

THE SUSTAINABILITY OF THE UBC FOOD SYSTEM: COLLABORATIVE PROJECT III

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Sent by Heather Ann Thompson

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Food Security



Agricultural Sciences 450

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ABSTRACT

Our group has been assigned the task of developing a definition of food security for the UBC campus, given that it is of the utmost importance for UBC to strive towards sustainability. In order to effectively carry out this assignment, we have designed a model of sustainability that reflects our problem definition, value assumptions, and chosen economic, ecological, and social indicators. We have selected our economic indicator to measure the difference in cost between nutritious foods found on-campus with those same foods found off-campus. Our ecological indicator of choice is food mileage, which will be measured through the Weighted Average Source Distance method. We have also developed a questionnaire for our social indicator that will measure the perceived availability, acceptability, and accessibility of food to those who access the UBC Food Supply the most: students, permanent residents, faculty, and staff.

Our group has also investigated the possible differences between food security as it pertains to students in residence and food security for people who live off campus. This led us to inquire further about the role that AMS Food Services, UBC Food Services, and other stakeholders, play in campus food security. Lastly, we have reviewed recent developments on food policy within the City of Vancouver and the work conducted on food security at UBC by previous groups of students in the Land, Food and Community courses within the Faculty of Agricultural Sciences, and provided recommendations for further action and research in the UBC Food System Project.

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INTRODUCTION

For the past two years, the University of British Columbia (UBC) Agricultural Sciences (AGSC) 450 classes have been involved in the UBC Food System Project (UBCFSP), working with other partners in pursuit of a more sustainable UBC food system (UBCFS) (Bouris, 2003). Thus far, the UBCFSP has focused on exploratory studies of the UBC food systems and the development of a model for a sustainable UBCFS. Group 14 from 2003 stated that the problem with the UBCFS lies in developing a sustainability assessment framework for the entire UBCFS so that ongoing food system evaluation can be undertaken. Our group feels that this is an accurate evaluation of the problem, and with this in mind, our group proposes a model that we feel best represents a sustainable UBCFS. Moreover, our group has examined UBCFS sustainability in the context of developing a definition for food security for a sustainable UBC campus and reviewing what has been done in other areas of sustainability on campus, and we have provided further recommendations to the UBCFSP partners.

MODEL OF SUSTAINABILITY

After assessing the papers designated as the “Four Best 2003 UBCFSS Papers” from the AGSC 450 class of 2003, our group selected Group 14’s model as being the best representation of a sustainable UBCFS. Our decision was based on a number of factors. First of all, our group shares similar values with Group 14. We acknowledge the ultimate importance of “our life support system,” the Earth (Group 14, 2003) but we also recognize that our concern with the UBCFS is inherently anthropocentric. We found Group 14’s definition of sustainability clear and their vision for a sustainable UBCFS to be one that harmonizes the ecological, economic, and social constructs of the UBC community that are required for sustainability. Group 14 recognized the boundaries of the food system to be “both visual and perceptual,” (Group 14, 2003) thus allowing for logical systems analysis. Moreover, Group 14 outlined the components of the UBCFS and presented the system’s interactions in a clear and concise manner.

Our group also appreciates Group 14's comprehensive outline of the ecological, economic, and social indicators and the research methods for assessing the overall sustainability of the food system. We believe that the criteria and most of the indicators proposed by Group 14 can be used in assessing the UBCFS on a "sustainability continuum." However, we favour Groups 18's method of indicator assessment, with its value multiplier system, because it allows for an easily interpretable quantitative representation of the food system sustainability. Detailed definitions of sustainability often vary from situation to situation and are dynamic (Kloppenburger et. al., 2000); we believe that Group 18's scale allows for adaptability to different or evolving definitions of sustainability as needed as the UBCFSS progresses. One modification we would like to make to this scale is to change it from a seven to a five-point scale. This is still a subjective measurement scheme, but we feel that it provides for a more facile sustainability rating analysis.

VALUE ASSUMPTIONS

A weak anthropocentric, individual freedom-based ethical perspective informs our group's analysis. In approaching the issue of UBCFS sustainability, all of our group members agreed that a human-centered view is inherent in the concept of food security, as well as in the fact that we are analyzing a human food system. Likewise, we believe that an individual freedom-based ethical perspective takes into account the relationship between food security and individuals' needs and preferences. By recognizing the individual, implications for the entire community can be realized, thus allowing for a unity amongst the stakeholders of a community such as UBC. In addition, we believe that the notion of a sustainable UBC community promotes an ethical position whereby both enlightened self-interest and future generations' interests are given ethical consideration.

While acknowledging that the food system exists to meet human needs, we feel that any move towards greater sustainability would require a greater emphasis on recognizing all of the social, ecological, and economic impacts of the processes of food production, processing, packaging, distribution,

preparation, consumption, and waste disposal relative to the UBCFS. Our group believes that a weak anthropocentric value system may somewhat limit our perception of ecological sustainability. However, we also feel once one acknowledges that human survival is ultimately dependant on environmental health, a weak anthropocentric view makes the concept of environmental stewardship more comprehensible on an individual level.

Based on these perspectives, our group believes that all aspects of sustainability – economic, social, and ecological – are interrelated and equally important to a food system. Our topic of food security acts as a channel through which we can view the UBCFS more closely and examine the social aspect of the food system in greater detail. We also believe that UBC has a unique opportunity to demonstrate some of the possibilities for sustainable development.

DEFINITION OF FOOD SECURITY

The concept of food security, as defined for the UBC campus, encompasses the availability, accessibility, acceptability, affordability, safety, and sustainability of the food supply for students, permanent residents, faculty, and staff. Food security for the UBC campus embraces a different socio-economic significance than for other areas in the Lower Mainland. It is our group's consensus that the majority of the UBC population is one that generally does not experience widespread food insecurity *with* hunger. We make this statement after comparing the UBC community to the Downtown Eastside community, which frequently experiences food insecurity *with* hunger (Vancouver Agreement Food Task Group, 2002). For this reason, it is vital for those who access the UBC food supply to be able to do so in manner that maximizes their health, as opposed to simply sustaining their life. However, because UBC is a dynamic community, the socio-economic status of the UBC community may change and this definition may require reevaluation.

The different components of food security are all significant. Availability refers to the continual provision of food produced for the UBC community. In order to ensure the longevity of this food

supply, the methods by which food is produced and transported to UBC should be sustainable for generations to come (Ryerson University, 2003). Accessibility refers to the equal distribution and access to safe and nutritious food by all members of the UBC community. It is necessary to consider that food must be attainable “in a manner that maintains human dignity” (Ryerson University, 2003). Furthermore, food must be readily obtainable in regards to food service outlet and residence cafeteria hours of operation, the location of restaurants and grocery stores on campus, and the availability of personal and/or community kitchens for those who desire to use such facilities. Acceptability encompasses appropriate food selection on campus in order to accommodate food allergies, disease-state diets (e.g. Diabetes), ecological acceptance, and religious as well as ethnic preferences. Moreover, the UBC campus should promote a balanced diet that optimizes the health of its community members. The UBC community must have access to affordable, nutritious foods. Food safety should also be a priority so that students, faculty, and staff have access to food that is both healthful and safe. To ensure the safety of the food supply, it is of the utmost importance that food production methods that rely on biotechnology, genetic engineering, chemical fertilizers, and pesticides be brought to the attention of the consumers at UBC (Agriculture and Agri-Food Canada, 2003).

In the context of UBC’s efforts to become a sustainable food system, the food supply of the campus serves as a pivotal link between ecology, economics, and societal well-being. The future of food security at UBC is highly dependent on the sustainability of the food supply entering the campus. The campus should attempt to purchase as much local food as possible, thereby decreasing energy needs and financial costs associated with the distance and refrigeration of food transport. By doing so, UBC can play an active role in the revitalization of the local community, which will translate into visible economic development and community empowerment (Community Food Security Coalition, 2003).

SUSTAINABILITY INDICATORS

Economic Indicator

Our group believes that Group 14's economic indicator of the cost of nutritious foods on campus is essential for assessing the sustainability of the UBC campus with regards to the food security because the affordability of healthy foods is a key concern of a food secure campus. However, a cost comparison of nutritious meal options found on and off campus, as proposed by Group 9, would be a more accurate method of researching the cost of nutritious food on campus than Group 14's suggestion of administering a survey of the total percentage of income spent on food. Our group has chosen to measure the difference in cost of nutritious foods on-campus with the cost of the same foods purchased off-campus to determine if buying nutritious foods on-campus is a viable option for students, permanent residents, faculty and staff.

One detail our group felt was important to keep in mind when measuring this indicator is that UBC Food Services is a unionized company and therefore has higher pay rates for their employees. This pay rate must be factored into the overhead costs (Yip, 2004). Many food providers off-campus are not unionized and can consequently offer their products at lower prices. Students who live off-campus can purchase foods in bulk or raw form and prepare them themselves, thus circumventing these overhead costs. Taking this factor into consideration, our group developed a measurement scale that allowed for flexibility regarding this unavoidable price discrepancy.

In order to determine the actual cost differences between nutritious foods which can be purchased on the UBC campus with those that can be purchased off campus, a simple, yet effective, comparison tool for price analysis has been developed (see Appendix A). We propose that a price analysis of select, highly nutritious foods, at specific locations on UBC campus be performed. When designing this tool we also took into consideration the food outlets on and off-campus that most frequented by students, permanent residents, staff, and faculty. Once the price data for these specific foods is gathered, tabulated, and averaged, comparisons can be made to the prices of the same foods purchased off campus at the specified locations.

Ecological Indicator

Measuring food miles of common foods found on campus is the ecological indicator chosen by our group. Food miles represent the distance food travels from production to consumption. As stated by

Group 14 from 2003, the UBCFS would be made more sustainable by having food production as localized as possible. Foods produced locally travel a minimal distance and thus retain a higher degree of quality and freshness than those that are transported over long distances (McNair, 2004). Group 9 also noted that local food production reduces the amount of energy and resources spent on packaging and transport. As a result, reduced environmental impact is to be expected due to a decrease in pollution by fossil fuels and packaging materials (Pretty, 2001).

In agreement with Group 14, AMS Food Services, UBC Food Services and the UBC Village would be analyzed in a food miles assessment. The evaluation would be performed annually by calculating the total distance traveled by food provided by these retailers. The objective of the assessment would be to encourage a more local UBCFS and increase consumer awareness regarding food system localization. Our group has adapted the evaluation method proposed by Group 18 and the Weighted Average Source Distance (WASD) to calculate food miles (see Appendix B).

Social Indicator

Instead of using ‘awareness of nutritious foods’ as suggested by Group 14 from last year, our group has selected to use the “perceived availability, acceptability, and accessibility of foods on campus” as our social indicator because it is more encompassing with regards to food security. Foods that are acceptable to students, permanent residents, faculty, and staff must be made available and accessible to them. We have included the concept of perception in our social indicator, as it is the method by which individuals subjectively organize and interpret their environment. One should note that perception differs from one person to the next, and thus it may not accurately represent objective reality (Robbins & Langton, 2001). Therefore, this aspect of human behavior must be accounted for when assessing food security, which inherently has a strong human component to it.

A questionnaire (see Appendix C) that measures the perceived availability, acceptability, and accessibility of food on the UBC campus may be administered biannually to those who access the food

supply the most: students, permanent residents, faculty, and staff. The primary purpose of the questionnaire is to assess the security of the food supply through the perceived availability, acceptability, and accessibility of food on the UBC Campus. Secondary purposes of the questionnaire may include the option of monitoring food consumption trends, determining dietary knowledge and habits, and analyzing the relationships between food choice and income, gender, and/or ethnicity (Lee & Nieman, 2003).

Overall UBCFS Sustainability

As proposed by Group 18 (2003), it is imperative that we apply “sustainability point values for each of our indicators”: cost of nutritious foods on campus, food miles, and the perceived availability, acceptability, and accessibility of foods on campus. This is necessary in order to calculate the overall sustainability of the UBCFS (See Appendix D for Details).

FOOD SECURITY AS IT PERTAINS TO STUDENTS LIVING IN RESIDENCES AND THOSE WHO LIVE OFF-CAMPUS

In our definition of food security, affordability, acceptability, accessibility and availability cover concerns of both students living on-campus and those living off-campus. It is noteworthy that several of our group members have lived in UBC residences, but our entire group currently lives off-campus. We believe that this experience provides us with the perspective necessary to identify the differences in food security for students living in residence and those living off-campus.

Affordability is an area of concern for most students living on a limited budget with no source of fixed income. When living in either Totem Park or Place Vanier residences on the UBC campus, students are required to purchase a meal plan because no cooking or storage facilities are available. These meal plans range in cost from \$3,223.36 to \$2,540.16 per eight-month academic year (UBC Food Services, 2004). This works out to a monthly meal plans cost range between \$317.52 and \$402.92. The Cost of Eating in BC Report (2001), however, states that the average monthly cost of eating for a 19-24 year old male is \$197.92 and for a 19-24 year old female is \$146.22. This indicates that there is a substantial increase of at least \$119.60 to \$171.30 per month that students must pay for food when on a meal plan.

This potentially introduces an issue of food insecurity into the lives of many students living in residence. Student that live off-campus have more freedom of choice when it comes to the types of foods they purchase, the cost and the quality. These students can also prepare their own food, which eliminates the cost of having a dining establishment with overhead costs and unionized employees preparing the meals for them. UBC Food Services does provide a value for their overhead costs on their website and once this value (\$1632.96) is subtracted from the meal plan, the cost of food per month is very reasonable (UBC Food Services, 2004). One way to decrease these costs would be to hire non-union employees because the overhead costs of running the establishment should remain consistent.

Acceptability is also an issue for many students living in residence, as cafeteria food is generally regarded unfavorably (Wellness Guide, undated). However, one should be note that Place Vanier has recently made several improvements to their menu in an attempt to better meet the needs of the residents (UBC Food Services, 2004). The acceptability of food encompasses the nutritional and safety issues pertaining to food security. Students living in residence have no control over the ingredients or the methods used to prepare the food available to them. This becomes a concern for students with dietary restrictions for nutritional, religious, personal, or medical reasons. On the other hand, students who live off-campus and prepare their own foods have complete control over the ingredient and nutritional content of their foods. Food safety should actually be less of an issue for students eating in a UBC cafeteria where strict food safety policies are in place (Parr, 2004), whereas in an individual's home there is no way to ensure that food safety techniques are adhered to, unless the individual has the food safety knowledge in the first place.

Accessibility and availability are also primary concerns for those students who live in residence. Many UBC Food Services outlets have limited hours of operation. This means that students who do not have cooking facilities available to them may be forced to look for food either in the UBC Village or off-campus. This presents a problem when compared to students who live off-campus and can prepare food

any time. For example, a student who has a late class until 9:00pm may miss the dining room hours as both Place Vanier and Totem Park dining rooms since both close at 7:00 or 7:30pm. All other UBC Food Services locations around campus and in the Student Union Building (SUB) usually close at or before 4:00pm and are therefore not an option in the evening. Most AMS food service outlets do remain open later than those managed by UBC Food Services, however these outlets are all located in the Student Union Building (AMS Food Services, 2004). The only other source of food at this time is from the convenience stores in both residences that provide convenience-type foods; however, there are some frozen entrees available which may provide a more complete meal. This lack of service in the evening brings up additional issues of safety for a student, especially a female student, who would be required to walk to the village or bus loop during the dark hours of the evening..

ROLE OF AMS FOOD SERVICES AND UBC FOOD SERVICES IN FOOD SECURITY

AMS Food Services and UBC Food Services control the majority of the food service outlets on the UBC campus and therefore play an important role in all aspects of food security status (i.e. accessibility, availability, affordability and acceptability) as well as sustainability at UBC. These food service providers have a number of common attributes. For example, between these two food service providers there are over 30 food service locations at UBC which UBC students, faculty, staff, and residents can patronize; this facilitates food accessibility during the day-time hours and weekdays (UBC Food Service & AMS Food Services, 2004). Likewise, both AMS Food Services and UBC Food Services employ a considerable number of students (Group 3, 2003), which helps to strengthen economic and community ties within UBC.

AMS Food Service outlets are located exclusively in the Student Union Building. Although AMS Food Services plays a smaller role in food security than UBC Food Services, this role is vital. Many students visit the SUB on a daily basis, and here they can access many food options. The AMS food service outlets provide a wide variety of food choices to accommodate a wide variety of tastes (ex. Asian

cuisine, vegetarian food options, etc.) (AMS Food Services, 2004). This diverse selection of food selections helps to address the food security issue of acceptability, and this is particularly important considering that UBC's ethnically diverse community.

UBC Food Services manages the majority of and the largest food outlets on campus, and thus it has considerable impact on the food security at UBC (Yip, 2004). Recently UBC Food Services introduced a new line of popular, nutritious food products entitled "ThinkFood" that are conveniently packaged so that customers can take their purchase on-the-go (Lin, 2003). This initiative indicates that UBC Food Services is attempting to accommodate student's needs, thus positively contributing to the food security situation. Not only does UBC Food Services provide important food services to the general UBC public, but it operates the cafeterias in both of the UBC junior residences, Totem Park and Place Vanier (Yip, 2004). UBC Food Services has recently completely remodeled Place Vanier's dining room and expanded their menu in order to cater to expanding food availability and acceptability concerns of all those who frequent the cafeteria, especially the dormitory residents (Lin, 2003). The hours of operation of the majority of UBC Food Services outlets are somewhat limited, but both Totem Park and Place Vanier Dining Rooms generally remain open to 7:00 or 7:30pm (UBC Food Services, 2004). However, as previously mentioned, both Place Vanier and Totem Park outlets are in rather remote locations, and after 7:30pm quality food for residents may not be accessible. UBC Food Services has the difficult task of balancing business profitability the provision of affordable, accessible, and acceptable food products. As a result, our group recommends as a future project an assessment of the feasibility of keeping a single, central site which is not located in the SUB, such as 99 Chairs, open later. Other initiatives to enhance sustainability and food security at UBC have already been started by AMS Food Services and UBC Food Services, and examples of these are available in Appendix E ii.

OTHER STAKEHOLDERS IN FOOD SECURITY

The stakeholders in food security at UBC are very similar to those identified as stakeholders in UBCFS sustainability by Group 3 from 2003. AMS Food Services and UBC Food Services have already been noted as major food providers and food security stakeholders at UBC. Other stakeholders include the following individuals and organizations: 1.) The **UBC Farm**, which is involved in education, research, food production and composting activities (Group 3, 2003); 2.) **Farmers** that provide the food supplied to UBC; 3.) **Local, national and international food suppliers** to UBC (see Appendix E); 4.) **Transportation services** for food to and from UBC, such as Aramark, which delivers Coca-Cola products to campus (Yip, 2004); 5.) **Food and beverage outlets** not-operated by AMS or UBC Food Services; 6.) The **UBC Campus Sustainability Office**, which promotes sustainability initiatives, research and interdisciplinary discussion; 7.) The **UBC Board of Governors**, who have the ultimate say in budget money allocation, long-term planning and development on campus (AMS, undated); 8.) **UBC Waste Management**; 9.) The **Faculty of Agricultural Sciences** at UBC, including faculty members, administration and students (especially the AGSC 450 and 250 classes). 10.) **Consumers**, including students living in residence, permanent residents, food service patrons at UBC, and people who bring food onto campus from elsewhere.

Partnerships

Food security issues within the UBCFS can be better dealt with if appropriate partnerships between major food service providers such as AMS and UBC Food Services and other stakeholders are in place. To balance the opposing forces of the profitability of businesses and the affordability of food, increased cooperation and dialogue between consumers and food service providers would be beneficial. The UBC Campus Sustainability Office's Sustainability Circles Program provides an opportunity for different stakeholders and community members to come together and discuss sustainability issues (UBC Campus Sustainability Office, undated). A Sustainability Circle forum focused solely on food security where different stakeholders could voice their views on food security and listen to other stakeholders'

concerns could be a very important step in establishing greater ties between different stakeholder groups. If this meeting is a success, perhaps annual forums could be held on the same topic.

Many have also suggested increased ties between AMS and/or UBC Food Services and the UBC Farm to provide campus grown food within the UBCFS. Starting in the summer of 2003, Sage Bistro, which is operated by UBC Food Services, began to purchase select produce from the UBC Farm (Parr, 2004). However, the UBC Farm's size and staff-limited production capabilities already fall short of the consumer demand for farm produce at the weekly summer market gardens. This is a major challenge to expanding purchasing partnerships (Bomke, 2003). Greater ties between UBC Waste Services, AMS Food Services, UBC Food Services, other campus food service providers, consumers, and the UBC Farm seem very promising, however, in terms of managing compostable materials on campus. A large in-vessel compost unit was recently approved for UBC South Campus (UBC Waste Management, undated). Expanding the use of compost from food security stakeholders on the UBC grounds (e.g. the UBC Farm) would be a realistic step towards creating a more sustainable campus waste disposal system.

In addition, great opportunities exist for Agricultural Sciences classes, students, researchers and the UBC SEEDS project to continue to work on addressing food security at UBC that has already been initiated by the UBCFS Project. Evaluation of food security through surveys and other studies could be organized, carried out, and analyzed by these stakeholders. This would benefit the Faculty of Agriculture and the Campus Sustainability Office, as well as other stakeholders and the UBCFS as a whole, as it would provide research opportunities and promote the accumulation of a wider knowledge base of UBC food security. UBC food security assessments could also provide a template for other institutions that want to address food security issues (see Appendix E).

CITY OF VANCOUVER FOOD POLICY

Food policy could also be used as a tool to achieve food security at UBC. Local food policy in particular could be designed to protect local food production, processing, and consumption, to increase

accessibility to quality food, as well as to protect and strengthen connections between farmers, food processors, consumers, and food related business (Fenestra, 1997). In keeping with this notion, the Vancouver Food Policy team has already launched a Food Action Plan, which includes such projects as community gardens, farmers' markets, community kitchens, and school gardens (Vancouver City Council, 2004). This plan could be used to expand already existing practices at UBC to promote a food secure campus. At the same time, UBC could be used as a model to observe the implementation process and result of food policy applications, as well as to provide learning and training mediums (Pretty, 2001). UBC and the City of Vancouver are both currently undergoing food system assessments, and our group feels that the city's food policy will not impinge on the UBCFS and food security, but rather complement UBC's objectives.

FURTHER FOOD SECURITY THEMES AND RECOMMENDATIONS

Research into food security at UBC has been conducted in the past, and some important findings have been documented. One major theme that emerges from the research carried out by AGSC 450 students in both 2002 and 2003 is affordability. According to a survey administered in 2002 (Brunetti, 2002), 78% of respondents felt that the overall price of food at UBC was either moderately expensive or expensive. Only 14%, however, reported that price was the primary factor that influenced their food choices, ranking below both convenience and personal preference. In light of this survey, improving affordability singularly is not enough to improve UBC food security. To assess the UBCFS, acceptability, accessibility, and availability need to be addressed as well.

Moreover, a community's needs may change as its composition changes; this is particularly important since UBC is a community that supports a mixed population where some individuals depend on its food system for all of their nutritional needs and others only depend on it partially. We recognize that UBC's composition of students, staff, faculty members, and residents can change annually, yet annual assessments may not be feasible due to financial and time constraints. Thus, if yearly assessments are not

feasible, our group proposes performing a community food security assessment at least every three years to evaluate whether the services provided by the UBCFS and the community's needs are aligned.

Concern for nutritional quality of foods also warrants further investigation because the health of a community's members is one of the essential determinants of social vitality (Hart, 2000). Nutrition therefore plays an indispensable role, especially for those living on campus. Improving nutrition status should be achieved by simultaneously increasing consumer awareness of nutritious food choices and increasing the availability, accessibility, and affordability of nutritious foods on campus. As consumers' knowledge about nutrition increases, this can beneficially lead to a change in their perception of acceptability of the foods provided on campus.

Some limitations of our study lie obtaining funding and personnel to conduct all our proposed research into campus food security. However, we have developed a summary of recommendations for future students and the Campus Sustainability Office with regards to food security. These include: 1.) administration of the UBCFS assessment tools with the research methods that we have developed and discussed in this paper; 2.) further investigation by next year's AGSC 450 class of the additional indicators of profitability of food services at UBC, percent of compostable waste on campus actually composted, and consumer awareness of nutritious foods (see Appendices A, B & C); 3.) assessment by future AGSC 450 classes and UBC Food Services of the feasibility of extending the hours of 99 Chairs; 4.) promotion of cooperation and communication between stakeholders through the Campus Sustainability Office forums, such as a Sustainability Circle that focuses solely on food security with the participation of all stakeholders; and 5.) establishment and strengthening of working partnerships amongst current stakeholders (such as between the UBC Food Services' Marketing and Sustainability Coordinator and the Sustainability Office) (Parr, 2004) and possibly with new organizations. Many positive initiatives have already been instigated between UBC Food Services, AMS Food Services and the Campus Sustainability Office (see Appendix E ii.), but these could benefit from expansion and refinement. The promotion of additional collaboration

between UBC and the City of Vancouver could also prove beneficial to help to further integrate these two systems and food security research in Vancouver.

CONCLUSION

Our group believes that food security is necessary for food system sustainability and vice versa. In looking at the availability, accessibility, acceptability and affordability of a system, we are able to determine whether or not sustainability is achieved with the help of our indicators. Food security indicators are essential in appraising the current status of economic, ecological and social sustainability at UBC. Evaluation methods such as the provided surveys should take into account that the social mass of UBC varies year to year. Every year there is a turnover of students, faculty and staff therefore changing the stresses placed on the UBC food system. All stakeholders must be considered to reach our goal of sustainability. Ongoing collaboration between UBCFS stakeholders as well as municipal policy-makers, and continued evaluation is necessary to determine the sustainability of the UBCFS. As we, the AGSC 450 class of 2004 based our models upon the previous year, it is our hope that the next AGSC 450 class will further refine our project and apply it to gather significant results.

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APPENDIX A: ECONOMIC INDICATOR RESEARCH DESIGN

There are many food outlets on campus; however, the locations with the largest selection and the highest customer traffic are the Pacific Spirit Place, Place Vanier, Totem Park and 99 Chairs cafeterias (Yip, 2004). Although UBC Food Services is the largest food service provider on campus, we have also included in the price analysis food outlets operated by other parties (ie. Benny's Bagels and The Deli). Locations off-campus we determined to be the most likely location students, staff, and faculty living off-campus would frequent were the IGA on 41st and Broadway and the Safeway on 10th and 4th, since these locations within a reasonable radius of the UBC campus. With this tool, the prices of the foods suggested below could be gathered and averaged between locations and then a price analysis of the foods purchased on-campus and those purchased off-campus can be performed. Individual percent differences between specific items will provide a detailed look at which items may have the largest price variation, and thus offer insight to possible solutions. Whereas, the overall percent difference averaged from all food prices gathered either on or off-campus will provide a broad overview of how sustainable UBC is in regards to food security according to our indicator scale. As a group we felt that the performance of this price analysis once a year would be sufficient, since most food prices do not vary dramatically within one school year.

We would also like to note, that our group did feel that the profitability of UBC Food Services is important and a tool to measure this as an economic indicator would be complementary to our indicator of choice. Due to the time constraints, we focused only on differences in cost.

Sample Survey Comparing the Prices of Foods On and Off Campus

On Campus Locations	Proposed Foods for Comparison	Off Campus Locations	Price	Percentage Difference in Price
All Locations* (excluding Benny's Bagels)	1 Medium Apple	IGA/Safeway		
All Locations (excluding Benny's Bagels)	1 Medium Orange	IGA/Safeway		
All Locations (excluding Benny's Bagels)	1 Medium Banana	IGA/Safeway		
All Locations	Bagel with Cream Cheese or Peanut Butter	IGA/Safeway		
Vanier, Totem	Toast, 2 Slices with Peanut Butter	IGA/Safeway		
All Locations (excluding Benny's Bagels & The Delly)	Cereal - 30g	IGA/Safeway		
All Locations	Milk - 8oz	IGA/Safeway		
All Locations	Juice -12oz	IGA/Safeway		
All Locations	Sandwiches on W/W Bread with Lettuce, Tomato, Cucumber, & Cheese -Ham -Turkey -Vegetarian	IGA/Safeway		
All Locations (excluding Benny's Bagels)	Low-Fat Yogurt – 6-8oz	IGA/Safeway		
Vanier, Totem, & SUB	Salad Bar – Price/g	IGA		
Vanier, Totem, & SUB	Fruit/Yogurt Bar – Price/g	IGA		
All Locations	Soup – 8 & 12 oz -Cream Based -Meat Based -Vegetable Based	IGA/Safeway		
All Locations	Entrees	IGA/Safeway		

*Note that for the sample survey provided “All Locations” includes: Pacific Spirit Place, Place Vanier Dining Room, Totem Park Dining Room, 99 Chairs, Benny’s Bagels, and The Deli.

Indicator Range

(5 is highly sustainable and 1 is highly unsustainable)

5 =	<10%**	Highly Sustainable
4 =	10-25%	Moderately Sustainable
3 =	25-40%	Mildly Unsustainable
2 =	40-55%	Relatively Unsustainable
1 =	>55%	Exceedingly Unsustainable

* **Percent being the overall percent difference of all foods priced on the UBC campus vs. the same foods priced at the indicated locations off-campus

APPENDIX B: ECOLOGICAL INDICATOR RESEARCH DESIGN

- Formula for calculating Weighted Average Source Distance (WASD):

$$*WASD = \frac{\sum (m_k \times d_k)}{\sum m_k}$$

m- amount consumed (kg),

k- location of the production,

d- distances from the locations of production to the point of consumption (km)

*From Pirog, *et.al.* (2001)

(WASD will be calculated for each type of food proposed in Appendix A as well as a random selection of other food products)

- Ecological indicator scale:
(5 is the highly sustainable and 1 the highly unsustainable)

1= food produced outside North America; food miles is more than 24,256,000 square km

2= food produced in North America; food miles is between 9,093,507 square km and 24,256,000 square km radius

3= food produced in Canada; food miles is between 925,186 square km and 9,093,507 square km radius

4= food produced in BC; food miles is between 114.67 square km and 925,186 square km radius

5= food produced in Vancouver; food miles less than 114.67 square km radius

(Numbers are geographical statistics from <http://atlas.gc.ca>)

Please note that aside from food miles, the group felt that the percent of compostable waste on campus actually composted also be a strong corresponding ecological indicator. Increasing campus composting is an entirely feasible project, and campus compost can be used as fertilizer to improve nutrient cycling, which could affect food security indirectly (UBC Waste Management). Due to limited space, however, we have decided not to further discuss composting as an ecological indicator in this project.

APPENDIX C: SOCIAL INDICATOR RESEARCH DESIGN

Sample Questionnaire Measuring the Perceived Availability, Acceptability, and Accessibility of Food on the UBC Campus

Questionnaire Methods

The questionnaire should be administered randomly two times throughout an academic year, approximately six months apart in order to account for the seasonal variation of the food supply. Ideally, the questionnaire should be conducted during both the Fall and Winter semesters, which is when the campus is most heavily populated with students, faculty, and staff. The questionnaire may be administered in one of two ways:

- (1) The Agricultural Sciences 250 students can survey the UBC community in late September and the Agricultural Sciences 450 students can survey the UBC community in late March (Group 14, 2003). By selecting September and March, the students have time to alter the questionnaire if need be and collect and analyze the required data at times that do not interfere with midterms or finals; or
- (2) The questionnaire may be self-administered on the UBC website. An email and/or letter can be sent out to randomly selected students, faculty, and staff informing them of the user-friendly website and the importance of the questionnaire. Guidelines for answering the questionnaire may be found on the website. The collected, anonymous data can be computer compiled and analyzed by designated Agricultural Sciences students. The computerized questionnaire has numerous strengths: a reduction in the respondent burden, a cost-effective method of delivery and analysis for large sample sizes (Lee & Nieman, 2003), a decrease in the amount of paper used, and an increased response rate due to the flexibility regarding time in answering the questionnaire.

The respondents will be able to answer the survey according to a five-point scale, which is one

that is reliable and respondent misinterpretation may be minimized with word labels describing each numerical scale point. Furthermore, the labeled scale can easily be analyzed to determine how many of those surveyed feel that the UBCFS is socially sustainable (Pearson NCS, 1995).

Those analyzing the answers can look at an individual question, a section, or the entire survey in order to determine the percentage of respondents that feel that the UBCFS is socially sustainable. This can easily be done by determining the average response, and then comparing it to the following guidelines:

- 5 = 100% Highly Sustainable
- 4 = 80% Moderately Sustainable
- 3 = 60% Mildly Unsustainable
- 2 = 40% Relatively Unsustainable
- 1 = 20% Exceedingly Unsustainable

Questionnaire Design:

Section I: Personal Background

Age _____ Ethnic Background _____
 Gender _____ 2003 Income _____
 Do you live on-campus or off-campus? _____

Section II: Perceived Availability of Food on the UBC Campus

(1) Do you find that you have access to adequate amounts of safe foods?

Strongly Agree Agree Neutral Disagree Strongly Disagree
 5 4 3 2 1

(2) Do you feel that you have access to adequate amounts of nutritious foods?

Strongly Agree Agree Neutral Disagree Strongly Disagree
 5 4 3 2 1

(3) Do you feel that the UBC food supply is one that is reliable?

Strongly Agree Agree Neutral Disagree Strongly Disagree
 5 4 3 2 1

(4) Do you feel that the campus offers a healthful variety of foods in vending machines?

Strongly Agree Agree Neutral Disagree Strongly Disagree
5 4 3 2 1

(5) Do you feel that there is enough locally grown produce available on the UBC campus?

Strongly Agree Agree Neutral Disagree Strongly Disagree
5 4 3 2 1

Section III: Perceived Accessibility of Food on the UBC Campus

(1) Do you typically purchase food on campus?

Strongly Agree Agree Neutral Disagree Strongly Disagree
5 4 3 2 1

(2) Are you able to afford nutritionally balanced meals on campus?

Strongly Agree Agree Neutral Disagree Strongly Disagree
5 4 3 2 1

(3) Do you feel that the hours of operation of retail food outlets meet your needs?

Strongly Agree Agree Neutral Disagree Strongly Disagree
5 4 3 2 1

(4) Do you feel that the location of retail food outlets meet your needs?

Strongly Agree Agree Neutral Disagree Strongly Disagree
5 4 3 2 1

(5) Would you choose to use community kitchens if such facilities were available?

Strongly Agree Agree Neutral Disagree Strongly Disagree
5 4 3 2 1

Section II: Perceived Acceptability of Food on the UBC Campus

(1) Do you feel that the campus offers foods that are culturally appropriate?

Strongly Agree Agree Neutral Disagree Strongly Disagree
5 4 3 2 1

(2) Do you feel that the campus offers foods that accommodate food allergies and/or disease-state diets?

Strongly Agree Agree Neutral Disagree Strongly Disagree
5 4 3 2 1

(3) Would you like to see nutrition labeling on both packaged and prepared foods?

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

(4) Would you like to see bio-labeling, such as food miles, on both packaged and prepared foods?

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

(5) Do you feel that the campus offers foods that are personally acceptable to you?

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

Note: Our group also agrees that increasing consumer awareness of nutritious foods through education is an important contributor to social sustainability, and should also be considered as a potential indicator of UBCFS sustainability.

APPENDIX D: OVERALL UBCFS SUSTAINABILITY

Below is a table that will provide a numerical value for the overall sustainability of the UBCFS, as it pertains to our three chosen indicators: cost of nutritious foods on campus; food miles; and the perceived availability, acceptability, and accessibility of foods on campus. Our group has chosen to give equal importance to each of our indicators, as reflected in the “Value Multiplier” of 0.33 per indicator. We feel that a balance between economic, ecological, and social sustainability is desirable in the context of food security. Once a score, ranging from 1 to 5, for any given indicator is determined, this value is multiplied by the “Value Multiplier” of 0.33. Finally, the scores from each of the three indicators may be tallied under the “Weighted Index Value,” and the overall sustainability of the UBCFS is given a score out of 5. This system allows for comparisons to be made on a regular basis (Group 18, 2003).

Indicator	Measurement Criteria	1	2	3	4	5	Enter a Value /5	Value Multiplier	Weighted Index Value
Affordability of Nutritious Foods	Price Comparison On and Off Campus	>55% Difference	40-55% Difference	25-40% Difference	10-25% Difference	<10% Difference		0.33	
Food Miles	Average Miles Traveled by UBC Food	>24,256,000 km ² radius	9,093,507 - 24,256,000 km ² radius	925,186 - 9,093,507 km ² radius	114.67 – 925,186 km ² radius	<114.67 km ² radius		0.33	
Availability, Acceptability, and Accessibility of Foods	Perception of Campus Population that Believes UBC is Food Secure	0-20%	21-40%	41-60%	61-80%	81-100%		0.33	
Campus Sustainability Index /5									

APPENDIX E: AMS AND UBC FOOD SERVICES SUPPLIERS AND ONGOING PARTNERSHIPS

i.) AMS and UBC Food Services Suppliers:

For UBC Food Services, these include Central Foods and Allied Foods for produce, Neptune for frozen foods, eggs and cheese, Centennial for meat, Sysco for groceries, and Coca-Cola for all soft drinks (Yip, 2004). For AMS Food Services, this includes Gordon Food Services (a Division of Neptune) for dry goods, locally owned La Rosa Foods for pasta, olive oil and canned ingredients four sauces, Dairyland for dairy products, locally owned Central Foods for produce, Albion Fisheries for seafood, locally owned Que Pasa for Mexican foods, the Pita Bread factory, Coca Cola for soft drinks and juice under UBC's Cold Beverage Agreement (Toogood, 2004). Also, AMS Food Services uses Canterbury coffee, which is certified organic, shade grown, bird friendly and fair trade (Toogood, 2004).

ii.) Ongoing Partnerships

Already, a number of partnerships between the different stakeholders groups on campus exist to address food security issues, and these programs should be continued in the future. For example, AMS and UBC Food Services, Waste Management UBC and student groups have helped to initiate green discounts when patrons bring their own reusable food containers to food service outlets on campus. Likewise, UBC Food Services participates in a cooking oil recycling program on campus with partners such as the UBC Campus Sustainability office to create biodiesel, which is then used to power campus vehicles. UBC Food Services also has a Sustainability Coordinator to ensure effective communication between UBC Food Services and the Sustainability Office on Campus. In addition, promotion of sustainability initiatives is critically important. Further focus on collaborative education, advertising and marketing regarding sustainability initiatives is essential (Parr, 2004).

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