UBC Social Ecological Economic Development Studies (SEEDS) Student Report

UBC Food Systems Project: Creating Sustainable Food Procurement Targets for the AMS Lighter Footprint Strategy

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Abstract

Community based action research was conducted to determine strategies for the Alma Mater Society (AMS) Food Service Department to procure their food in a more sustainable manner, in order to reduce their ecological footprint. Interviews were conducted with relevant stakeholders, including the AMS Food and Beverage Department (AMSFBD) Manager, and representatives from their main produce supplier, Central Foods. Literature searches were conducted on sustainability initiatives by other universities, UBC policies were obtained, and food procurement lists were obtained from the AMS. Surveys were also conducted on students to determine their awareness of sustainability initiatives, and their food consumption patterns at the Student Union Building. The focus was narrowed down to the procurement of seasonal local produce during the winter months from November to March, with a specific focus on cucumbers, carrots, broccoli, tomatoes, mushrooms, peppers, onions, and potatoes, which are common items used by AMSFBD outlets. The results showed that of these items, the only BC grown ones used by AMSFBD outlets in the winter are red small potatoes, and mushrooms; however, Central Foods is willing to source any items that the AMS requests. Our results also indicate that although student awareness of AMS sustainability initiatives is low, they would support a one-time price increase of between $0.25 and $0.50 to account for future sustainability initiatives. It is our recommendation that the AMS increase their communication with their suppliers, increase marketing initiatives to build student awareness, and conduct formal marketing research that can be statistically analyzed to assess a price increase that will be accepted by UBC students.

Introduction

This paper will discuss sustainable food procurement targets for the *Alma Mater Society (AMS) Lighter Footprint Strategy*. We will begin by providing an introduction to the problems that a lack of sustainability has had within the global context, as well as expanding on the

specific contribution of the food system to these problems, while also introducing some of the actions that universities around the world have taken to address some of these problems. Additionally, we will introduce the initiatives that have been taken on by the University of British Columbia (UBC), particularly with respect to the contribution made by the AMS. We will then introduce the value assumptions that have guided our thinking, and how these assumptions influenced our opinions on the guiding principles developed by the project partners.

An outline of the methodology used in this community based action research project will be provided, following which we will present and discuss the findings and results of our research. The findings will be presented and interpreted on the basis of what other campuses are doing, relevant UBC food system related policies, results of interviews with suppliers, the marketing of current AMS initiatives, potential price increases, organic versus conventionally grown products, distance versus greenhouse heating, and the fuel used in food transportation vehicles.

We will then provide short-term recommendations to the AMS, the UBC Social, Ecological, Economic Development Studies (SEEDS), and future AGSC 450 students, as well as long-term recommendations to the AMS to ensure that they are able to procure their food in the most sustainable manner. Finally, we will conclude with a summary of future areas for inquiry.

Problem Definition

Climate change and global warming have become a growing concern with regards to their impact on our environment. In fact, the negative implications of climate change have never been more apparent. According to consensus data from the Intergovernmental Panel on Climate Change, greenhouse gases are higher than they have been in 650,000 years, which is likely the cause of the global warming that we have seen in the past 50 years (Bernstein et al., 2007). This warming has had a drastic effect on the floating arctic sea ice, which has shrunken by 2.7% per

decade since 1978, is now predicted to be completed dissipated by 2013, and will further contribute to warming effects through positive feedback mechanisms (Bernstein et al., 2007). If action is not taken immediately on a global level, we can expect to see a global mean temperature increase of 2˚C, which is a high enough increase to see catastrophic effects on the environment, such as flooding, loss of crops, and loss of species (Bernstein et al., 2007).

The food industry itself substantially contributes to climate change, from the carbon emissions that are produced in food production and processing, to the energy consumption required to grow, harvest, process, and transport food. In fact, the food industry in Canada is one of the largest producers of industrial waste, and uses greater than 3% of all manufacturing power from industry and greater than 6% of withdrawn water (Maxime, Marcotte, & Arcand, 2005).

With the increased environmental concerns regarding climate change and global warming, universities have realized not only their contribution to the problem, but also their responsibility in driving initiatives forward to help achieve a beyond climate neutral state. In recent years, there has been a growing movement for university campuses to increase their sustainability initiatives, not only so that they may serve as role models for sustainability, but also to serve as a learning ground for the generation of people who will be responsible for saving our environment. In fact, many universities globally have taken on diverse initiatives towards achieving sustainable campuses. For instance, Kyushu University in Fukuoka, Japan, recognized the need for sustainability to be taken into account when designing their new campus, and as such adopted a policy to conserve all species, while creating a campus that served as both a conservation experiment and a learning ground for students, with these strategies being incorporated into new courses and dissertation topics (M'Gonigle & Starke, 2006). In Canada, the University of Toronto has taken an integrative approach by combining their initiatives into one overarching Sustainability Board, which represents administrators from each of their three

campuses, and helps to coordinate partnerships between campuses to increase the effectiveness of initiatives (University of Toronto, 2007). Specifically, the university has addressed issues surrounding transportation, technologies and retrofits to provide more energy efficient doors and windows, buildings and lands of new constructions and storm-water management, behaviours and policies regarding educating the community and environment about the benefits of conservation, and even the development of ecological footprint analysis programs to evaluate the university's ecological impact (University of Toronto, 2007).

UBC is among the many university campuses that strive to achieve sustainability. Universities have become so involved in creating sustainability initiatives that the Sustainable Endowments Institute has created a report card to rank universities on their sustainability policies and initiatives (Sustainable Endowments Institute, 2008). In fact, according to the Sustainable Endowments Institute (2008), UBC is ranked as one of the campus sustainability leaders for their sustainability initiatives, receiving a grade of "B+" overall. However, with a total enrollment of over 45,000 students per year (Alma Mater Society, 2008), UBC has the potential of doing even more. Not only does UBC have the capacity to significantly reduce their own impact on the environment, but with such a high enrollment rate, they also have the capacity to impact students in such a way that they will take these initiatives back to their own communities, thereby producing a more global effect.

UBC's student society, the Alma Mater Society (AMS) has recognized the need for further initiatives that will address the ecological issues that we are facing. According to N. Toogood, AMS Food and Beverage Manager, since 1988 when their first sustainability initiative was introduced whereby students were offered a discount for bringing in their own coffee mugs, the AMS has been active in trying to reduce their ecological footprint; however, the transient nature of staff, and lack of formal strategy are barriers that they are constantly facing (personal

communication, March 19, 2008). The AMS Council has recognized that to overcome these obstacles, formal policies need to be created. As a result, the AMS Council passed a draft form of their strategy, now entitled the "AMS Lighter Footprint Strategy," in January 2007. The overall purpose of this strategy is to guide the AMS towards initiatives that will have a significant impact, while having procedures in place that will allow progress to be monitored and reported (Doherty, 2008). One area of focus within this strategy is with regards to creating sustainable food procurement targets for the AMS.

The AMS recognizes the negative implication of purchasing food that is produced in an unsustainable manner, and that is transported from thousands of miles away. As such, they have requested that Agriculture Sciences 450 students work with them to create reasonable food procurement targets that can be implemented in their food outlets, to ensure that their ecological footprint is kept to a minimum. In accordance with their desire to achieve more sustainable food procurement targets, our group has been working with the AMS and their suppliers to come up with achievable targets for the procurement of seasonal produce, particularly during the winter months of November to March, when availability is limited.

Vision Statement and Identification of Value Assumptions

Our group was in consensus regarding the importance of sustainability initiatives at UBC. We agreed that it is important for these issues to be addressed at the local level for progress to be made on a more global scale, and that universities in general provide the perfect infrastructure to address issues involving sustainability.

While we agreed that each of the seven principles outlined by the project partners is an important aspect to consider when creating initiatives and driving them forward, we felt that one of the principles may not have been the most achievable and that it was based on slightly utopian ideals. Specifically, the sixth principle “food is produced by socially, ecologically conscious

producers," we felt was slightly unrealistic. We felt that the social and ecological consciousness of producers was an improbable thing to control when the amount of food that food providers on campus utilize on a daily basis is so significant that it must be purchased on a mass level. Mass production defies this principle, since it is difficult to produce on a mass level without some detrimental effects to the surrounding ecosystem. The alternative would be to purchase from many small-scale producers. However, this means that either the food brokers and distributors would need to be willing to deal with many trips to many different farms, or that UBC food outlets would need to make arrangements with the farms to deliver directly to them, which introduces many other problems, including issues with quality control, inconsistencies in price, and even willingness of small scale farmers to make the bi-weekly trips to campus for deliveries.

Because it seemed that there is no simple solution to these issues, we debated about whether UBC farm may be able to increase their supply to keep up with the demand of the UBC food system, thereby eliminating some of the issues identified, or even making the principle more specific to identify a certain proportion of food that should be produced by socially, ecologically conscious producers (i.e. 75%). We came to the consensus that while we all see the value in being ecologically minded when purchasing food, sometimes our values are ideals that are not always feasible, and that there needs to be a balance in the sixth principle between the ideal situation and the most realistic one.

Methodology

Throughout the entire project, each of the group members was allocated tasks to research. The first steps taken in our research were done as a means of familiarizing ourselves with the problem, and the steps that have been taken by other universities to address the issue of sustainability. As such, a web-based search was conducted to identify what other universities have done in the past, to gain some insight into initiatives that are currently working, and those

that can be built upon. Additionally, current UBC policies influencing purchasing and sustainability were researched. We also felt that it was necessary to have a firm understanding of the ecological footprint of the food system with respect to common produce items that are purchased by the AMS, such as tomatoes and cauliflower. To address this, a background literature search was conducted on the ecological footprint analysis of fruits and vegetables.

To gain a sense of what types of products the major suppliers in the lower mainland are sourcing, as well as where they are sourcing their products from, an email was sent to Neptune, Intercity Packers, and Sysco on January 27. Additionally, we wanted to gain a sense of what types of products the AMS is currently purchasing, so in collaboration with scenario three from our Agricultural Science (AGSC) 450 class, we were able to obtain the AMS inventory list. Because this list was incomplete, on March 12 we requested and obtained the AMS' food procurement lists from Tom Coleman, the Assistant Food and Beverage Manager (Admin) of the AMS. From the procurement lists, we selected the most common fresh produce items appearing in most of the outlets to narrow down our targeted produce.

To gain further understanding about the AMS Food and Beverage Department (AMSFBD), we attended a meeting with Nancy Toogood, the AMS Food and Beverage Manger, on March 19 in room 215 of the Student Union Building (SUB). In this meeting, we discussed some of the achievements the department has had with regards to sustainability, as well as problems they are currently facing, which provided insight into further research that needed to be conducted. One profound statement that Nancy made was that the AMS' business philosophy is to meet the needs of the students; therefore, students' actions dictate what the AMS does. This inspired us to conduct research in to determine what the current needs of the students actually are. Consequently an online survey was conducted through *Survey Monkey*, which was circulated for one week, from March 19 to March 26 (see Appendix A).

Our overall goal with this survey was to determine the factors contributing to the food choices of UBC students, specifically with regards to sustainability. Therefore, the awareness of the issue of sustainability by UBC students was questioned within the survey. Secondly, there was a series of questions addressing the cost of the food provided in the SUB, since buying local and/or organic produce could potentially cost more than conventional produce. These questions addressed issues including how much more students were willing to pay for a sustainably produced meal (if anything at all), and whether an increased cost would affect their decision to purchase food through the AMSFBD. Lastly, the survey assessed the customers' willingness to change their eating habits if the food provided in the SUB was to be based on foods that are seasonally available in BC. A mixture of students from the faculty of Land and Food Systems (LFS) and other faculties were surveyed, and the results were analyzed accordingly.

On March 21, we conducted a telephone interview with Carolina Gonzales from Central Foods, which is the main produce supplier for the AMSFBD. During this interview, questions were asked regarding the origins of some of the produce items indicated on the AMS food procurement list, as well as whether those items were organic or conventional. However, she was unable to answer some of our questions with respect to factors influencing bringing in more locally grown produce, and recommended that we speak with Anna Wong for more detailed information. A second telephone interview was therefore conducted with A. Wong from Central Foods on March 25, who was able to answer these questions. Signing of the consent form was an issue that we encountered. When we asked C. Gonzales if we could send her a consent form before conducting the interview, she told us to just ask the questions without the form. A. Wong also indicated that a signed consent form was not necessary, and that she would prefer to just answer the questions. Group 27 also made an attempt to have the consent form signed by A. Wong, however a response was never received.

We had some additional unanswered questions regarding the students' awareness (or lack there of) of sustainability initiatives by the AMS that are currently in place. An email was sent to N. Toogood on March 27, to inquire about her opinion on this matter, in which a reply was received promptly after.

We had further questions regarding where Central Foods sources their produce from during the winter months, so C. Gonzales was contacted on March 31, for another telephone interview. We also attempted to contact A. Wong from Central Foods to inquire about the price difference between locally grown, organic, and imported produce; however, we were unable to reach her. We also felt that it would be helpful to speak with another supplier to see if they had experienced the same problems that Central Foods had reported with regards to factors that influence the supply of local produce. An email was therefore sent to Spencer Anderson, Assistant Vice President of Training and Category Development with SYSCO Vancouver, on March 31; however, no reply was received.

To ensure that our methods of research were not just limited to foods purchased by the AMSFBD, but covered other areas as well, we felt that the marketing of active sustainability initiatives by the AMSFBD warranted further exploration. Specifically, we wanted to determine the level of awareness about these marketing initiatives by UBC students. Thus, a second student survey was conducted via *Survey Monkey*, to inquire about student's knowledge of current sustainability initiatives, which ran from April 1 to April 8 (see Appendix B).

From the online surveys, meeting with Nancy, and the interviews with Central Foods, we narrowed our topic down to the seasonal purchase of local produce by the AMSFBD during the winter months, from November to March, specifically focussing on cucumbers, carrots, broccoli, tomatoes, mushrooms, peppers, onions, and potatoes. These eight items were chosen due to their extensive use throughout the AMSFBD outlets. The winter months of November to March were

chosen because these are the months when UBC makes its greatest negative contribution to the environment. During these five months UBC is at its highest population density, while local food is at its lowest availability, therefore it is of the utmost importance to create a sustainable policy focussing on this time period.

Findings & Discussion

What Other Campuses are Doing

According to the College Sustainability Report Card, which surveyed over 200 schools in 2007 on sustainability initiatives, the overall college sustainability leaders are Carleton College, Dartmouth College, Harvard University, Middlebury College, University of Vermont, and University of Washington, each receiving a grade of A- (Sustainable Endowments Institute, 2008).

Among these universities, Carleton College has taken on impressive food procurement initiatives, purchasing food from between 15 and 20 local farmers and producers, ensuring that all meat served through their dining services is grass-fed, and that 100 percent of the flour used in baked goods is certified organic (Sustainable Endowments Institute, 2008). They have also excelled in the areas of administration, in which they have adopted their own Environmental Statement of Principles, and have created an alliance between the faculty and students of their Environmental and Technologies Studies program and sustainability efforts (Sustainable Endowments Institute, 2008). Dartmouth College has succeeded in supporting local farmers, and introducing locally grown foods to their dining hall since 2005 through their Farm-to-Dartmouth project, as well as eliminating all Styrofoam containers and introducing composting in some of their dining halls (Sustainable Endowments Institute, 2008). But perhaps the most impressive is the food procurement initiatives taken on by Harvard University. Although it fluctuates from season to season, between 35% and 70% of the produce served in their dining hall is locally

grown, purchasing food from seven local farms and 60 local producers (Sustainable Endowments Institute, 2008).

These findings indicate that the common theme among these universities is their integration of sustainability initiatives into campus wide policies that involve combining sustainability initiatives into courses, which has a broader impact on students. This is one area that UBC can focus on as a long-term goal, as greater awareness about issues pertaining to sustainability will result in more educated food choices at AMSFBD outlets. If the AMS can work with UBC to show them that there is a need for greater student awareness, UBC may be more willing to oblige to expanding the current course curriculum.

UBC Food System Related Policies

UBC is actively involved in many food system sustainability related policies, strategies and procurement guidelines. The UBC Board of Governors has issued a policy entitled "Sustainable Development" that helps to develop an environmentally responsible campus, and integrates ecological, economic and social considerations of planning and operations in sustainable development (UBC Sustainability Office, 2005). The Alma Mater Society (AMS) has also issued the AMS Environmental Sustainability Strategy to guide the strategies and targets to promote sustainability (AMS, 2007).

In addressing the waste production associated with the food system, the AMSFBD and UBC Food Services Department (UBCFSD) are collaborating with UBC Waste Management to reduce the amount of organic waste generated from the campus food outlets and residences. The waste is composted in an in-vessel composter on campus and the fertilizer generated by the composter is used by the campus landscaping team to fertilize UBC grounds (UBC Sustainability Office, 2007). UBC Food Services also participates in recycling used cooking oil to be converted into bio-diesel fuel that is used to power landscape vehicles on campus (UBC Food Services

Department, n.d.). With regards to decreasing the waste associated with take out containers, Blue Chip Cookies, an outlet of the AMSFBD, has switched to the ecotainer cup, made from fully renewable resources and compostable with very little environmental impact. Additionally, Blue Chip offers students a saving of $0.25 per beverage purchased for bringing their own mug (AMS, n.d.). Discounts are also provided to students when they use their own mug or food container at other AMSFBD and UBCFSD outlets, thereby decreasing the use of paper cups, Styrofoam containers and plastic cutlery (AMS, n.d.; UBC Food Services Department, n.d.).

With regards to sustainable food purchasing, both the AMSFBD and UBCFSD are working to source local, sustainably harvested and humanely raised foods. Fair trade coffee is offered in all AMSFBD and UBCFSD non-franchise outlets. Pura Vida coffee, which is 100% organic, shade grown, fair trade certified coffee became the house brand coffee for all UBCFSD outlets as of September 2006 (UBC Sustainability Office, 2007). Purchasing policies were also implemented for the procurement of sustainable fish and seafood in AMSFBD and UBCFBD outlets. The Sustainable Seafood Project, which was started in January, 2006, removed five threatened seafood species from the purchase list, which includes monkfish, snapper, long-line caught tuna, sevruga caviar and swordfish. The project will expand to include the procurement of sustainable shellfish, steelhead trout/rainbow trout, shrimp and salmon (UBC Sustainability Office, 2007).

Both the AMSFBD and UBCFSD have a focus on reducing the carbon footprint associated with the delivery and transportation of foods. Purchasing products that are produced locally, including those from the UBC Farm, is a great initiative to carry this out. As an example, Pie R Squared, an AMSFBD outlet, has purchased approximately 700 lbs of butternut squash from UBC Farm since September 2007, and incorporated the squash into a pizza using a recipe developed by a group of AGSC 450 students in 2005 (N. Toogood, personal communication,

March 19, 2008). Meals that are produced from the UBC Farm are not only fresh, but they use less than 0.25 L of fuel and produce only 0.61 kg of CO_2, for a total of only 2.7 km of food miles (N. Toogood, personal communication, March 19, 2008). Through the purchase of locally produced products from local farmers and the UBC Farm, AMSFBD and UBCFSD have helped decrease the amount of pollution and the use of petroleum by decreasing the distance it would take to transport the food. The utilization of more UBC Farm produce may be accomplished if winter storage considerations are made. For example, by proposing a cold storage space in the new SUB development, issues pertaining to a lack of storage space in the winter may be addressed.

Suppliers

From our interviews with Central Foods we discovered that of the many produce items that are supplied to the AMSFBD during the winter months, only red small potatoes, alfalfa, and bean sprouts were confirmed to be BC grown, and mushrooms are the only product that are sourced from BC year round (C. Gonzales, personal communication, March 21, 2008). This is based on the current food procurement list, although the sources of these foods do not change much from season to season due to relationships built with current suppliers (C. Gonzales, personal communication, March 21, 2008). With regards to the remaining six items within our focus, of the cucumbers, carrots, broccoli, tomatoes, peppers, and onions supplied to the AMSFBD, none of them are locally grown. For instance, the cucumbers purchased by the AMS come from two different locations; the long English cucumbers are from BC Hot House, while the long English cucumbers in bulk and the white spine cucumbers are sourced from Mexico (C. Gonzales, personal communication, March 31, 2008). When asked about why Central sources the long English cucumbers from two different locations, we were informed that it was because it was a "better purchase for them, most likely because of quality," (C. Gonzales, personal

communication, March 31, 2008). With regards to carrots, Central Foods sources the jumbo carrots from California and China, and the snap top medium carrots from California. They informed us that the only difference between the jumbo carrots from California and China was size. The broccoli is sourced from California, all of the tomatoes and peppers are sourced from Mexico, and onions are sourced from both Washington and Mexico, while the 80 count bakers potatoes are sourced from Washington (A. Wong, personal communication, March 25, 2008).

We discovered that there are many factors that influence the decision to import produce rather than supply locally grown products. Based on the interview that Group 27 conducted with A. Wong, tomatoes are not sourced from BC because BC Hot House tomatoes have a different taste and the greenhouse sticker on each of the tomatoes is a hassle for chefs to remove (A. Wong, personal communication, March 25, 2008). Pricing is also an issue, and in fact one of the main reasons for sourcing produce from Mexico, is that it is cheaper to source from Mexico than BC even when transportation costs are taken into consideration (A. Wong, personal communication, March 25, 2008). Other factors include the amount of rainfall in BC, which causes the water content of onions to be so high that the quality is very poor (A. Wong, personal communication, March 25, 2008).

We were informed that Central Foods does not currently supply any products that are both organic and BC grown. In fact, the only organic item that they carry is the Spring Mix Salad, which is produced in California. Central Foods informed us that this is because organic items are expensive, thus affecting their selling price. They did, however, indicate that they are willing to accommodate the AMS if they request organic foods, although the request needs to be made ahead of time as it will require time for them to locate and source the items, order them, and transport them (C. Gonzales, personal communication, March 31, 2008).

With regards to the relative price differences between local and non-local products, we were unable to obtain a quantitative number from Central Foods, but instead were informed that the reason for buying imported foods compared to local is based on availability and quality (A. Wong, personal communication, March 25, 2008). We were also informed by Central Foods that if the AMS requested a switch to BC grown foods, there is the possibility to source more local products for them, but that they regularly switch back and forth between imported and BC grown foods based on availability and quality (A. Wong, personal communication, March 25, 2008). This seemed to contradict the response given to us previously, in which we were told that they do not usually switch between suppliers due to relationships that have been built with them (C. Gonzales, personal communication, March 31, 2008). We attempted to clarify this in collaboration with Group 27, in addition to further inquiring about the reason for price differences between BC grown and imported produce, via email with a follow-up telephone call to A. Wong. Unfortunately, she had not had the opportunity to review the questions prior to our phone call, and said that she would call us back at a later date; however, no response was received.

Through the interviews with Central Foods, there seemed to be many discrepancies between the information that was obtained from A. Wong and C. Gonzales. As was mentioned above, the ability to switch back and forth between BC grown and imported produce seemed possible to A. Wong, but not with C. Gonzales. In addition, when asked about the obstacles to sourcing locally, A. Wong responded by stating that availability, quality and pricing are all obstacles to sourcing locally, with availability and pricing being the major obstacles (A. Wong, personal communication, March 18, 2008). However, C. Gonzales indicated that quality was the major determinant (C. Gonzales, personal communication, March 31, 2008).

Marketing of Current Initiatives

As mentioned, the AMS Council passed a policy in draft form, in January 2007, with a strategy that guides the AMS towards initiatives that will help to achieve ecological sustainability. So far, the AMSFBD has done a remarkable job trying to meet certain criteria of sustainability. Currently, there are many positive initiatives that have taken place in the AMSFBD outlets to minimize their environmental impact. In addition to the $0.25 discount that is offered to people who bring their own re-usable mugs and food containers when they make purchases from the AMS food outlets, biodegradable food containers can be purchased from most AMS food outlets at the cost of $0.25 (N. Toogood, personal communication, March 5, 2008). Also, AMS Catering and the Pendulum Restaurant use dishes, mugs and flatware instead of disposable containers (N. Toogood, personal communication, March 5, 2008). To work towards producing a lighter ecological footprint, Blue Chip Cookies, an outlet of the AMSFBD, has switched from paper cups to ecotainer cups, which are made from fully renewable resources and are compostable. Furthermore, 100% of pre-consumer food waste is composted in all AMS businesses (N. Toogood, personal communication, March 5, 2008).

According to N. Toogood, their first sustainability initiative was introduced in 1988, where students were offered a discount for bringing in their own coffee mugs (personal communication, March 5, 2008). Since then, the AMS has been actively trying to reduce their ecological footprint; however, after 20 years, active promotion of incentives for customers to choose environmentally friendly options at the AMS has declined due to the transient nature of staff, and lack of formal strategy. This creates barriers and brings forth many challenges to the AMSFBD (N. Toogood, personal communication, March 19, 2008). From our second survey (see Appendix B), the data showed that less than half of the respondents surveyed (42.9%), were aware that the AMSFBD outlets offered discounts to their customers when they bring their own

cups and containers. Additionally, 74.3% of the 35 respondents had not heard about the ecotainer cup. Ironically, only 1 person out of the 35 respondents knew that biodegradable food containers could be purchased from most AMS food outlets, and 82.9% of the respondents did not know that 100% of pre-consumer food waste was composted in all AMSFBD outlets.

Although these initiatives are in place, students seem to be unaware about sustainability strategies, procedures and policies offered by the AMSFBD outlets. Many of the staff members themselves are oblivious to the matter, due to high staff turnover and ineffective internal communication (N. Toogood, personal communication, March 27, 2008). In addition, the resources of the AMSFBD are quite limited. Each outlet manager trains their own staff, which includes training them on their sustainability procedures, but unfortunately they do not have the time to get into great detail (N. Toogood, personal communication, March 27, 2008). N. Toogood is the primary person responsible for marketing the sustainability initiatives and promotions at the AMSFBD outlets. Fresh posters are put up several times a year but they get removed and constantly compete with other AMS initiatives and general operation signage (N. Toogood, personal communication, March 27, 2008). Although the AMS has a marketing department, they are not responsible for creating the marketing concepts, just executing them (N. Toogood, personal communication, March 27, 2008).

The AMS has already taken numerous steps to ensure the ecological sustainability of the UBC food system. The initiatives in place form a bridge in reaching the goal of sustainability; however, many have not been successful due to the lack of awareness regarding sustainability initiatives. The initiatives taken on by the AMSFBD outlets, like any other business, are ultimately driven by customer demand. However, if the awareness of the issues surrounding sustainability is low, it renders students powerless in assisting in the movement towards sustainability. Therefore, internal targets, like increasing student awareness about the importance

of sustainability, through incorporation of sustainability topics into current courses, in addition to informing them of the actions taken under the Lighter Footprint Strategy, are areas that can be acted on.

Price Increases

In the meeting with N. Toogood, it was mentioned that the AMSFBD was planning to introduce a one time price increase at their food outlets to counteract the increased food costs associated with the rising cost of oil, as well as to account for the increased cost of purchasing more sustainably produced foods (N. Toogood, personal communication, March 27, 2008). Thus, we felt that in our survey of food consumption patterns of students, it was important to assess students' perception to an adjustment in the selling price of foods at the SUB. It is important to note that in assessing the results to the survey on food consumption patterns at the SUB respondents were separated on the basis of Land and Food Systems students (LFS) and Non-Land and Food Systems students (NLFS) (see Appendix A). This was to prevent the potential of biased results that may otherwise occur had they not been separated on this basis, due to a greater awareness of and interest in issues pertaining to sustainability among LFS students. In addition, most of the LFS students are familiar with AGSC 450 projects, and therefore may have a more vested interest in answering in a particular way, which could also result in biased answers. Lastly, and perhaps the most important factor in analyzing this survey, was that LFS students represent only a small proportion of the UBC population, and therefore may not provide an accurate representation of the opinions of the total population at UBC. One additional point is that most of the questions asked provided qualitative rather than quantitative answers. As such, although the percentages are presented, because the results were not analyzed statistically, inferences could not be made.

From the results, 33% of NLFS students responded that they were willing to pay $0.25 more for a sustainably produced meal in the SUB, while an additional 33% of NLFS students responded that they were willing to pay $0.50 more (see Appendix A). These results suggest that UBC students would be supportive of a price increase, provided that they are made aware of what the price increase is for, and it is justified; however, formal marketing research should be conducted prior to increasing prices so that statistically analyzed results can be determined.

Once the acceptable price increase is determined, our suggestion is to ensure that appropriate signage is placed on meals that have been increased in price to show that they are "eco-friendly." This could, perhaps even include a logo stating something in terms of "the additional $0.50 you have paid has provided you with an eco-friendly meal." As long as students are aware of the reasons behind the price increase, negative emotional response will be minimized.

Organic Vs Conventional

Because initiatives that are implemented by the AMS must be in accordance with the desires of the students, in our initial survey, we questioned students on what was most important to them when purchasing food from the SUB; locally produced food, organically produced food, both locally and organically produced food, or none of the options presented (see Appendix A). Of the 93 respondents, 41.9% said locally produced food was the most important, while 23.7% said that both locally and organically produced food was the most important, and 11.8% said that organically produced food was the most important. Additionally, while it is known that organic farming practices consume more fossil fuels than conventional farming methods due to their high maintenance requirements and mechanical weeding techniques, conventional farming still consumes far more energy due to their use of ammonia based fertilizers and environmentally unfriendly pesticides (Trewavas, 2001). It is therefore advantageous on multiple sides of the

issue to support a more environmentally friendly and ecologically sustainable practice such as organic farming. The use of more organic food by the AMS would serve the purpose of meeting the desire of the students for organic food, particularly if it is both locally grown and organic, while providing a more environmentally friendly solution. Additionally, because 92.5% of the respondents to our survey said that they would be willing to pay an increased amount for a meal that was produced in a sustainable manner, this would allow for a slightly higher cost increase to account for the increased cost of purchasing local organic food, without a negative emotional response.

Distance Vs Greenhouse Heating

Due to the high fossil fuel consumption related to greenhouse heating, it is far more environmentally friendly to procure food from the closest source possible in comparison to greenhouse grown foods, even if it means purchasing foods from outside of BC. For instance, the ecological footprint of greenhouse tomatoes is 600 to 750 hectares to grow 1000 tons per year, in comparison to approximately 50 hectares to grow the same amount of field farm tomatoes (Rees, 2002).

For the AMS the closest large producer of fruits and vegetables in the winter months is California. California is also one of the largest producers of organic produce in North America. According to Statistics Canada the average heavy duty transport truck consumes between 34-37.3 L/100 km, and has the ability to haul around 80 metric tonnes of product (Statistics Canada, 2007). Therefore, having a full truckload of produce shipped from southern Mexico (4,025 km) will consume between 1368.5-1501.3 L of diesel fuel. Southern Florida (5,251 km) to Vancouver consumes between 1785.3-1958.6 L of diesel, while southern California (2,246 km) to Vancouver consumes only 763.6-837.8 L (Carbon Footprint, 2008). These numbers show that it is much more environmentally friendly to acquire food from the closest producer possible, rather

than relying on local produce that is greenhouse grown. One further benefit to concentrating the food supply to California is the low American dollar, which should make buying more locally even more cost effective.

One major problem with the current system that must be addressed is the overseas shipping of produce. The AMS currently purchases many products that are brought in from overseas. For instance, some of the carrots that are supplied to the AMSFBD by Central Foods come from China. Bunker fuel or Intermediate Fuel Oil (IFO) used by most ships around the world is a leading cause of GHG emissions (IMO, 2000). The first thing the AMS should implement is an "overseas only if necessary policy," stating that only products of necessity that are not produced on our continent should be procured from overseas. Exceptions could be made in the future if the products are shipped overseas using sustainable alternative fuel shipping methods. Research is underway in this field due to rising fuel costs however no such shipping method has been implemented.

Fuel Used in Food Transportation Vehicles

Ultimately the AMS should try to take steps towards encouraging food suppliers to provide as much information to them as possible regarding where the foods they are ordering are grown, and the growing methods used before placing orders with their food suppliers. Many food supply companies already provide their customers with information such as the state or country in which the product was produced, whether it was organically or conventionally grown, as well as whether it was grown in a greenhouse or field. It may prove beneficial for the AMS to express their willingness to support a more environmentally friendly company and propose that the suppliers themselves make efforts to reduce greenhouse gas emissions. One simple way for food supply companies to accomplish this would be to switch their fleet over to biodiesel instead of

conventional diesel. The switch is a simple and cost effective way to reduce greenhouse gasses with almost no effort on the part of the company.

Biodiesel (B20) is comprised of 20% biodiesel and 80% conventional diesel fuel. The benefits to using biodiesel go far beyond simply lowering greenhouse gas emissions, "Biodiesel's natural cleaning properties will also help to clean injectors, fuel lines, pumps and tanks, meaning that the overall maintenance costs are reduced," (Carbon Footprint, 2008). According to Natural Resources Canada, biodiesel has the potential to lower GHG emissions by as much as 60-100% under normal Canadian conditions depending on the feed stock used in production (ecoEnergy, 2008). Biodiesel has also recently become the same cost or cheaper than conventional diesel due to rising crude oil costs and government subsidies for alternative fuels (Hamilton, 2004). There are 8 locations in the lower mainland alone that currently sell biodiesel, including Whole Energy in North Vancouver, United Petroleum Products Inc. in Burnaby, and Super Gas in Surrey (Biofleet, 2008b). In one trip from southern California to Vancouver burning biodiesel instead of conventional diesel could reduce CO2 emissions from 3.07 tonnes to 2.59 tonnes, a reduction of 0.47 tonnes of CO2 in only one trip (Biofleet, 2008a).

There are, of course, negative implications to any alternative fuel source. Biodiesel is made from Canola in Canada, and Rape Seed in the U.S. While there is no law against importing biodiesel from countries that do not produce their products sustainably, it is unlikely that Canada will outsource its supply anytime soon (BCSEA, 2008). It should be noted that on a global scale the ramifications of biofuels could have disastrous effects not only on the global food chain but also the environment (Hamilton, 2004). While Canada's biofuels are produced sustainably, compared to other countries, the use of biodiesel as well as other biofuels supports an unsustainable industry and should be taken into account before making any long term decisions.

Recommendations

For the AMS and UBC to lower their ecological impact it is important to create guidelines in the food supply chain that can be implemented with minimal resistance and effort. During the summer months British Columbia produces such a large volume of readily available and diverse food that purchasing local produce is not an issue. In fact, the AMSFBD purchases as much BC grown produce as they can during the summer months, and even gets requests for local meals through their catering services by guests staying in the residence, which serves as a hotel for visitors during the summer (N. Toogood, personal communication, March 19, 2008). However, there are many problems that exist with respect to purchasing food in the winter months, mainly due to a lack of availability of locally grown produce resulting in increased cost, high food miles, and hydrocarbon consumption related to agricultural practices. Because the current food supply chain is based on cost alone, any alteration to the current system will result in a negative cost correlation. The recommendations outlined in this paper are aimed to minimize the negative cost effects while lowering the overall environmental effects.

Immediate Recommendations

To the AMSFBD:

1. The AMSFBD shall continue to purchase 100% local mushrooms year round since Central Foods is able to source mushrooms locally at any time. Since there is no bound contract with Central Foods, the request should be addressed immediately.
2. The AMSFBD shall conduct formal marketing research on customers' preferences and willingness to pay more for a sustainably produced meal. Our surveys could provide preliminary data for the AMSFBD; however, more quantitative data is needed for both surveys.
3. The AMSFBD shall increase awareness of the sustainability initiatives that they have undertaken. Increased awareness provides a more supportive environment for the sustainability

issues on campus. This includes making signage of initiatives visible, ensuring signage is not removed, and ensuring that staff are trained on the placement of signage.

4. The AMSFBD shall make an inquiry to the supplier about where the foods they are ordering are grown prior to purchasing them, and should try to buy foods from the closest organic food source that is not greenhouse grown. AMSFBD should purchase local foods over imported organic foods, unless the local supply is greenhouse grown. For those items that are not immediately available from the supplier, a request should be made to the supplier for them to source the item locally first. Additionally, no products should be purchased that are imported from overseas unless it is an ABSOLUTE necessity; for instance if the product is not grown on this continent.

To SEEDS Program:

1. SEEDS shall incorporate the issue of sustainability into more courses. By introducing sustainability into courses, more students from different faculties would be made aware of the importance of the issues.

To AGSC 450 Students in 2009:

1. Continue to examine the AMSFBD's procurement list during winter season. Determine the current sourcing locations, any closer sourcing locations, and analyze the quality and cost issue of fresh produce, particularly tomatoes, peppers, onions, and broccoli.

2. Identify possible linkages between AMSFBD's demand for UBC farm's fresh produce that could be stored during the winter months. For example, carrots store well in cold storage, which could potentially last throughout most of the winter months. Identify the issues pertaining to quality of items stored in cold storage, and potential solutions to these issues that could be proposed to AMSFBD and UBC farm.

3. Identify possible substitutions to processed or imported food ingredients for readily available local foods. For example, hazelnuts are grown in BC and could be substituted for walnuts in cookies.

4. Conduct a formal quantitative survey that can be statistically analyzed, to identify the types of food that are preferred most by AMSFBD customers. Different sustainability issues shall be addressed. For example, price difference and customers' preference for organic and/or non-organic foods, seasonal menus, and local produce. Furthermore, the survey could address whether or not students would like to see an increase in organic food at AMSFBD outlets.

Long-term Recommendations

To the AMSFBD:

1. UBC and the AMSFBD should support their suppliers to make the transition to alternative fuels to lower carbon emissions.

2. The AMSFBD should propose cold storage facilities to be considered in the construction of the new SUB.

Conclusion

The AMS has been very active in their initiatives towards achieving a sustainable campus to reduce their ecological footprint. They can serve as an example of how determination can have a substantial impact, and it is our belief that they can serve as leaders to encourage the remainder of UBC to become more collaborative in working towards achieving a beyond climate neutral state. Although the sustainability initiatives pertaining to the food system are important, it is just one area that can be improved upon. By taking the lead on issues, such as course development to increase student awareness of sustainability issues, policy development for integrative initiatives, and co-ordinating campus wide partnerships, we believe that the AMS can take UBC from a rating of B+ to being an overall campus leader in sustainability.

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Appendices

Appendix A Survey on Food Consumption at the SUB Among UBC Students

1. What faculty are you from?

Land and Food Systems (LFS)	55
No-Land and Food Systems (NLFS)	33

2. Do you currently, or have you ever, purchased food from the Student Union Building (SUB)?

	LFS	**NLFS**
Yes	85.5%	9.1%
No	14.5%	90.1%

3. If not, why?

	LFS	**NLFS**
I bring my own lunch	16.4%	6.1%
They don't offer foods that I like	5.5%	12.1%
The food is too expensive	5.5%	0.0%
Other	5.5%	3.0%
No-Response	74.5%	84.8%

4. If yes, where do you purchase your food from MOST OFTEN?

	LFS	**NLFS**
Blue Chip Cookies	18.2%	15.2%
The Honour Roll	20.0%	27.3%
The Pit Burger Bar	7.3%	9.1%
AMS Outdoor Barbeque	0.0%	3.0%
Bernoulli's Bagels	18.2%	6.1%
Pie R Squared	18.2%	9.1%
The Moon	1.8%	9.1%
The Pendulum	14.5%	9.1%
One of the Outlets in Pacific Spirit Place	9.1%	36.4%

5. Do you take sustainability (i.e. where the food was grown, and the growing methods used) into consideration when purchasing food from the SUB?

	LFS	**NLFS**
Yes	38.2%	9.1%
No	61.8%	90.9%

6. How important to you is price when purchasing food from the SUB?

	LFS	**NLFS**
Not important	3.6%	0.0%
Low importance	12.7%	3.0%
Moderately important	45.5%	51.5%
Very important	38.2%	45.5%

7. How much more would be willing to pay for a meal that was produced in a sustainable manner?

	LFS	**NLFS**
Nothing	3.6%	15.2%
5 cents	9.1%	6.1%
25 cents	20.0%	33.3%
50 cents	32.7%	33.3%
$1.00	27.3%	6.1%
Greater than $1.00	7.3%	6.1%

8. If the same item were available elsewhere in the SUB, but was not produced in a sustainable manner, would you purchase the cheaper item, or the more sustainable item?

	LFS	NLFS
Cheaper item	34.5%	69.7%
More sustainably produced item	65.5%	30.3%

9. Which is more important to you when purchasing food from the SUB; locally produced food, or organically produced food?

	LFS	NLFS
Locally produced	58.2%	12.1%
Organically produced	1.8%	27.3%
Both locally and organically produced	32.7%	12.1%
Neither are important	7.3%	48.5%

10. Would you be willing to change your eating habits at the SUB based on the seasonality of BC food (i.e. winter squash and carrots available in the winter, fresh fruits available in the summer)?

	LFS	NLFS
Yes	81.8%	36.4%
No	3.6%	15.2%
No preference	14.5%	48.5%

Appendix B Survey on Awareness of AMS Sustainability Initiatives among UBC Students

1. What faculty or program are you currently enrolled in?

Land and Food Systems (LFS)	14.3%
Non-Land and Food Systems (NLFS)	85.7%

2. Do you know the difference between AMS Food and Beverage and UBC Food Services?

Yes	25.7%
No	74.3%

3. Do you know that AMS food outlets offer discounts to their customers when they bring their own cups and containers?

Yes	42.9%
No	57.1%

4. Have you heard about the ecotainer cup (paper hot cup made from fully renewable materials)?

Yes	25.7%
No	74.3%

5. Do you know that biodegradable food containers can be purchased from most AMS food outlets?

Yes	2.86%
No	97.1%

6. Do you know that 100% of pre-consumer food waste is composted in all AMS businesses?

Yes	17.1%
No	82.9%

7. If washing stations were available, would you be willing to bring your own containers if you were to purchase food from AMS food outlets?

Yes	60.0%
No	28.6%