of the nature. There is awareness that a healthy environment is important for human health and survival. For example, these group members justify the need for importing certain foods at the expense of the environment, because they appreciate their current standards of living. Other group members adopt a weak eco-centric approach. These individuals see intrinsic value in the environment; they argue for environmental protection for its own sake, beyond the utility of humans. These individuals encouraged the use of environmental indicators such as the size of the ecological footprint left by UBCFS. What can be done to alleviate the effect of wastes produced on campus? What is the ultimate level of composting of biodegradable products? Can we increase recycling, eventually substituting the styrofoam cups and plates with a more environmentally friendly material?

The eco-centrists raise concerns of the difficulty to argue and defend their perspective. Most people associate with anthropocentrism as it is the predominating view in our society. Everybody can identify with human needs; there is an inherent, instinctive drive to survive. The short-term benefits of the anthropocentric environment are easily argued, and instant gratification further encourages this mind frame. ██████████

5. Indicators of sustainability

Sustainability indicators are ways to measure the condition of a system. They are classified as environmental, social, and economic, and rather than being disconnected, indicators create a

web of complex interactions

Sustainability indicators are tools useful for monitoring progress of a system, understanding sustainability, educating stakeholders on issues concerning the system, describing linkages between system components, and motivating and focusing action¹⁰.

Our group identified awareness, food security issues, and food system footprint as essential components of the UBCFS. Levels of awareness and food security issues determine social and economic sustainability, while the extent of the ecological footprint determines environmental sustainability. Although we were aware that **food security** would be a large task to study in itself, we wanted to combine three different components of food security into one. Our group's definition of food security involves the affordability, accessibility, and acceptability of food on the UBC campus. **Awareness** encompasses UBCFS stakeholders' knowledge of the system components, components' interactions, and knowledge of sustainability issues. **Food system footprint** takes into account the environmental impact of food inputs and food outputs relative to the UBCFS

Awareness

When attempting to construct our map of the UBC food system, no one in the group was certain as to which services were actually included within our boundaries. The UBC Farm and the UBC Food Co-op were mentioned, but most of us were not sure about the services they provided. We determined that if we, as agricultural students were not aware of these two important food providers, how many other students from other faculties knew that they even existed? For this reason, our group determined that in order to be sustainable, the population

must first be aware that you exist before they will use your services. As a group we felt that some of the local food providers on campus were lacking in creating awareness of themselves. If no one knows about the farm, the food co-op, the sustainability office or any other smaller operation not part of the central campus, then no one will use them.

An indicator to measure awareness of the services that make up the UBC food system would be a questionnaire/survey given to a representative sample of the UBC population (students, faculty, staff, residents) [REDACTED]

The questionnaire would give us the information of whether the population was aware of the existence of specific food providers and the products or resources they provide. If it were found that there was a lack of knowledge of their existence, we would determine that it would reflect in an unsustainable ranking in this domain. Measuring awareness would be our example of a social indicator.

Food Security Issues

For the purposes of this project, we wanted to provide indicators for the **affordability** of the food on the campus, the **accessibility** of the food services and providers and the **acceptability** of the food being provided according to the population of UBC. Because these are three major factors that assist in determining food security, we labeled this section as “food security issues”. We chose this as an indicator because our group felt that a food system cannot be sustainable if it is financially not an affordable system for its population, nor if it is difficult to access the services it provides. If the food itself is not acceptable to the consumers, the population will not support it.

Again, we felt that the best way to indicate sustainability in these areas would be by asking the population of the UBC campus to determine their feelings on the affordability, accessibility



and acceptability of the food that is available to them on campus. By answering the questions, we could judge the current economic sustainability of the food system, and by using the same questions throughout the years of the project, determine if there are improvements. The questionnaire should be simple and user friendly. We have included examples of questions in Appendix D.


Food System Footprint

William Rees, a renowned member of the UBC community, is the creator of the ecological footprint. The ecological footprint is a tool, which measures the land area that would be needed to sustain an individual, city, or country at the current consumption levels. The original ecological footprint assesses the impact of all components of a person's lifestyle, but we have adapted and simplified it to deal only with the food system. We chose two representative indicators; for inputs we chose to assess the distance food travels before it gets to the system and for outputs we looked at the percentage of food waste that is composted.

Food miles: Food that is shipped long distances has an impact on the environment because of the overwhelming use of fossil fuels in the transport. The use of fossil fuels is unsustainable for many obvious reasons (pollution and it is non-renewable). However, local consumption is not just a matter of environmental sustainability. We also looked at the issue of social sustainability with respect to local food production. Buying from local suppliers strengthens community interactions and contributes to the local economy ¹¹. So buying locally has elements of environmental, social and economic sustainability.

We recognize that there are several barriers that prevent us from buying 100% of the food locally. First of all, we live in a temperate climate where food production in is not possible all year round



 Secondly, only 5% of BC land is arable, restricting food production in quantities sufficient to feed the whole community⁹. Last, we have become accustomed to a variety of foods that do not grow in this climate. While we acknowledge that attitudes towards consumption will need to change in order to have a more sustainable system, we do not think that it is necessary to give up all non-essential imported food.

To measure this indicator, we propose to assess the distance food traveled before it reached consumers by dividing the food into two categories: local and imported. We defined local as within BC, and imported as anywhere in the rest of Canada and internationally. While we could have used a more complicated analysis, we made this choice in order to simplify the data collection. We think that this decision will not compromise our ability to estimate food miles traveled and use this information to predict changes in sustainability.

Percent composted: The ecological footprint takes into account the area needed to provide resources, and also the area needed to absorb wastes. Increasing the amount of waste that is reused moves us in the direction of sustainability. As mentioned above, 70% of the solid waste generated at UBC is compostable. This valuable resource ends up in the dump, becoming a liability rather than an asset. We consider changes in the percentage of waste composed to be a good indicator of changes in sustainability practices. We would like to see 100% of the food waste recycled in the system and used at the farm and in landscaping. While this is our optimal situation, it is unlikely that this will be achieved over night, so some intermediate stages can be used as benchmarks. We decided that on the unsustainable end, anything below 20% is very unsustainable, 50% is intermediate, and over 80% is very good.


6. Model to assess UBCFS


The amoeba approach is a model used to visually assess a system's condition relative to an optimal condition. It has been used extensively in assessing resource sustainability, such as



marine ecosystems¹², soil conditions¹³, agroecosystems¹⁴, and it has even been used in marketing to assess consumer satisfaction¹⁵. We believe that this model can also be used to visually represent and assess the sustainability of the UBC food system.

The model is circular with the various indicators positioned around the outside. Lines radiate from the center to the indicators, on a continuum from unsustainable (in the center) to sustainable (the outer ring). The optimal situation, when the system scores the highest degree of sustainability, would look like a circle. However often systems are not at their optimal levels. The intermediate stage between sustainable and unsustainable is the halfway point on the radiating lines. Anything closer to the center is very unsustainable. (*See appendix C for diagram.*)

This type of model is relevant for us because it allows for simultaneous assessment of different indicators, and easy comparison between components of the system. It is easy to see which areas need the most work, which is especially useful considering that the Sustainability Office will need to prioritize their efforts.

In order to apply this model we first needed to propose an optimal level for our indicators. We decided that in a sustainable food system 80% of the food consumed would be produced/processed locally and only 20% is imported. Our intermediate stage was 50% local. Similar situations hold for the other indicators. For affordability for example, we proposed asking a random sample of the population whether they considered food on campus affordable. We defined unsustainable as a situation where less than 20% of the population responded that the food was reasonable to affordable (>3 on questionnaire, see appendix D). An intermediate stage exists when 50% of the population perceives that the food is affordable. Our objective is that 100% of the population considers the food reasonably affordable. 



7. Methods of data collection and analysis

As mentioned above, for our economic and social indicators, we will collect data through questionnaires. It is important for us to recognize that the campus does not just contain students, so we propose that the questionnaires also be answered by staff, faculty, and residents of campus. The information drawn from this survey will give us an idea of how income levels relates to perceptions of the cost of food. It will also let the researchers know the level of awareness of the different food providers on campus.

To assess the amount of food purchased locally we suggest contacting the various food providers, such as Food Services, AMS, and the Food Coop, and finding out who supplies them. Since we divided it into local and imported it is simply a matter of putting each product into those categories. By doing this for all of the services, future students can calculate the percentage in each category and put UBC in one of the stages: unsustainable, intermediate or sustainable.

(See reference 16 for contact information; see appendix D for example of questionnaire and continuum.)

8. Recommendations and Reflections

Our group has introduced the main problems that we identified in the sustainability of the UBC Food system as it operates today. It is a difficult task to measure and assess a complex system, such as the UBC food system. In order to ensure compatible analysis, the system has to be defined clearly. The map of the UBC food system defines the boundaries of the system, its components and interactions. One of the objectives of the study is to strengthen the local components and interactions. UBC Food System's current level of sustainability falls between the unsustainable and intermediate stage that we defined. Our short-term goal would be to reach the intermediate stage of sustainability. The ideal sustainable food system is the long-term goal

the UBC community should strive for. The weak anthropocentric community-based approach of our group influenced our definitions and the selection of economic, social and ecological indicators. The most important criteria for sustainability in our study are awareness, accessibility, affordability and the ecological footprint of the UBC food system, measured by food miles and the percentage of food waste composted. The group strongly supports the use of surveys to gather data, because they also help to create awareness on campus. The amoeba model created for the UBC food system enables the researchers to assess the progress made towards sustainability. The results visually point out where efforts should be directed. We are including a template for an amoeba model of the UBC food system on which to draw the changing levels of sustainability. AMS, UBC Food Services, the UBC Farm, the Sustainability Office and other players should address the parts of the system that are low in sustainability in the amoeba model. This will help to work towards our definition of sustainable UBC food system.

The idea of a “World Café” or “Sustainability Circles”⁷ in which students, faculty and staff members, as well as volunteers of the UBC Farm, employees of AMS, UBC food services, the Sustainability Office and Waste Management come together and create a community definition of the UBC Food System. This would help the players to get a more holistic picture of the food system. Besides exchanging knowledge about the different areas of expertise, they could develop ideas for tighter relationships between the players (UBC Farm and UBCFS) as well as to students and faculty members.



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Appendix D – Methods of Data Collection

A.) Examples of some of the questions we would include to measure *awareness* of the food system and *affordability* of the food on campus:

- 1.) Are you a student
 faculty member
 staff member
 resident
 visitor to UBC
- 2.) Of the following services listed, which ones are you aware exist? UBC Farm
 UBC food co-op
 UBC Sustainability office
 none
- 3.) Are you on any kind of income assistance (eg. UI, student loans, social income assistance)? Yes No
- 4.) Do you ever eat on campus? Yes No
 If yes, how many meals per week? 0-1 times
 2-5 times
 more than 5 times
- 5.) How do you generally feel about the price of food found on campus?
 1 (too expensive) 2 3 (reasonable) 4 5 (very affordable)

Unsustainable	Intermediate	Sustainable
> 80% listed as too expensive	50% listed as reasonable	>80% listed as very affordable

B.) To assess the amount of food purchased locally by each food service business:

We decided that a certain percentage of food should be produced locally (about 80%) and a small amount can be imported (20%).

Unsustainable		Intermediate		Sustainable	
Local	Imported	Local	Imported	Local	Imported
< 20%	>80%	50%	50%	>80%	<20%

C.) To assess the amount of food waste composted:

We decided that an assessment of the amount of food waste could be done by measuring the changes in rate of unloading the compost bins.

Unsustainable	Intermediate	Sustainable
< 20%	50%	> 80%