

UBC Social Ecological Economic Development Studies (SEEDS) Student Report

**The UBC Food System: Indicators in the Measurement of Sustainability The
Sustainability of UBC Food System Collaborative Project II**

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The UBC Food System: Indicators in the Measurement of Sustainability

The Sustainability of UBC Food System Collaborative Project II Scenario #8



**For: Dr. Alejandro Rojas and Anthony Brunetti, UBC's Sustainability Office
and UBC's Food Service Providers**

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ABSTRACT

Sustainability is a term that can be challenging to define. Our group believes that a sustainable food system, though, would be one that is economically viable, and that meets the community's needs for safe and nutritious foods, while conserving or enhancing its natural resources and environmental quality. In order to create a sustainable UBC Food System, our group truly believes that a maximum amount of recycling and composting must be done by the community, to preserve what we deem particularly important, environmental integrity. Other indicators of sustainability would be the amount of knowledge the UBC Community has of their food system, the availability and accessibility of food to the community, the prices of food on campus, UBC Food Services being a profitable business, and food bought for the UBC Community travelling as little as possible to reach campus. From these indicators, we have devised a model to measure, on a continuum, the sustainability of our food system. In the future, it is our hope that Land, Food and Community III classes can perform research, with this year's AGSC 450 models in mind, to evaluate the UBC Food System's sustainability, and to provide proposals of how to shift the state of our food system from its current position to a more sustainable one.

INTRODUCTION AND BACKGROUND

Sustainability is a term for which there is no one "perfect" definition (Alternative Farming Systems Info. Centre, 2003). Nevertheless, a well agreed upon concept of sustainability is that it is an ideal long-range view for how land, food and community should be utilized. The UBC Sustainability Office defines sustainability as "the synergy between ecological, social and economic goals". They view the sustainability of all systems, not just those of food, as three interlocking rings of economy, society and ecology, where if one ring is removed the entire structure falls apart (UBC Campus Sustainability Office, 2003). A systems perspective is

essential to understanding sustainability as it provides tools to explore the interconnections between food and our community. It is important to consider these three types of sustainability (ecological, economic, and social) not as separate identities, but as interwoven components of the food system. Our group has, therefore, decided to define the sustainability of a food system as one that is economically viable, and that meets the community's needs for safe and nutritious foods while conserving or enhancing the food system's natural resources and environmental quality for future generations.

A socially sustainable food system is one that enhances social equity and democracy for all members of the community (Feenstra, 1997). In this regard, a socially sustainable system exists when there is food security for everyone. This in turn contributes to the health, social harmony and social justice of the system (Feenstra, 1997). Ecological sustainability emerges in a food system when the health of the environment is sustained and enhanced for use by all beings, and by future generations (Kloppenburger et al., 2000). Ecologically sound distribution and production practices such as recycling, composting and the use of animal nutrients fall into this subsystem. A food system is economically sustainable when local farmers and area businesses are profitable, commercially competitive, and capable of supporting a good standard of living for workers, their households and the community in general (Kloppenburger et al., 2000). In such a system, prices must reflect costs of production. Although the aforementioned definitions appear to “disconnect” the three components of sustainability, it is important to remember that a food system is a web, and changes in one part of the web affect all of the others (appendix I).

The UBC Food System does not presently comply with our definition of a sustainable food system. There are many areas where improvements could be made to propel the food system from a state of relative unsustainability (appendix II) to a state of maximum sustainability. Recent changes in the UBC community include a doubling of the campus resident

population from 1994- 2002 (UBC Waste Management Annual Report, 2002). This increase in population is largely responsible for the increase in total waste generated, and the destruction of campus “green spaces” (gardens, grass areas, farm and forest land), including a plan to develop 80 % of the remaining 60 hectares of farm and forestland (UBC Waste Management Annual Report, 2002). In addition, the larger population requires more food, and this in turn leads to increased usage of packaging materials for foodstuffs. Further, there is more waste brought onto campus by students from outside sources. Last year’s reports found that post consumer packaging in the waste stream was high, thus adding to the already increased waste on campus. Another problem identified was the lack of a comprehensive, campus-wide, and whole-cycle composting system (Brunetti, 2002). Our group also noted that there was a decline in the recycling rate from the 2000-2001 year to the 2001-2002 year (UBC Waste Management, 2003). This may be due in part to the lack of easily accessible and conveniently spaced recycling bins on campus.

It is important to note that not all sustainability issues of the UBC Food System are waste-related. Additional areas for improvement are related to purchasing, both by food outlets and consumers. For instance, the UBC Food System presently relies on Sysco Konings and Central Foods for most of their supplies (Brown, 2001). Many of these goods have travelled excessive “food-miles”, however, resulting in a price increase for consumers, as well as increased usage of fossil fuels and a lack of community supported agriculture. Socially, this practice results in customers being more removed from the people, places and agricultural practices that produce their food (Brown, 2001). A more sustainable food system would be one where there is preferential use of locally grown and processed foods. Many students have also reported that food is not affordable, and social spaces for making and eating food on campus are lacking (Brunetti, 2002). In addition, the UBC Food Services’ mission statement lacks a “sustainability

clause”, and we feel that the incorporation of such a clause would be a good start for the progression of the UBC Food System along the sustainability continuum (UBC Food Services, 2002).

All sustainability concerns of the UBC Food System identified to date could be improved to give the whole system greater sustainability. This transition will involve a progression along the sustainability continuum where each step taken may have a profound impact the entire system (UBC Farm, 2002).

UNDERLYING VALUE ASSUMPTIONS

The members of our group have academic backgrounds in nutrition and food science, which we feel may have influenced our perspective of the sustainability of UBC’s Food System. Initially, our group believed that the priority of the UBC Food System should be to provide nutritious, high quality, and affordable food to members of the UBC community (incorporating both economic and social sustainability). This view describes a weak anthropocentric view, that “while it is true that human beings are the source of all value in the sense that it is human beings who place value on nature, it does not follow that the values they place on nature simply serve their own interests instrumentally.” (Brown, 2001). However, we later realized that it is also essential to consider the wider impacts of the food system on the ecological sustainability of UBC and the surrounding communities describing more of a biocentric perspective. In keeping with this value assumption, the group’s vision of a sustainable food system at UBC includes economic and social, as well as ecological criteria. It is the group’s view that a food system cannot be sustainable if it does not meet criteria for all three types of sustainability. Additionally, the group agreed that there were complex interactions between criteria for all types of sustainability.

Our group believes that the ultimate goal for UBC's Food System should be to create and maintain sustainability. In coming to this conclusion, the group recognized that a sustainable food system is multi-factorial. As our group's view is weakly anthropocentric, we were initially more focused on social factors, particularly customer satisfaction in the UBC Community. Our group soon realized, however, that this is only a small part of creating a sustainable food system and that sustainability can be measured using a great number of indicators. Thus, we later expanded our views to include other ecological, economic and social factors, such as distance food products are transported, the use of fossil fuels, and other non-renewable inputs, and how these factors influence the biodiversity and species interactions in the environment.

Given the time and resource limitations of the project, the group identified six sustainability indicators that we believe are broad enough to cover the majority of the aspects of the UBC Food System. These indicators are divided into ecological, ecological-economic, economic, economic-social and social factors, with specific criteria provided for each.

UBC FOOD SYSTEM

In analyzing UBC's food system, the group decided that we needed to identify which components make up the food system, how these components are arranged, and where the boundaries of the food system lie (appendix III). It was decided that a natural boundary for UBC would be the area within the University Gates incorporating the UBC Farm, all food production, preparation and service at all food outlets, the marketing of foods and consumer decisions to purchase these foods, as well as the entire waste disposal system on campus, and the impact of all of these factors on the economy, the environment, and the health and satisfaction of consumers. It is the group's view that the UBC Food System includes all processes in food production, from growing and harvesting the raw food product, to processing, packaging, and transporting the changed food product, to the marketing and consumption of the food, and finally to the recycling,

composting, and disposal of all wastes produced during the entire process. UBC's Food System is composed of many different, interrelated elements that cannot function independently. It is thus important to consider all aspects of the system in order to understand the role played by each, as well as its impact on the other elements. Food systems are very complex; not only are there ecological, economic and social factors which need to be considered, but it is also necessary to consider how each of these subsystems relates to the other subsystems, and what the impact of this is both within and outside of the boundaries of the food system.

The interactions between the components, the economic, ecological, and social inputs and outputs of the system all need to be studied in order to evaluate the sustainability (or lack thereof) of a system, such as that of the UBC Food System.

INDICATORS OF SUSTAINABILITY

In an attempt to measure the current sustainability of the UBC Food System, one needs to consider the variables that contribute to each of the three subsystems: ecological, social and economic. Once these factors have been established, indicators must be chosen accordingly. However, the subsystems are complex as there are multiple factors involved in each, and these factors are interwoven, making the determination of variables difficult. It is worthy of mentioning that the following list of indicators is by no means complete. Rather, they are an attempt by our group to highlight the key aspects of each of the three subsystems. In order to measure sustainability, our group has formulated a model (with six sub-models, one for each indicator) defining sustainability along a continuum with many intermediate stages (appendix IV). The group has decided to describe two intermediate stages (minimally sustainable and intermediately sustainable), which can serve as landmarks for measurement. It should be understood, however, that there are actually many more stages along the continuum.

As research has yet to be completed for each indicator, it was not possible to give specific numerical criteria for each stage of sustainability. Where possible, based on available studies, attempts have been made to include numerical criteria.

1. ECOLOGICAL INDICATOR OF SUSTAINABILITY

The UBC Waste Management 2001/2002 Annual Report indicates that there is a steady increase in total waste generated due to the increased UBC Campus population. This is a concern because waste contributes to ever-growing landfills. Therefore, we have chosen as our ecological indicator, the proportion of food wastes that are being composted and recycled at UBC. This encompasses the waste generated from production, packaging and distribution (UBC Waste Management Annual Report, 2002). Our group describes food wastes as including: disposable cutlery, paper plates, packaging material, pop cans, glass and plastic bottles, paper and Styrofoam cups, and organic food wastes from both the producer and the consumer. While the group understands that there are many other indicators of ecological sustainability, such as food production on the UBC Farm and the use of non-renewable inputs for the farm, and the transportation and processing of foods on campus, it was decided that an indicator which focuses on the issue of waste disposal would be central to many ecological issues at UBC. An analysis of the waste system would allow for the development of programs which could increase recycling and composting rates, decrease the amount of wastes taken to landfills, and increase the preferential use of recyclable and compostable products over those which need to be discarded.

To determine the amount and type of waste produced by each food service establishment on campus it will be necessary to refer to the UBC Waste Management Annual Report. Food waste flow charts and the determination of which waste products are presently recyclable or compostable will also need to be determined.

In a totally sustainable food system there would be a low generation of wastes with maximum

composting and recycling. A minimally sustainable food system would be one that has a relatively high generation of wastes with relatively low composting and recycling. An intermediately sustainable food system there would be a relatively low level of wastes with high composting and recycling. Finally, in a totally unsustainable system there would be a high generation of wastes with no composting or recycling (appendix V).

2. ECOLOGICAL-SOCIAL INDICATOR OF SUSTAINABILITY:

To determine the ecological-social sustainability of the UBC Food System, our group decided to use the amount of knowledge that the UBC Community members have of their food system and their concept of sustainability. If the UBC Community members do not understand how the food system works and their own role within it, they cannot participate in the global food system and make responsible and effective food choices in regards to their health and the environment. (Kloppenburg et al., 2000). Therefore, the reason our group chose this indicator was because we believe that awareness is key to sustainability. This indicator includes a broad spectrum and covers almost all of the important concepts that are within the scope of ecological and social issues; whereas, other indicators such as the understanding of food growth and production do not take into account all aspects of a sustainable food system. It is important that all of the UBC Community members (especially future AGSC students and professors) in the coming years act and focus on critical issues pertaining to the assessment of our chosen indicator.

In order to measure our indicator, a qualitative survey of the UBC Community (faculty, staff and students) will need to be conducted. The level of knowledge and awareness of current programs, which promote the sustainability of the food system, will also have to be determined.

In an unsustainable food system, the information pertaining to the UBC Food System would not be accessed and widely distributed to everyone in the UBC Community. In addition, UBC Community members would have a complete lack of knowledge and understanding of the

concept of sustainability. In a minimally sustainable food system there would be little information pertaining to the UBC Food System that is accessed and widely distributed to everyone in the UBC Community. They would also have some knowledge and understanding of the concept of sustainability. In an intermediately sustainable food system most information pertaining to the UBC Food System would be accessible and widely distributed to everyone in the UBC Community. The community members would have some knowledge and understanding of the concept of sustainability. Finally, a completely sustainable food system would be one where all information pertaining to the UBC Food System is easily accessible and widely distributed to everyone in the UBC Community. The UBC Community members would have a complete knowledge and understanding of the concept of sustainability (appendix VI).

3. SOCIAL INDICATOR OF SUSTAINABILITY

The perceived availability and acceptability of foods on campus is an indicator of social sustainability as it is a key component of food security. Since our group definition of social sustainability incorporated food security, it was decided that using a social indicator to measure this was warranted. Decisions to purchase food are based on personal, nutritional, and cultural perceptions of accessibility and availability. Personal beliefs surrounding one's food choices consist of the values that one assigns to foods including monetary, ethical and moral values (for example, vegetarianism), taste preferences, and general "likes" and "dislikes". Nutritional considerations include the decision as to whether a particular food is nutritionally "acceptable". The definition of "nutritionally acceptable" is personal, and will vary from individual to individual based on one's own beliefs and values. Foods must also be culturally acceptable to the members of the UBC Community, as there are many diverse cultures represented on campus. To be culturally acceptable, a food must be recognized as sacramental, and the traditional

practices in the production, preparation and consumption of the food must be honoured (Kloppenburg et al., 2000).

An unsustainable food system would be one where there is no perceived availability of personally, nutritionally and culturally acceptable foods on campus. A minimally sustainable food system would be one where there is relatively low perceived availability to such foods. In an intermediately sustainable food system, the perceived availability of acceptable foods would be relatively high, with few foods that were found to be “unacceptable”. In a truly sustainable food system, the foods within the UBC community would be perceived as completely available and acceptable in all three dimensions. The idea of having something available for everyone is a concept that our group believes is another key to sustainability [REDACTED]

[REDACTED]. Other social indicators include the hours of operation of food service outlets, the distribution of food providers on campus, and the enjoyment of foods by consumers. However, since our indicator encompasses food security, we felt that this approach would be the most widespread and would be relatively easy to **measure using qualitative surveys of the UBC Community members**

[REDACTED] appendix VII).

4. SOCIAL-ECONOMIC INDICATOR OF SUSTAINABILITY

A critical component of a sustainable food system is food security. Food security is influenced by food prices, which further affects the affordability and accessibility of food. Because much of the UBC Community is composed of students who have relatively low monetary resources, we have chosen our social-economic indicator to be the selling prices of food on-campus in comparison to off-campus food prices and the acceptability of these prices to the UBC Community. This can be done by comparing the selling prices of food items on-campus

to similar food items in the surrounding regions of the lower mainland. A qualitative survey of the UBC population to determine individual perceptions of the affordability and acceptability of food on campus will need to be conducted.

An unsustainable food system would be one where similar food products are much more expensive on campus than in the surrounding regions of the lower mainland, and these foods would not be perceived as acceptable and affordable by the UBC population. A minimally sustainable food system would be one where similar food products are perceived as being more expensive on-campus than in the surrounding regions of the lower mainland, and these foods would be perceived as minimally acceptable and affordable by the UBC population. An intermediately sustainable food system would be one where similar food products on-campus are perceived as comparable in price to foods in the surrounding regions of the lower mainland, and these foods would be perceived as relatively highly acceptable and affordable by most of the UBC population. Finally, a truly sustainable food system would be one where similar food products are perceived as less expensive on-campus than in all the surrounding regions of the lower mainland and these foods would be perceived as fully acceptable and affordable by all of the UBC population (appendix VIII).

Although there are other possible indicators that could be used to measure social-economic sustainability, our group thought that measuring the perceived affordability and acceptability of food to the UBC population was the broadest and easiest to measure.

5. ECONOMIC INDICATOR OF SUSTAINABILITY:

To be economically sustainable, the UBC Food System needs to generate profit by purchasing less expensive foods and selling them at **higher prices** [REDACTED] (UBC Food Services, 2002). Thus, the profitability of the UBC Food System is one of the measurable indicators we have chosen to determine economic sustainability. Although there

are many other potential indicators such as the affordability and the prices of food in the UBC community, and the number of jobs available within the UBC Food System, our group believed that our indicator was the easiest to measure and encompasses the broadest range of economic factors. A sustainable food system is one that does not rely on external subsidies from the global food supply, and is therefore economically independent. This can be achieved by purchasing regionally grown food and operating within UBC's monetary allowance.

By evaluating the financial record of the individual food services at UBC, such as their expenditures on labour, food and overhead cost, as well as their financial profits, it is possible to calculate their overall financial monetary balance. This value can then be used to indicate how much money can be reinvested into the UBC Food System to improve the financial status of the services that are currently less profitable.

In a completely economically sustainable food system, 100% of the UBC Food Service outlets would generate enough profit to avoid reliance on external subsidies (including supplies and financing). To be intermediately sustainable, 75% of the UBC Food Service outlets would generate enough profit to avoid much reliance on external subsidies. A minimally sustainable system would be when 25% of the UBC Food Service outlets generate enough profit to avoid some reliance on external subsidies. An unsustainable system is when 0% of the UBC Food Service outlets generate enough profit to avoid reliance on external subsidies (appendix IX)

6. ECONOMIC-ECOLOGICAL INDICATOR OF SUSTAINABILITY:

The indicator our group chose to represent economic-ecological sustainability was the distance food travels and the location where the food is grown, processed, and prepared in relation to the UBC Campus. Our group decided to use this indicator because we believe that sustainability is determined by the concept of close proximity (Lieblein et al., 2001). By having food grown, processed, and prepared on the UBC Campus, or having food travel the shortest

distance possible, we believe that the UBC Community will experience a long-term improvement in food quality, reduced losses and energy costs from transport and packaging, and an improvement in consumer confidence related to their food system (Lieblein et al., 2001).

A sustainable food system would exist when all foods are grown, processed, and prepared within the boundaries of the UBC Food System and/or within a close proximity to the UBC campus, meaning that they are all produced regionally and/or provincially. An intermediately sustainable food system would be one where most of the foods purchased at UBC are grown, processed, and prepared within the boundaries of the UBC Food System and/or within a close proximity to the UBC campus, meaning that they are produced either mostly regionally and/or provincially. A minimally sustainable food system would be when most foods are grown, processed, and prepared off-campus and/or most foods are being produced off-campus at a location relatively far from UBC, meaning that they are produced provincially, nationally and/or internationally. Finally, an unsustainable food system would be one where food is not produced within the boundaries of the UBC Campus, and/or when all the foods are grown, processed, and prepared far away from campus, including nationally and/or internationally (appendix X).

However, it is important to keep in mind that our ideal situation of economic- ecological sustainability at UBC may be unrealistic as many people demand foods that come from other countries and cannot be grown locally (for example, bananas). One way to achieve our ideal situation of a sustainable food system would be to have the community follow a seasonal diet.

Our group believes that our economic-ecological indicator is the easiest to measure and encompasses the broadest range. It is worthy of mentioning that there are other possible indicators to measure economic-ecological sustainability such as the number of jobs at the UBC Farm.

UBC FOOD SYSTEM'S SUSTAINABILITY AS A WHOLE:

It is the group's view that a sustainable UBC Food System would be characterized by criteria for each of the six indicators that fall on the sustainable end of the spectrum (appendix IV). We have numbered the scales on our model from 1 to 10, which we find is easily convertible to percentage values. With such values, we have defined minimally sustainable of being approximately 33% sustainable, with intermediately then being approximately 66% sustainable, and unsustainable and sustainable being 0% and 100% respectively. Once a value has been determined for each indicator, a sense of the sustainability of the entire UBC Food system can be measured as an average value of the six indicators (which we weigh as having equal value). Having values on the outside of the scales within our model (near the one value) would therefore represent an unsustainable system, while moving towards the centre would be a shift towards sustainability. Again, we believe that a totally sustainable food system would be one in which there is a low generation of wastes with maximum composting and recycling, where all members of the UBC community have complete knowledge and understanding of the concept of sustainability, where all members perceive that adequate food is available and acceptable in all respects, where foods are equally or less expensive than similar products off-campus and thus perceived as affordable by the UBC community, where each food service outlet within the system can generate enough profit to avoid reliance on external subsidies, and where most, if not all, foods purchased at UBC have also been grown, processed, and prepared within the boundaries of the UBC Food System, or at least within close proximity to the campus. While a system meeting all of these criteria may not be realistic in the near future, it is the group's opinion that it is a goal to work towards, and that any progress which contributes to UBC's sustainability, is very valuable.

CONCLUSION: HOW TO CONTINUE THE ASSESSMENT OF THE SUSTAINABILITY OF UBC'S FOOD SYSTEM

The AGSC 450 Land, Food and Community III class of 2002 began this sustainability research project in collaboration with UBC Food Services, the AMS Food and Beverage Services, the UBC Campus Sustainability Office and SEEDS. We, the class of 2003, have now continued the project, and three years of research are to follow. In order to make the UBC Food System sustainable, we propose a five-year plan; two years of which have been completed. The first year was the initial planning stage. The AGSC students created a vision of economic, ecological, and social sustainability for the UBC Food System. Indicators then needed to be identified to measure sustainability along a continuum, from unsustainable to sustainable. Our group, and our colleagues from 2002, have now accomplished these stages. We now propose that the classes of 2004-2006 assess UBC's Food System using the chosen indicators. Through further research, they will need to measure the specific criteria proposed, in order to evaluate the sustainability of each indicator in relation to the UBC Community's Food System. There are many resources that can be used to begin their research. To study the indicators, students could refer to the UBC Waste Management Annual Report. Future students will need to determine where the UBC Community's food suppliers are located and where their food supply originates. Financial records of UBC's Food System will need to be analyzed and off-campus food costs will need to be evaluated. Both qualitative and quantitative surveys may be required to determine the community's perceived acceptability, accessibility and affordability of available foods. Finally, current programs that promote knowledge of the UBC's Food System in relation to sustainability will need to be assessed. These continuing projects should be researched and studied in collaboration with the UBC Waste Management Office, the UBC Campus Sustainability Office, SEEDS, UBC Food Services, AMS Food and Beverage Services and all other food providers, the off-campus food suppliers, processing plants, Sysco Konings, Central Foods, and all other

distributors, as well all faculty, staff, students and residents that make up the UBC Community. Together, by examining and assessing the state of UBC's Food System sustainability, the AGSC Team can eventually suggest the development of projects and strategies to implement our findings, and to shift the state of UBC's Food System from its current position to one which is more sustainable.

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