

The UBC Food System Project (UBCFSP): Summary Report 2008

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- Synthesize the findings of 2008 AGSC 450 students
- Work with UBCFSP partners and collaborators to plan and ideally implement food system related initiatives
- Conduct meetings with UBCFSP partners to gather input for the next iteration of the UBCFSP
- Draft scenarios for the 2008-2009 year

Summary

Introduction:

The University of British Columbia Food System Project (UBCFSP) is a collaborative, community-based action research project initiated jointly in 2001 between the UBC Faculty of Land and Food Systems and the Sustainability Office's Social Ecological Economic Development Studies Program (SEEDS). The Project involves multiple partners and collaborators, including: UBC Food Services (UBCFS), AMS Food and Beverage Department (AMSFBD), UBC Waste Management (UBCWM), Centre for Sustainable Food Systems at UBC Farm, UBC Campus and Community Planning (C&CP), Sauder School of Business classes, UBC Plant Operations, Alma Mater Society (AMS), UBC Sustainability Office (SO), Social, Economic, Ecological Development Studies (SEEDS), and the Faculty of Land and Food Systems students and teaching team.

The UBCFSP is part of an Agricultural Science 450 Land, Food and Community (LFC) III course, a mandatory capstone course required for all 4th year Faculty of Land and Food System students. The project commenced seven years ago and has involved eight generations of AGSC 450 students, with over 1200 students (160 AGSC 450 groups, four Sauder School of Business groups, and one Global Resource Systems group) to date.

The main goals of the UBCFSP are the following:

1. To conduct a campus wide UBC food system sustainability assessment.
2. To create a shared vision and a model among partners of a sustainable food system.
3. To identify barriers that impinges on the ability to make transitions towards food system sustainability.
4. To develop opportunities and recommendations to UBCFSP partners and collaborators.
5. To implement measures to make transitions towards UBC food system sustainability.
6. To give students opportunities to apply all learning from their program specialization and the Land, Food and Community (LFC) series in a transdisciplinary real life project.

Methodology and Procedures:

Methodological Perspective:

Community Based Action Research (CBAR) serves as the methodological perspective in the UBCFSP. CBAR can be defined as an "inquiry or investigation that provides people with the means to take systematic action to resolve specific problems"; it enables "people (a) to investigate systematically their problems and issues, (b) to formulate powerful and sophisticated accounts of their situations, and (c) to devise plans to deal with the problems at hand" (Stringer, 1999). The tasks of CBAR are to capture participants' pluralistic voices and to situate their experiences within larger contexts. The goals of CBAR are to produce knowledge through open discourse; produce action and change, and to give research back to the community in which it originated. The process of CBAR is an iterative one, whereby research is conducted through a "look, think, act" routine, which involves a "constant process of observation, reflection and action" (Stringer, 1999).

The significance of CBAR in the UBCFSP is manifold. The Project Coordinator applies basic principles of CBAR such as consensus building, and inclusiveness when meeting with partners to identify challenges in various areas of operations, and develop corresponding tasks needed address them in drafting project scenarios. Furthermore, she strives to build consensus among project partners in identifying challenges, next steps of action and makes every effort to collaboratively implement solutions. Students and members of the teaching team are able to participate in an already established collaborative process, where they can work with project partners to assist them in issues that affect them, and ultimately develop tools that will ideally help address some of the challenges identified by participants.

Methods of Data Collection:

Methods of data collection that have been used by AGSC 450 students throughout the project's duration have ranged from conducting reviews of literature, secondary sources, interviews and focus groups, to administering questionnaires and engaging in participant observation methods.

Project Design:

In the UBCFSP, AGSC 450 students are assigned in groups between six to eight people depending upon size of the class and are primarily responsible for designing, conducting research and planning initiatives. The AGSC 450 teaching team primarily acts as resource persons, and as facilitators to help groups with their work. The Project Coordinator works with the principal investigator and co-investigators in planning the entire project based upon previous work, and meetings she holds with stakeholders and also to implement recommendations. Other UBCFSP partners are involved namely as acting as resource persons, reviewing and giving input on student work and in implementing proposed findings and action plans. Principal

Paper Objectives:

The purpose of this paper is to provide a summary of the 2008 iteration of the project. Specifically, this paper consists of an overview of central group tasks, findings and recommendations, as well as some central outcomes that emerged from group work and meetings with stakeholders.

Overview of 2008:

2008 marked the seventh year and eighth iteration of the UBCFSP. The class consisted of 197 students who were divided into 30 groups to work on one of eight scenarios (listed below in **Table 1**). The Project Coordinator worked closely with project partners and other food system actors to develop a series of scenarios that met the needs of staff working in our food system, fulfilled the learning objectives of the class and were manageable workloads for students in a three credit course. Each scenario contained a background and problem statement, a set of tasks needed to address the problem, recommended resources and people to help groups begin their work.

Table 1: 2008 List of Scenarios	
Scenario	Title
1.	Climate Action Partnership – Moving UBC Beyond Climate Neutral
2.	Creating Sustainable Food Procurement Targets for the “Alma Mater Society (AMS) Lighter Footprint Strategy”
3.	Exploring Ways to Lighten AMS Food and Beverage Department’s Ecological Footprint
4.	Creating a “UBC Farm to Campus Food Provider Program”
5.	Practicing Urban Agriculture Right Here: Integrating the Land and Food Systems (LFS) Garden with the Faculty of Land and Food Systems Community
6.	Developing a Sustainable Food Outlet for UBC Food Services in the New Beaty Biodiversity Centre
7.	Investigating the Overall Ecological Footprint of the University of British Columbia Point Grey Campus Food System
8.	Investigating the Desirability and Feasibility of Incorporating more Local, Seasonal and Sustainability Produced Food Products into the Agricultural Student’s Undergraduate Society (AGUS) Weekly BBQ Menus

Based upon group’s assigned scenario, students were required to produce a 30 page report and a 15 minute PowerPoint presentation sharing their findings. All groups were asked to complete the following tasks: (1) Provide reflections on the project Vision Statement which outlines collectively agreed upon principles that should guide our transition towards a sustainable UBC food system; (2) Provide reflections and expand if necessary on the problem statement assigned to them (3) Develop new and/or refine proposed research

designs, campaigns, and action plans from previous years; (4) Engage in data collection and develop action plans for implementation in 2008 and 2009, and (5) Provide recommendations for the next steps to appropriate project partners and collaborators, as well as other relevant food system actors.

Methods of data collection varied amongst groups and scenarios. All groups were given the opportunity to obtain information from invited class speakers, who gave presentations and spent class time discussing and answering questions. Guest speakers throughout the term included representatives from UBC Food Services, AMS Food and Beverage Department, UBC Sustainability Office, UBC Centre for Sustainable Food Systems at UBC Farm, School of Community and Regional Planning, and the Alma Mater Society. All students were required to review a selection of previous related AGSC 450 group papers, required course readings (resources selected on an ongoing basis throughout the term and posted on the course website (WebCT), and review summaries of project findings from previous years. Other methods of data collection included questionnaires, focus groups, interviews, participant observation, secondary data analysis, and literature reviews. Questionnaires were administered either face-to-face or electronically, with sample sizes ranging from 30 to 426 participants. Interviews and focus groups were held with various UBCFSP partners and collaborators, students, faculty, and staff, as well as a selection of off-campus participants – ranging from food distributors, producers, retailers, chefs, to staff and faculty from campuses across Canada.

Central Objectives, Findings and Recommendations: 2007 Groups

In the following section, specific scenario objectives are identified, and key findings and recommendations are summarized from 30 group reports. For more information on specific findings please contact the Project Coordinator. The top ten group reports² can be found on the UBC Sustainability Office's website: <http://www.sustain.ubc.ca/seedslibrary/>

Scenario 1: Climate Action Partnership – Moving UBC Beyond Climate Neutral **(Groups 12, 21, 23 & 30)**

Objectives:

- To inform the development of the Climate Action Partnership's (CAP)³ "Climate Action Framework", specifically by gathering community input and data to develop a set of preliminary campus food system targets that will help move UBC beyond climate neutral.

Central Findings:

Literature Review:

- All groups conducted a literature review to obtain information about the linkages between climate change food systems at institutional, regional, national and global levels. Based upon this review, the following was found:

General Agricultural and Climate Change Linkages:

- Greenhouse gas emissions have increased significantly and are expected to continue to increase. Over the past three decades there has been a 120% increase in transport emissions, an 80% increase in CO₂ emissions and 70% in other greenhouse emissions (IPCC, 2007 in Group 12 & 23, 2008).

² Please see: Scenario 1: Group 21 & 30, Scenario 2: Group 18, Scenario 3: Group 15, 28 & 29, Scenario 4: Group 16 & 20, Scenario 5: Group 17, Scenario 7: Group 2, and Scenario 8: Group 14.

³ The "Climate Action Partnership" (CAP) is a participatory partnership launched in 2007 by the UBC Sustainability Office involving representatives from the Sustainability Office, UBC Trek Program Centre, Common Energy UBC, and other pertinent campus stakeholders. The main objective of the CAP is to collaboratively find approaches to move UBC beyond climate-neutral, by focusing on ways to create climate change solutions, by reducing the level of GHG emissions as a result of campus operations – from transportation, building, energy, water, business to food practices. It is hoped that this objective will be met by the following initiatives: 1) Production of a "comprehensive GHG emissions inventory baseline" for UBC; 2) Development of a "Climate Action Framework"; and 3) Development and launch of a "Canadian University College Alliance" where UBC will work with other BC campuses to develop and implement climate actions.

- According to the Food Climate Research Network (2007), agriculture accounts for 17-32% of total GHG emitted globally (Group 21, 2008). Globally, agriculture is responsible for nearly two-thirds of methane emissions (Lappe, 2008 in Group 23, 2008).
- In Canada, agricultural practices are estimated to contribute to 28% of total anthropogenic methane and 72% of total nitrous oxide emissions. Moreover, a GHG audit conducted in 2003 found that agriculture-related activity contributed to 8.4% of Canada's total national emissions (Environment Canada, 2005 in Group 21, 2008).
- In 2005, the agricultural sector contributed the equivalent of 7.2 percent to the overall national increase of emissions (Environment Canada, 2008 in Group 30, 2008).
- Climate change has been found to causes more fluctuations in weather conditions in developed countries and to intensify the weather conditions in the areas that are already subject to high climate variability, such as drought and flooding (Schmidhuber & Tubiello, 2007). Increases in climate variability can cause fluctuations in food production, and thus can heighten risks of hunger and diseases especially in developing countries like Sub-Saharan African and South Asia (Schmidhuber & Tubiello, 2007 in Group 12, 2008). Furthermore, it is speculated that with rising temperatures, sea warming occurs, creating increased risk of shellfish and reef-fish poisoning (Schmidhuber & Tubiello, 2007 in Group 12, 2008).
- Climate change can also affect food production, such as by increasing types of agricultural pests present and allowing more pests to survive through winter contributing to higher risks of crop failure. Higher CO₂ concentrations in the atmosphere has also been found to increase in some cases the crops yield, yet the nutritional quality, such as protein concentration may decrease (Schmidhuber & Tubiello, 2007 in Group 12, 2008).

Transportation:

- The average number of miles that food travels has doubled in 30 years. Airfreight is the fastest growing mode of food transport, accounting for 11% of the food industry's transport emissions despite only carrying 1% of the food (Friends of the Earth, 2007 in Group 23, 2008).
- Canada's transportation sector was deemed by the Natural Source Canada (2006) to be the largest source of carbon dioxide emissions for the country (cited in Group 23, 2008).
- Fossil fuels burned during animal feed and product transport contribute to an additional 0.8 million tones of annual CO₂ emissions (Koneswaran & Nierenberg, 2008 in Group 12, 2008).
- It is estimated that the average item in Canada travels approximately 4497 km, and generates 51,709 MCTE per annum (NCAT, 2008 in Group 21, 2008). British Columbia relies on 64% of its food consumed within the province to be imported from elsewhere; where BC is 159% self-reliant for fruits, and 14% for grains (BC MAL, 2006 in Group 21, 2008).
- Based upon a study conducted by The Leopold Centre for Sustainable Agriculture comparing the emissions associated with local and non-local food items, it was concluded that the transportation of non-local food items generated 5 to 17 times more CO₂ than local food items. Similarly, another study conducted in Waterloo examined 58 foods items and found that if they were sourced regionally, GHGs would be lowered by 49,485 MCTE annually (NCAT, 2008 in Group 21, 2008).
- Each form of transportation varies in terms of GHG contributions, with the following g/tonne-km CO₂ emission equivalents reported for different modes of transport: air (1,101.0) truck (269.9), marine (130.3), and rail (21.2). Each of these modes of transportation also varies in their emission contributions based upon engine and load factor efficiency, and refrigeration (Xeureb, 2005 in Group 21, 2008).
- Several recent studies have indicated potential energy savings and reductions in GHG emissions from a more locally-based diet, by reporting significant carbon dioxide emission reductions from procuring locally grown food when contrasted with those that are imported (Bentley and Barker, 2007 in Group 30, 2008).

Livestock:

- The livestock sector has been reported to account for nearly one-fifth of the world's total GHG emissions, more than the entire transportation sector (Lappe, 2008 in Group 23, 2008).
- Similarly, according to the UN FAO, production of livestock may actually contribute more to GHG emissions than transportation (UN FAO, 2006). In the UK, meat and dairy production account for 8%

of the total GHG emissions and nearly 50% of the total food-related GHGs in the UK (Garnett, 2007 in Group 21, 2008).

- Different levels of GHG emissions are associated with livestock production depending upon types of management practices employed, such as livestock density, unit of land available per cattle head, feed and manure management practices. An increase in livestock density is found to increase the net emissions of CO₂ and ammonia as well as the nitrogen and other pollutants that come off the farm (Subak, 1999 in Group 12, 2008).

Manure Management Practices:

- Industrial raised livestock have been found to directly and indirectly emit 40% more greenhouse gases and consume 85% more energy than organic raised livestock because livestock is raised in limited spaces, only a small amount of manure is required to be used as fertilizer, and excess manure is often deposited to a "small, local landmass" where it accumulates in the soil and emits methane, phosphorus and other types of pollutants. It is estimated that an annual CO₂ emission of 90 million tones are released in the atmosphere from industrial livestock farming, and approximately 18 million tones of methane are emitted annually by livestock manure in the US. Furthermore, nitrous oxide is emitted once manure and urine from the livestock accumulates on the soil (Koneswaran & Nierenberg, 2008 in Group 12, 2008). However, other studies have found that due to the longer production time associated with organic livestock to reach slaughter weight, they produced GHGE that were comparable to those in conventional farms where production time was much shorter (Dalgaard, Halberg, & Kristensen, 1998; Dalgaard *et al.*, 2001; Subak, 1999 in Group 12, 2008).
- Globally, animal manure contributes to approximately 4% of anthropogenic methane emissions, equivalent to the release a total of 18 million tones of methane globally each year (US-EPA, 2005 in Group 12, 2008).
- It is estimated that up to a 50% reduction in emissions can be made by frequent and complete removal of manure from storage pit and cooling of manure to below 10°C, compared to liquid-slurry phase under warm temperature methods. Also, it has been found that using feed with higher digestibility minimizes waste energy that is available for bacteria growth (Steinfeld *et al.*, 2006 in Group 12, 2008).

Food Waste:

- In 2005, the waste sector in Canada contributed approximately 3.7% of overall GHG emissions in the national inventory (Environment Canada, 2007 in Group 21, 2008).
- The International Alliance Against Hunger (2007) estimates that between 33-50% of all food shipped to leading developed countries is not consumed and instead is wasted, created unnecessary GHG emissions generated by the production, distribution, processing and storage of food (Group 21, 2008).
- According to the US Environmental Protection Agency, waste in the form of disposable containers and packaging represents 33.1% of the solid waste by volume in the USA food system (Lang & Heasman, 2004 in Group 21, 2008).

Fertilizer and Pesticide Use:

- Approximately 41 million tones of CO₂ are emitted annually through the production of nitrate fertilizer (Koneswaran & Nierenberg, 2008 in Group 12, 2008), with overuse of fertilizers considered as the highest direct source of CO₂ emissions (Bellarby *et al.*, 2008 in Group 12, 2008).
- Approximately 80% of the global soybean crop and more than half of the global production of corn is used to feed the growing population of livestock worldwide (Koneswaran & Nierenberg, 2008). With an annual production of approximately 10 billion bushels of corn and 2.8 billion bushels of soybeans in 2000 in the United States, 60% of corn and 47% of soy are for livestock consumption (Environmental Protection Agency, 2007). In order to maximize the yields of both corn and soy, nitrate fertilizer is often applied to the soil (Koneswaran & Nierenberg, 2008 in Group 12, 2008). Approximately 1.2% of the world's energy is needed to produce nitrate fertilizer (Wood & Cowie, 2004 in Group 12, 2008).
- The use of nitrogen fertilizer contributes to approximately three quarters of the US's nitrous oxide emission (Lappe, 2008 in Group 23, 2008). According to Heller and Keoleian (2000), the production of synthetic fertilizers and pesticides accounts for 40% of the energy used within the entire agricultural system in the United States (Brodt, 2007 in Group 21, 2008).

- According to a report released by the Alberta Agriculture and Rural Development the production and use of fertilizer accounts 42% of Alberta's total agriculture-related emissions (Sutton, 2000 in Group 21, 2008).

Animal Feed:

- When all emissions, such as use of fossil fuel and fertilizers and the loss of carbon sinks associated with feedlots are taken into account the feedlot system produces approximately 1.8 times the amount of greenhouse gases than a pastoral system (Subak, 1999 in Group 12, 2008).
- It has been found that feeding cattle high quality legumes and forages can decrease methane production by 20% since they can be easily digested in the ruminant gut (Group 12, 2008). Grazing beef cows on alfalfa grass pastures compared to grass-only pastures has been shown to decrease methane production by 25%. Also, grazing cattle early in the season when pastures are still immature decreased methane production by 25-45% compared to grazing steers later on in the season. The practice of grinding or pelleting feed lowers fibre digestion and increases feed passage through the digestive tract; as a result, methane production can be decreased by 20-40% (Boadi & Wittenberg, 2004 in Group 12, 2008).

Deforestation:

- Deforestation accounts for 9% of anthropogenic CO₂ emissions, mostly due to expansion of pastures and arable land for feed crops with 70% of previous forested land in the Amazon currently being occupied by pastures (Fearnside & Laurance, 2004 in Group 12, 2008). A total of 6 million acres of the Amazon rainforest, or 25,000 square kilometers are removed annually for production of animal feed and grazing land (Sustainable Table, 2003 in Group 12, 2008).
- Deforestation is further compounded by the fact that carbon sinks can store twice as much CO₂ than vegetation covers or the atmosphere can, and it has been found that soils that are cultivated are discovered to have the ability to release up to 28 million tones of CO₂ each year (Koneswaran & Nierenberg, 2008 in Group 12, 2008).

Energy:

- The increasing demand and reliance on energy-demanding operations, such as heating, cooling, ventilation systems, and the production of seed, herbicides, and pesticides, have been found to play a significant role in releasing GHG emissions (Grillot, 2007; Koneswaran & Nierenberg, 2008 in Group 12, 2008).
- 1.2% of overall GHG emissions in Canada are attributed to the processing and manufacturing of food with more than 80% of these emissions are directly tied to the utilization of energy, which is needed for the thermal and mechanical processes involved in transforming food (Environment Canada, 2005 in Group 21, 2008). Furthermore, related emissions depend on the energy source being used; where in Canada the primary fuel used is natural gas (64%), followed by electricity (26%) and fuel oil (4%), with the remaining energy generated from sources such as propane, butane and coal (AAFC, 2005 in Group 21, 2008).
- Energy use has been found to vary depending upon the type of preservation methods employed. The canning of food products has been shown to use double the amount of energy as freezing in the manufacturing process due in part to the materials needed such as aluminum cans and glass jars. However, cooling methods require continuous inputs of energy and in the long term can have higher GHG emissions, but overall, freezing is thought to require up to 35% more energy than canning. The dehydration of foods may result in a net decrease in energy consumption of 15% as more food can be transported in a condensed form and there no refrigeration is required (Brodt, 2007 in Group 21, 2008).
- All groups conducted a review of efforts that other Canadian and US campuses have made in making their campuses climate neutral, beyond climate neutral, and to produce climate action targets in relation to their food systems. Based upon this review the following was found:
 - Over 507 post secondary institutions across North America have joined the American College and University President Climate Commitment (ACUPCC) - an initiative that provides a framework and support for schools to become climate-neutral. Specifically, signing institutions are required to

complete a GHG emissions inventory, and within two years must set a target date and create a comprehensive plan to include a list of steps and goals to reach carbon-neutrality. Also, schools must participate in short term actions to reduce greenhouse gas emissions, integrate sustainability into curriculum, and create a publicly available plan of action (ACUPCC, 2007; 2008 in Groups 12, 21 & 30, 2008).

- In 2007, the British Columbia Provincial Government mandated that all public sector organizations, including universities and colleges, become carbon neutral by 2010 through its adoption of a progressive carbon reduction plan in the passing of *Bill 44: GHG Reduction Targets Act* (Penner, 2007 in Groups 21 & 30, 2008). Carbon offsets in B.C. will be available at \$25 per tonne of GHG emissions in 2010, and this price is projected to increase in the future (Cited in Group 30, 2008).

Arizona State University (ASU):

- ASU has committed to carbon neutrality within two years of completing a GHG inventory (ASU, 2007 in (Group 21, 2008).

Evergreen State College, Washington:

- By 2020, Evergreen has made a commitment to be carbon neutral and a zero-waste facility. To date, Evergreen has established a target to increase local food purchases to 40% by 2010, and currently has an organic farm that produces enough food to supply the campus food service. Furthermore, all students pay a fee in order for the campus to rely entirely on green energy, such as geothermal and wind power (ESU, 2007 in Group 12, 2008).

Oberlin College:

- Oberlin has conducted a GHG inventory and has found that agriculture and food accounted for 91 tons of CO₂ per year, or 0.18% of the total campus emissions (excluding emissions from food service buildings). Oberlin is one of the few campuses who have included food in their GHG inventory, and has provided some recommendations for reducing food system emissions, including retrofit options for vending machines that can decrease annual energy consumption per machine by 2,000-3,500 kWh (RMI, 2002 in Group 21, 2008).
- Oberlin College found they could save up to 3,500 kWh per machine per year by retrofitting old machines with models such as *VendingMiser's* "SnackMiser" and "Coolermiser" - vending machines installed with sensors that trigger power only when it senses someone within 25 feet of the machine (Group 21, 2008).

Simon Fraser University (SFU):

- SFU has developed a "Local Food Project" which aims to bring more local food to the SFU Burnaby campus, and raise awareness of the benefits of local food as part of their goal to establish SFU as a model sustainable institution (Sustainable SFU, 2008 in Group 30, 2008).

The College of the Atlantic (COA), Maine:

- COA is the first university to achieve carbon neutrality through reduced emissions and purchased offsets and has also set goals for 100% reliance on energy from renewable resources by 2015 (COA, 2007 in Groups 21 & 23, 2008).

University of British Columbia (UBC):

- In 2007, the UBC Sustainability Office launched the Climate Action Partnership (CAP) to find ways to move UBC *beyond* climate neutral. To date, CAP has held a series of roundtable discussions to develop recommendations and targets for climate actions at UBC, and has completed a greenhouse gas emissions profile for UBC examining various contributors of campus emissions to move UBC toward climate-neutrality. However, to date UBC direct food system emissions have not been directly included in the emissions profile (Group 21 & 23, 2008).
- UBC's Sustainability Office completed Canada's largest water and energy retrofit of its kind - *EcoTrek*, which involved rebuilding and retrofitting the infrastructure of nearly 300 academic buildings. to reduce energy, water use and GHG emissions at UBC (Groups 21 & 23, 2008).

- Since September 2004, UBC Waste Management (UBCWMM) has been composting campus organic waste in its large in-vessel composting facility which is capable of processing up to five tonnes of food and landscape waste daily, and is the first of its kind in Canada. It can process pre- and post-consumer food wastes, including meat, grain and dairy as well as napkins, cups and plates. Compost is turned into rich soil that can be used on campus grounds (UBCWMM, 2007 in Groups 23 & 30, 2008).

University of California, Santa Cruz (UCSC):

- UCSC has committed to procurement of local food for dining services that must be grown 250 miles of the university, and has set targets for progressive annual increases regarding the percentage of local food incorporated into menus (UC Santa Cruz, 2004 in Group 21, 2008).

University of Victoria (UVIC):

- UVIC launched a Common Energy Network, a multi-stakeholder cooperative of students, staff, faculty, and regional partners working together to find solutions to climate change problems (Common Energy, 2007). The UVIC team has targeted their goal of going beyond climate neutral through a series of three working groups that support three campaigns: a climate trust fund, a university challenge, and a strategy document (Ferris and Best, 2007 in Group 23, 2008).
- UVIC Common Energy developed the following statement about the importance of a local food economy: "Supporting local food production will increase food security and nutritional content, lower carbon dioxide emissions, support local farmers, diversify our local economy, and build healthy communities" (Common Energy, 2007, p.40 in Group 30, 2008).

UBC's Food System Related Emissions:

- All groups collected some baseline data based upon a review of literature and communication with food system representatives pertaining to UBC's food related emissions. Data was collected for three of UBC food system sectors and is summarized below:

Energy, Buildings and Transportation Related Emissions:

- UBC building operations, commuter traffic, and flights emit approximately 82 750 tonnes of CO₂, and electricity and heating are contributing about 74% of registered emissions on campus. However, no data is currently available to determine what proportion of these emissions is associated directly with campus food production, processing and storage (Ferris & Best, 2007 in Groups 12, 21 & 30, 2008).
- Emissions reductions have been made at UBC through changes in energy usage and changes to buildings such as the Ecotrek retrofit of 277 core buildings, which achieved 24% CO₂ emissions reduction per square meter since 2000 and savings of more than 2.6 million annually (Ecotrek, 2008 in Group 30, 2008).
- According to John Meech (2008), the Director of The Centre for Environmental Research in Minerals, Metals, and Materials at UBC, high-temperature geothermal resources under B.C. have potential to supply 30% of our power needs with clean energy within the next 15 years (in Group 30, 2008).

Waste Related Emissions:

- UBC operates an in-vessel composter capable of handling 5 tons of organic pre and post consumer waste per day. In 2004, the composter was operating well-below capacity as just over one ton per day (UBCWMM, 2008 in Group 21, 2008)⁴. It is estimated that for every percent of discarded food that can be diverted to the composter at UBC, the net reduction in GHG emissions would be 4.6 MTCE (UBCWMM, 2006⁵ in Group 21, 2008). The emissions associated with transportation to, and operation of an in vessel machinery were found to be lower than or comparable to that for transportation to a landfill (USEPA, 2006 in Group 21, 2008).
- According to UBC Waste Management, 12 tonnes of garbage are generated daily - 70% of which can be recycled or composted. According to findings of a 1998 UBC waste audit, UBC landfill waste was comprised of approximately 34% organic material such as discarded food, and if this proportion is maintained, in 2004 it would represent 1843 tons of food waste⁶ (UBCWMM, 2006 in Group 21, 2008).

⁴ Value is based on 200tons/yr from grounds organic waste, 130tons/yr from UBC farm animal waste, and 50.5tons/yr from food discards

⁵ Value is based on 1% of 1843tons of discarded food, and a net benefit of 0.25 MTCE/1wet ton (US EPA, 2006).

⁶ This value represents 34% of the 2005 total tonnage of solid waste.

- Approximately 40% of the landfill waste is made up by disposable containers such as coffee cups and paper plates generated from campus food outlets (Wastefree UBC, 2008 in Groups 21 & 23, 2008).
- Currently UBC's garbage is collected and shipped out to the Cache Creek Landfill which is over 1200 km away, and it is estimated that this waste transportation releases approximately one kilogram of carbon dioxide into the atmosphere with every tonne of waste that is shipped (Naus, 2007 in Group 30, 2008). Deposited landfill waste also continues to release a potent GHG – methane (Gallant, Personal Communication, April 2nd, 2008 in Group 30, 2008).
- UBC Food Service's (UBCFS) has a "Way-To-Go" program that encourages residents to use reusable containers, and reward those that support waste reduction, by distributing a reusable container to each resident. Also UBCFS offers customers a 15 cent discount to customers who bring their own mugs or food containers to any of their outlets. As a result, the use of paper cups has been reduced by 10% (UBC Food Services, 2008 in Group 23, 2008).
- Currently 100% of all pre-consumer food waste is composted at AMS Food and Beverage Department (AMSFBD), and they also offer biodegradable Eco-container cups (Groups 12 & 30, 2008).

Food Procurement Related Emissions:

- UBC food providers have the potential to supply food for 43,579 students and 12,648 staff and faculty at UBC (UBC Public Affairs, 2008 in Group 30, 2008). UBCFS serve approximately 10,000 to 12,000 meals per day (Ferris, 2008), and AMSFBD serves approximately 3,000 (Toogood, Personal Communication, April 2, 2008 in Group 30, 2008).
- UBC Farm sells its products to an increasing number of campus outlets, including: Sage Bistro, Place Vanier, Caffe Perugia, Pie R Squared, The Pendulum, Bernoulli's Bagels, Sprouts and Agora Café. Increased procurement of UBC Farm products to campus outlets have reduced food miles, since they have traveled approximately 2km to get from farm to plate (Group 30, 2008).
- Currently all chicken, bread and whole eggs are purchased from local BC producers, and most beef, turkey and lamb products are sourced from outside the province by both AMSFBD and UBCFS.
- UBCFS purchase 100% of their liquid and whole eggs locally as well as all poultry, and are currently working with a distributors to obtain local organic apples on a year round basis (Group 30, 2008). According to the 2007 Neptune velocity reports, UBC Food Services purchased 3,493 kg of meat, 9,510 kg of poultry and 19, 1203 L of milk (D. Yip, personal communication, April 4, 2008). Many of the meat vendors Neptune currently purchases from are not local, contributed to high food miles for these products and indicated an area of need for improvement in order to reduce their GHG emissions (Group 23, 2008).
- AMSFBD's Pendulum Restaurant's ecological footprint was calculated in 2005, where it was estimated to be equivalent to 340 hectares per year based on an average of 350 customers per day. The largest product contributors to GHG emissions included dairy cheese, since approximately ten litres of milk is required to make one litre of cheese. Furthermore, it was found that refrigerators run 24 hours a day, and the main grill is left on for the entire time the outlet is open (Baynham and Dalton, 2005 in Group 23, 2008).
- AMSFBD's Pie R Squared (PRS) outlet, used a high amount of dairy cheese, with approximately 10 tons of mozzarella cheese purchased every year (Group 23, 2008).
- To reduce GHG emissions from campus food procurement, targeting a reduction in GHG intensive foods, such as meat, dairy and rice is believed to be necessary (Capyk, 2007 in Group 12, 2008).

Food Roundtable Discussion:

- All groups participating in a CAP food roundtable, where a discussion was held with UBC food system representatives about food and climate change to help identify sources of emissions, and to obtain input about strategies for reducing the impact of the UBC food system to contribute to the goal of moving UBC *beyond* climate neutral. The roundtable was carried out in a "world café" format with four questions distributed for eight tables. Discussions were carried out in four sessions of 15 minutes each, and participants were asked to rotate to various tables to provide everyone the opportunity to respond to every question. Participants included faculty, staff, students, and some pertinent UBC food system actors. Representatives from the class were hired to take notes at each table during the session, which would be later summarized, and a series of recommendations and targets for climate actions at UBC would ideally be established. Based upon this roundtable discussion, the following four questions were asked and summaries of common responses are outlined below:

Question 1: *We know much better how to reduce emissions than we do how to measure them. What food items known to have lower emissions can be provided in the short run by UBC food providers?*

Responses:

- Most groups felt that foods that are animal-based, processed, cold stored, packaged, intensively produced (tillage, hothouse, and fertilizer), and distributed long distances or by plane are primary contributors to GHG emissions; however, there was much debate about each of these factors (Group 21, 2008).
- Foods that do not need refrigerated transport or storage, fresh foods, and foods that have less waste associated with their consumption were believed to contribute to lower GHG emissions (Group 30, 2008).
- Beef and dairy production was identified as having a larger impact as it has high energy inputs and produces methane gas (Groups 12 & 30, 2008).
- Foods that are canned, fresh or dried were expressed to contribute to lower GHG emissions than frozen foods (Group 12, 2008).
- Foods that are transported by boat and rail were expressed to contribute to lower GHG emissions than those transported by plane (Group 12, 2008).
- Foods derived from wetland agriculture were expressed to have high GHG emissions (Group 12, 2008).

Question 2: *What does a Beyond Climate-Neutral Food System look like at UBC?*

Responses:

- Many respondents described an ideal beyond climate neutral UBC food system to be one that maximized its food production by utilizing edible landscapes and rooftop gardens, included no food franchises, food outlets relied on energy efficient technologies, promoted local and seasonal foods, all food sold would carry labels that indicate their carbon footprint (i.e. GHG gases or carbon inputs needed to produce, transport and process items), food providers play an active role in shifting customer demand away from high GHG food items such as meat, and all organic materials are composted, and all food packaging is reusable rather than recyclable or biodegradable (Groups 12 & 21, 2008).
- Also, respondents envisioned the establishment of a proactive policy and administration towards climate neutrality and beyond. This policy was envisioned to include: campus-wide local food procurement policy for food providers, compost bins available in every building with mandatory custodial staff training to collect compost from all buildings, policies in place to ensure energy efficiency in all core UBC buildings (Groups 12 & 30, 2008), and policies to gradually phase out foods flown by plane (Group 12, 2008).

Question 3: *What are the targets and indicators that we can set for a beyond climate neutral food system?*

Responses:

- Many useful indicators were discussed, but relatively few targets were generally offered because of a lack of information about the baseline values. Many participants felt that the proportion of local and high GHG producing foods being sold at both UBCFS and AMSFB was a good indicator, but few specific targets were offered. Other indicators brought up include the amount of food that is being produced on campus, customer knowledge of GHG emissions associated with food items, number of franchises, percentage of organic waste being composted, and amount of electricity being used by food service operations (Group 21, 2008).
- Some specific targets cited included: increasing the amount of local food sold on campus to decrease the GHG emissions associated with foods sold, with an indicator of establishing a baseline percentage of local foods sold on campus and increasing this percentage over a period of time. Also, reducing the amount of unsustainably produced food purchased was cited as a target to be monitored by establishing standards for the percentage of foods sold at each food outlet that can be produced in sustainable ways. Reducing the energy used for refrigeration of food products was suggested as a target to be measured by the amount of electricity and fridge space being used. Also, using more efficient appliances at campus outlets was suggested as another target with the indicator being electricity usage. Finally, setting a target for 100% of all food that can be composted or recycled be placed in the proper system was suggested, with indicators including monitoring the amount of recyclables in the waste system or monitoring the amount of compost the UBC composter is creating (Group 12, 2008).

Question 4: *What are some food system best practices (at UBC or elsewhere)? What current opportunities do we have for immediate and long term action? How can we act on this?*

Responses:

- Participants recognized UBC a number of sustainability initiatives that the campus is showing unique leadership in such as the in-vessel composting facility, the Sustainability Office, the AMS lighter footprint strategy and unique operations such as the UBC farm and Sprouts (Group 21, 2008).
- Many areas for suggested improvement were expressed, including: sourcing more food products from local distributors, establishing transportation quotas for food outlets, facilitating more on-campus food production, creating energy reduction strategies for the food sector, such as using more efficient technologies, and unplugging unnecessary equipment at night. Also, it was frequently cited that more efforts need to be made to divert relatively high levels of organic waste being directed to the landfill to the composted by increasing number of campus compost bins and awareness of their locations (Group 21, 2008).
- It was believed that more emphasis needed to be placed upon creating awareness and support for the many current sustainability initiatives already in place at UBC, such as composting, local food procurement, and food systems sustainability research. Many participants believed that consumer behavior patterns towards our food system need to change, by raising public awareness, finding ways to increase the availability and demand for sustainably produced seasonal local food, and promoting lifestyle changes that promote sustainability (Group 30, 2008).
- Some specific strategies that were cited to help improve the sustainability of the campus included: raising current discount given at UBC outlets for bringing containers and cups, creating seasonal menus, phasing out the most unsustainable foods on campus, creating strict purchasing policies concerning sustainability of food sources, increasing food producing land on campus, and creating more incentives and penalty strategies that could help to change customer behaviors to act more sustainably (Group 12, 2008).

Targets:

- All groups developed a set of preliminary campus food system targets⁷ that will help move UBC beyond climate neutral. Targets were developed based upon a review of secondary sources, roundtable discussions and interviews with campus food system actors. Specifically, targets were developed for three food system categories including food, energy and waste, as well as some corresponding indicators and baseline information about their current status which summarized below:

Food Targets, Indicators and Current Status:

- **Target:** Progressively increase the average percent of local BC foods purchased annually by UBC Food Services and AMS Food and Beverage Department to 50% by 2015 in the following increments:
 - 2008-09: 2.5% increase from current baseline
 - 2009-10: 5% increase from current baseline
 - 2010-11: 10% increase, etc.
- **Indicator:** Annual average percent of food used by UBCFS or AMSFB that is obtained from local source
- **Current Status:**
 - A maximum of 28% of UBCFS' purchases originate from local sources (SEEDS report, 2004).
 - A maximum of 23% of AMSFB purchases originate from local sources (AGSC 450 Group 2, Summer 2004 in Group 21, 2008).
- **Target:**
 - Increase the percent of vegan and vegetarian options by 10% in residence dining halls and all non-franchise food service outlets, to decrease animal based items that are more GHG intensive.
- **Indicator:** percentage of vegetarian and vegan options in menus.
- **Current status:**
 - UBCFS outlets currently have an average of approximately 44% vegetarian and 13% vegan menu options (AGSC 450 Group 11, 2006 in Group 21, 2008).

⁷ Note that significant overlap existed between group's reported targets and recommendations making it difficult to differentiate into distinct sections. Thus targets were summarized in both of these sections in this report.

- **Target:**
 - Reduce the percentage of income that UBCFS receives from its franchises and snack bars to 26% by 2020 to enable UBCFS more control over purchasing and packaging used in these food outlets.
Indicator: Percentage of revenue obtained from franchises.
Current status:
 - 36% of total revenue for UBCFS is from franchises and snack bars (Capyk, 2008 in Group 21, 2008).
- **Target:** Increase campus food production and develop a local food processing center (Group 30, 2008).
- **Target:** Decrease the number of franchise food service outlets on campus that do not adhere to climate neutral practices (Group 30, 2008).

Waste Targets, Indicators and Current Status:

- **Target:**
 - Decrease the amount of compostable or recyclable waste going to landfills from UBC by 2015.
 - Decrease organic waste from 35% to 15%.
 - Decrease disposable container waste from 40% to 20%.
- Indicator:** Percentage of waste types from the UBC food system.
- Current status:**
 - 75% of UBC's current waste stream can be composted or recycled.
 - 35% of UBC's current waste stream is organic material that can be composted.
 - 40% of UBC's current waste stream is generated from disposable containers (Wastefree UBC, 2008 in Group 21, 2008).
- **Target:**
 - Enable 90% of UBC's food system waste stream to be composted or recycled by 2015 (Group 30, 2008).
- **Target:**
 - Create a campus wide social marketing program to promote recycling and composting (Group 30, 2008).
- **Target:**
 - Improve receptacle and manpower availability to deal with increased recycling and composting materials (Group 30, 2008).

Energy Targets, Indicators and Current Status:

- **Target:**
 - Reduce energy use by 2015 in all food outlet buildings through the replacement of appliances, lighting and cooking practices with more energy efficient options.
Indicator: Percentage of energy savings for each food outlet building.
Current status: unavailable (Group 21, 2008).
- **Target:**
 - Increase energy efficiency of all appliances in food service outlets (Group 30, 2008).
- **Target:**
 - All new buildings are built to the highest sustainable building practices (i.e. Gold LEED) (Group 30, 2008).

Key Recommendations:

UBC Administration:

- Consider developing a campus-wide sustainability policy that exceeds the current UBC Sustainability Strategy and provincial regulations pertaining to climate neutrality in order to establish UBC as a global leader in sustainable food systems. The policy should be collaborative and be made up of multiple lead stakeholders across sectors including: policy makers and administration, UBC Waste Management (UBCWMM), UBC Food Services (UBCFS), AMS Food and Beverage Department (AMSFBD), and the UBC Sustainability Office. The sustainability policy should encompass building standards, energy efficiency, food procurement, and waste management sectors. Some examples of specific strategies that this campus wide policy should address include:

- Seek to promote sustainable campus development by requiring all new building developments and existing projects renovations to be built according to the highest LEED certification standards.
- Seek to promote an increase of institutional capacity thorough regulation and monitoring of campus food related GHG emissions.
- Develop specific targets for current food service sustainability initiatives such as composting and local food procurement, and provide support and incentives for meeting those targets.
- Establish sustainable purchasing standards for food service outlet appliances.
- Develop research initiatives that can help fill existing knowledge gaps about the GHG emissions of food to help UBC make progress in reaching carbon neutrality in the food sector and to help UBC demonstrate true leader in sustainability (Group 30, 2008).

Climate Action Partnership (CAP):

- Consider creating a co-operative group to work with the various food providers on campus to help retrofit existing retail spaces, and to coordinate specific projects and provide advice to help UBC food providers become climate neutral (Group 23, 2008).
- Organize and facilitate monthly or bi-monthly meetings to bring together key UBC food system stakeholders to address and discuss sustainability issues, collaborations, and improvements within their respective organizations, as well as to establish targets that will bring the UBC food system beyond climate neutral (Group 30, 2008).
- Consider reorganizing the current CAP Emissions Inventory to define and include an additional element in scope three – food. Food should represent any GHG emissions that result in the growing, processing, manufacturing, transporting, storing, sale, consumption and disposal of any and all food products that is not accounted for by any other elements of the inventory (Group 23, 2008).
- Consider investigating the potential of creating a processing/preservation facility at UBC or in the Fraser Valley that could supply UBC with locally grown foods to help enhance local food availability, volume, and processing requirements of UBC's large food providers. Specifically, local foods could be stored in this facility, extending their seasonal availability, and processed for UBC's food outlets throughout the academic year (Group 30, 2008).

UBC Sustainability Office:

- Engage more UBC students, staff, and faculty in the beyond climate neutral movement to help reach the CAP targets by instigating more core courses in different faculties that emphasize sustainable practices, such as the Faculty of Land and Food System's Agricultural Sciences (AGSC) 450 class (Group 23, 2008).

UBC Food Providers – UBC Food Services (UBCFS) and Alma Mater Society Food and Beverage Department (AMSFBD):

- Change menus to decrease the amount of animal products used to help lower GHG emission contributions (Group 12, 2008).
- Conduct a sustainability assessment of current meat producers that supply UBC food providers. Based upon analysis create a list of standards to consider when choosing a livestock producer, such as those that are characterized by lower GHG emissions practices, etc. (Group 12, 2008).
- Set up a score point system to sell foods according to priorities of which food items will produce most GHG emissions (Group 21, 2008).
- Source meat products, as well as dairy, from smaller farm operations which could help reduce GHG emissions (Group 12, 2008).
- Increase procurement of local BC products (Group 12 & 23, 2008) and the amount of local foods incorporated into all menu items across all food outlets (Group 21, 2008).
- Collaborate with all campus food providers to promote local food products by creating local food specials and holding special educational events (Group 23, 2008).
- Consider adjusting menus to include more food products that are currently grown by the UBC Farm (Group 23, 2008).
- Continue to work with the UBC Farm to create menus that promote their food items and create more promotion and advertising about the importance of supporting the UBC Farm (Group 21, 2008).
- Minimize procurement of highly packaged food products to lower emissions and excess waste (Group 21, 2008).

- Collaborate with franchises to use less packaging on food items and more GHG friendly products (Group 21, 2008).
- Ensure that all excess organic food waste created during food preparation is composted (Group 21, 2008).
- Increase awareness of discounts given for reusable containers and mugs through advertising in participating outlets to encourage further waste reduction (Groups 21 & 23, 2008).
- Increase availability, accessibility (especially in high traffic areas) and awareness of compost bins (Group 21 & 30, 2008).
- Consider selling reusable containers and canvas bags to reduce the amount of waste generated (Group 23, 2008).
- Replace cleaning products such as dish detergents, counter and glass cleaners with biodegradable ones (Group 23, 2008).
- Create a strategy to increase composting of post-consumer waste. Specifically, create a point of purchase and point of decision signage that informs customers what items are compostable and where their food waste can be composted. Also, work with staff to ensure that when customers purchase food items in compostable plates and containers that they inform customers directly that they can be composted (Group 30, 2008).
- Consider including a mandatory tour of the in-vessel composter as part of employee orientation to improve awareness of the problems caused with contamination in compost bins, such as from metal spoons, and grease grates (Group 30, 2008).
- Provide ongoing education and awareness on composting and recycling to the UBC community in order to increase campus participation in composting and recycling (Group 21, 2008).
- Replace all worn out appliances with more energy efficient alternatives (i.e. *Energy Star*) (Groups 21 & 23, 2008).
- Replace all lights with long-lasting energy efficient light bulbs in all food outlets and turn off lights when not in use (Groups 21 & 23, 2008).
- Work with BC Hydro to retrofit current conventional tank water heaters to tankless ones to help reduce energy use (Group 23, 2008).
- Reduce the use of refrigerants, by providing more fresh foods and reduce the use of air-conditioners whenever possible (Group 21, 2008).
- Unplug vending machines at night or use more energy efficient versions such as those available at Oberlin College (VendingMiser's "SnackMiser" and "Coolermiser") which save up to 3, 500 kwh per machine a year through the use of sensors where power is only triggered on when someone is sensed within 25feet of the machine (Group 21, 2008).

UBC Food Services (UBCFS):

- Decrease the proportion of franchises to UBCFS run outlets to increase control over operations (Group 21, 2008).
- Increase the number of recycling depository bins in all residences (Group 23, 2008).

Alma Mater Society Food and Beverage Department (AMSFBD):

- Increase the availability and usability of compost bins near all AMSFBD food outlets (Group 21, 2008).

UBC Farm:

- Establish a staff member position to work with UBC food providers to both purchase and promote UBC Farm food products (Group 23, 2008).
- Consider diversifying crops to help meet demands by UBC food providers for diverse food menu item offerings (Group 23, 2008).

UBC Campus & Community Planning:

- Use EcoTrek guidelines to retrofit all food service outlet buildings to increase energy efficiency (Group 21, 2008).
- Preserve current on-campus food production areas such as the UBC Farm, and increase opportunities for creation of urban agricultural land designated areas, as well as edible landscapes (Group 21, 2008).
- Consider incorporating green roofs and/or edible rooftop gardens on new building developments, to help increase building energy savings and opportunities for increased campus food production (Group 21, 2008).

- Try to increase campus use and opportunities for renewable energy and “clean” energy sources (ex. solar, wind, etc.) (Group 21, 2008).

UBC Waste Management:

- Consider conducting a waste audit to determine how much material is currently being composted in the in-vessel composter, how many potential carbon emissions are being diverted through this process, and the maximum capacity of the composter. A waste audit of this type could help maximize and promote composting opportunities and quantify subsequent reductions of GHG emissions that may occur through improved waste management (Group 30, 2008).
- Begin tracking the number of contaminated bins coming from each UBC food outlet to help identify problem outlets which could help alleviate future contamination problems (Group 30, 2008).

Scenario 2: Creating Sustainable Food Procurement Targets for the “Alma Mater Society (AMS) Lighter Footprint Strategy” (Groups 6, 18, 19 & 27)

Objectives:

- To inform the development of the “Alma Mater Society Lighter Footprint Strategy” (AMSLFS), specifically in developing targets and action plans for the AMS Food and Beverage Department (AMSFBD) that would help enhance the sustainability of their operations.

Specific Objectives:

- To create targets and action plans that would enable AMSFBD to reduce their ecological footprint by creating local and sustainable food procurement targets (Group 6 & 27, 2008).
- To create targets and action plans that would enable AMSFBD to reduce waste, as part of the AMSLFS, such as by increasing awareness about existing composting and recycling programs, creating harmonization among various waste management signs throughout campus, and promoting the use of reusable containers (Group 18, 2008).
- To determine how AMSFBD can lighten its ecological footprint by working with existing food suppliers (Group 19, 2008).

Central Findings:

Literature Review:

- All groups conducted a review of sustainability practices at other campuses across North America. Based upon this review as well as interviews conducted with representatives from these campuses, the following was found:
 - A growing number of campuses have implemented sustainability initiatives, including: Carleton College, Harvard University, Middlebury College, University of Vermont, University of Washington (Group 6, 2008), Concordia University, Simon Fraser University, University of Victoria, University of California at Santa Barbara, Dartmouth College, Yale University (Group 18, 2008), University of Toronto, Queens University, University of California, Santa Cruz (Group 19, 2008), and the University of Guelph (Group 27, 2008). A description of some notable campus sustainability initiatives are described below:

Carleton College, Minnesota:

- Carleton College adopted an “Environmental Statement of Principles”, and has a number of sustainable procurement initiatives, ranging from purchasing 100% organic flour for baked goods, 100% grass fed beef products, to purchasing local produce from 15-20 local farmers and producers (Sustainable Endowments Institute, 2008 in Group 6, 2008).

Harvard University, Massachusetts:

- Harvard sources approximately 35% to 70% of produce served in their dining hall from seven local farms and 60 local producers (Group 6, 2008).

University of California, Santa Barbara (UCSB):

- UCSB has made a commitment to creating a sustainable campus food system, which will include “clear guidelines that prioritize local, organic, humane, and socially responsible purchasing as well as waste reduction and green dining facility standards” (CAFS, 2007 in Group 18, 2008).

Yale University, Connecticut:

- Yale created a “Yale Sustainable Food Project” (YSFP) which “aims to nourish a culture in which the interwoven pleasures of growing, cooking, and sharing food become an integral part of each student’s experience” (Yale Sustainability Office, 2008). Yale also created a baseline metrics program where information regarding the current state of the university has been collected, enabling them to benchmark progress (Group 18, 2008).

University of Toronto (U of T):

- U of T partnered with “Local Food Plus” (LFP), a non-profit organization that certifies farmers and processors according to locality and sustainability criteria, and links them to local purchasers, to improve sustainable food procurement on campus. A growing number of campus restaurants and cafeterias are now featuring these products (Group 19, 2008).

Queens University, Ontario:

- Queens University currently sources approximately 35% of its food locally, fluctuating according to seasonal availability. Sodexo Canada operates one its main cafes and is committed to purchasing as locally as possible, and providing nutritional information on all its food items (Group 19, 2008).

University of California, Santa Cruz (UCSC):

- UCSC created a “Food System Working Group” whose objective is to provide the campus community with access to more local and organic food produced from socially responsible growers. The Food System Working Group has created food procurement guidelines for their Dining Services to adopt, which encompasses priorities to buy local, seasonal, certified organic, humanely produced animal products, as well as to buy direct, certified fair trade, and from worker supportive producers (UC Santa Cruz, n.d., in Group 19, 2008).

University of Guelph, Ontario:

- Guelph Hospitality Services (GHS) serves as the University’s main food provider. GHS is a self supporting department who manage seven campus dining facilities and two retail shops, serving 18,000 meals per day. GHS’s have created a vision statement which stipulates their desires “to be recognized as the leader for local sustainability practices in a Canadian university hospitality operation becoming more environmentally responsible while remaining financially viable and satisfying the needs of our customers” (University of GHS, n.d, in Group 27, 2008).
- Other initiatives include the creation of a sustainability plan, where 22 initiatives that encompass many spheres related to sustainability are outlined, from biodegradable food packaging, waste management and recycling, promoting environmental awareness, co-op food purchasing, and supporting local suppliers. The plan also contains 24 future sustainable initiatives with general implementation dates (University of GHS, n.d, in Group 27, 2008).
- GHS considers local sourcing as a primary goal to reduce food miles as well as Guelph’s overall carbon footprint. It was found that approximately 30% of food purchased is from local Ontario suppliers, and up to 41% of produce is sourced locally during Ontario’s main growing season - mid May until October. Specifically 5% of produce is purchased directly from a cooperative - *The Elmira Produce Auction Cooperative (EPAC)*, and approximately 25% is sourced from their regular produce suppliers (University of GHS, n.d, in Group 27, 2008).
- Cited barriers in implementing GHS’s sustainability plan, included: transportation of produce from supply sources such as individual farms, or auctions to the campus and meeting requirements outlined by chefs’ while ensuring the pricing remains competitive. It was determined that Guelph’s chefs work on a three week rotating menu. A considerable amount of time is spent translating crop availability from the farmer to the chef, and requirements from the chef to the farmer. This dialog allows menus

to be adjusted depending on the conditions of the current growing season. While it was noted that a lot of time was spent organizing their current communication system with suppliers and farmers, it was also noted that now the system has been implemented the process is quite efficient (Group 27, 2008).

- Two groups conducted a review of literature about sustainable packaging and practices. Based upon this review as well as interviews conducted with associated representatives, the following was found:
 - The most comprehensive definition for sustainable packaging was found and derived from the *Sustainable Packaging Coalition (SPC)*, where it can be defined as being “beneficial, safe & healthy for individuals and communities throughout its life cycle; compatible with market criteria for performance and cost; sourced, manufactured, transported, and recycled using renewable energy; a maximized use of renewable or recycled source materials; manufactured using clean production technologies and best practices; made from materials healthy in all probable end of life scenarios; physically designed to optimize materials and energy; effectively recovered and utilized in biological and/or industrial cradle to cradle cycles” (SPC 2007, cited in Group 19, 2008).
 - It was found that challenges exist for consumers and distributors to identify products from suppliers even those who engage in sustainable packaging, due to lack of transparency in communicating such initiatives. As a solution, it was found that a “Packaging Scorecard” which measures suppliers’ ability for developing sustainable packaging could help increase this transparency through provision about specific sustainability information of each products packaging. The scorecard measures greenhouse gas emissions related to raw materials packaging production, product to packaging ratio, innovation, cube utilization, recycled content usage, sustainable materials values, amount of renewable energy used in package manufacturing, the recovery value of the raw materials and emission related to the distance required to transport the packaging materials (FPA, 2008, cited in Group 19, 2008). The overall score of each supplier can be used for evaluating the sustainability level of packaging in each product (Group 19, 2008).
- Current takeout ware options used at AMSFBD outlets were investigated, as well as alternative sustainable options that have the lowest ecological footprint. Based upon this review, the following was found:
 - Currently, at least 77% of the 12 tonnes of waste that UBC produces daily can be composted or recycled including post-consumer food waste and some paper takeout containers (UBC Plant Operations, 2007). Up to 5 tonnes of organic waste can be composted daily on campus, enabling a large capacity for compostable campus takeout ware to be composted and diverted from the landfill (Group 18, 2008).
 - It was found that some AMSFBD outlets currently offer compostable paper cups, while others only offer Styrofoam ones, and some outlets offer biodegradable containers for an additional cost. Within the month of February 2007, it was found that the AMS food outlet, *Blue Chip Cookies*, consumed 18,850 paper cups, with an average of 673 cups used per day (Chandran, 2007 cited in Group 18, 2008). This usage equates to approximately 622.05 kilograms of wood, since paper products consume two to three times their weight in trees (Halweil, B., & Nierenberg, D., 2008, cited in Group 18, 2008).
 - It was found that there are several issues to consider in choosing sustainable takeout ware depending upon inputs, origin of product production and manufacturing. Specifically, it was found that:
 - Compostable paper or other biodegradable products, produce little to no waste, however it was found that this also depended upon types and volume of inputs that went into the manufacturing process. Specifically, it was found that petrol consumption must be considered in container manufacturing, where paper cups consume 4.1g of petrol chemicals and 33g of wood chips, foam cups consume 3.2g of petrol chemicals and 0g of wood chips but they cannot be recycled or composted (Chandran, 2007, cited in Group 18, 2008). However, compostable materials can use less energy than non-compostable materials that are sent to the landfill, especially if they are composted from the point of production or consumption as close as possible, such as at UBC, where they provide compost for campus grounds (Group 18, 2008).
 - The origins of materials that are used in production were also found an important factor to

consider. Many biodegradable containers were found to be produced and manufactured overseas, including biodegradable takeout ware currently offered at AMSFBD outlets, which are produced and manufactured in China, resulting in a high ecological footprint due to the use of fossil fuels associated with the long travel distances. Alternatively, locally produced containers can decrease the amount of transportation miles; thereby decreasing greenhouse gases emissions. Overall, it was concluded that a need exists to eliminate all non-biodegradable styrofoam takeout ware and non-local biodegradable takeout ware currently used at AMSFBD outlets, and to replace it with reusable ware and locally produced and manufactured biodegradable ware (Group 18, 2008).

- Alternative options to the biodegradable takeout containers currently produced and manufactured in China and currently offered at AMSFBD outlets were investigated. Based upon this review, biodegradable takeout ware products from a company - *Aspenware* were found to have the lowest ecological footprint. These products are made in British Columbia using gentrified firewood. The company engages in sustainable forestry practices, using fallen BC wood and underutilized trees such as birch. The takeout ware line is 100% natural and can be completely broken down in 65 days. Efforts are made to optimize the use of wood and plans are in place to develop products from surplus or excess materials. The company's plant runs on hydro-electric power and their manufacturing processes emit minimal, if any, carbon (Aspenware, 2008, cited in Group 18, 2008).
- Furthermore, reusable takeout ware options were investigated for the AMSFBD. Based upon this research, one company was found (*Rubbermaid*) that manufactures collapsible, dishwasher and microwave safe containers. It was believed that a need existed to not only reduce waste through providing biodegradable containers, but also to encourage customers to bring their own reusable containers to campus. The containers recommended were deemed user friendly and space efficient for transport (Group 18, 2008).
- A marketing campaign was also developed that would ideally increase awareness and participation in composting and general waste reduction behavior. Specifically, the proposed marketing strategy included the following components listed below:
 - A "composting road sign" was designed to be placed near Student Union Building (SUB) waste bins, outlet exit points, and building entrances that would direct customers to the nearest composting bin in an effort to encourage composting. Signs were based upon "Check Fuel... Next Service Station 5km ahead" road signs, and require calculations be made of the distance between the sign and the nearest compost bin.
 - It was proposed that efforts should be made to raise awareness of current takeout ware that is compostable and recyclable, such as by labeling beverage cups and paper bags for baked goods from the AMSFBD outlet - *Blue Chip Cookies* with phrases such as "compost me" with a stamp or a pressed symbol.
 - A composting button was developed – "Get Caught Composting" for all campus food service staff to wear to help promote composting awareness and participation. It was believed that by having staff wear these buttons they would be encouraged to compost themselves, since it may help them feel an obligation to follow through with the message they are conveying, and also help remind customers to compost.
 - An interactive waste management quiz was created to help students think about the impacts of their waste behaviour. It was proposed that the quiz be published in the *2008-09 AMS Student Agenda*.
 - Proposed that an educational composting game - "Bin Basketball" developed and implemented by AGSC 450 2007 colleagues (Group 21, 2007) be re-established and held in the SUB in each term for the 2008-09 academic year. The game was designed to raise awareness among the campus community about what items can and can not be composted on campus.
 - Proposed that increasing the discount for bringing your own container and mug for AMSFBD customers be considered to enhance incentives for customers to engage in waste reduction behavior.
 - It was proposed that in order to measure the success of proposed marketing and waste reduction strategies, that a waste audit be conducted in the SUB both before and after implementation (Group 18, 2008).

- It was found that currently AMSFBD only has one compost bin in the SUB. It was recommended that if funding is made available a minimum of at least one additional bin be constructed and placed on the main floor of the SUB, with a longer term goal of having a compost bin at every major exit in the SUB. It was suggested that bins be maintained by a student hired by the AMS (Group 18, 2008).
- A review of general sustainable food procurement guides for institutions was conducted, where potential challenges for campus food providers were identified. Specifically, it was found that some anticipated challenges that food providers might face include: budgetary constraints where short-term costs associated with implementing a strategy may exist even when long-term gains are anticipated; on-going management constraints such as supply limitations (i.e. volume and seasonality), service complexity (i.e. frequent menu changes), the integration of social and environmental concerns into procurement (i.e. feasibility of cost increases), and finding indicators of progress, as well as agreed upon targets of success (Group 27, 2008).

Interviews:

- Interviews were conducted with representatives from AMSFBD and one of their main produce suppliers - *Central Foods* to obtain input about current procurement practices. Based upon these interviews, the following was found:
 - Produce items used extensively by AMSFBD include: cucumbers, carrots, broccoli, tomatoes, mushrooms, peppers, onions, and potatoes. It was decided that efforts should be made to determine the origin of these high volume products and determine the potential to source them locally from November to March, since this constitutes a time period when most items are not sourced locally, creating a high ecological footprint (Group 6, 2008).
 - Only small red potatoes, alfalfa, and bean sprouts are sourced locally during the winter months, and mushrooms constituted the only product that is sourced from BC year round. Cucumbers, carrots, broccoli, tomatoes, peppers, and onions supplied to the AMSFBD, were all found to be imported (Group 6, 2008).
 - Central Foods does not currently supply any products that are both organic and BC grown, with the only organic item provided as spring mix salad, which is grown in California. Willingness was expressed by *Central Foods* to accommodate requests for organic foods by AMSFBD, if requests were made with adequate advance notice (Group 6, 2008).
 - Reasons cited by *Central Foods* for sourcing imported foods included, price, availability and quality (Group 6, 2008).
- Face-to-face interviews were conducted with representatives from AMSFBD to gather input and information about current challenges in existing sustainability initiatives and in implementing new ones. Based upon interviews, the following was found:
 - According to AMSFBD, a marketing plan should be created to promote the composting and recycling programs that already exist in the SUB (Group 18, 2008).
 - Currently, only one composting station is available for all AMS food outlets, located in the basement of the SUB. This was considered insufficient accessibility for the current volume of customers, and a need was expressed for the implementation of more stations. Main barriers cited in increasing composting bins were mainly issues of cost and maintenance issues. It was found that the current compost bin is maintained by a staff member who volunteers an extra 20 minutes to empty the bin in off work hours. Furthermore, it was found that the cost of constructing the existing side by side composting bin was \$1000 for materials, which was believed to be unaffordable at this time to seek additional funds to build more bins at this rate (Group 18, 2008).
 - Current challenges expressed by AMSFBD representatives regarding implementing sustainable food procurement policies, targets, and actions included: lack of suitable storage capacity units to keep produce for extended periods of time, labour constraints where staff are already overworked, posing difficulties in asking additional time contributions dedicated to initiating better sustainable procurement policies, financial constraints where the current budget restricts hiring of additional staff to help with such initiatives, lack of acquisition capacity to buy local produce where AMSFBD only has access occasionally to a truck for direct farm produce pickups, customer demands, whereby customers demand products that do not correspond with seasonality, such as caesar salad in January, tomatoes in December, etc., and finally inability of the AMSFBD to track what produce is coming from where and

to consequently evaluate what percentage of their produce is local, creating difficulties in establishing a clear baseline or evaluation mechanism to track change in the system (Group 27, 2008).

- Current potential opportunities expressed by AMSFBD representatives regarding implementing sustainable food procurement policies, targets and actions include: enthusiasm expressed to be perceived as a leader among sustainable food service providers in academic institutions, potential to use AMSFBD's buying power to influence product suppliers buying practices to source more sustainable products, flexibility in changing suppliers since AMSFBD does not enter into binding contracts with suppliers enabling additional leveraging power to stipulate sustainable sourcing demands, etc., opportunity for local harvest extension storage space in designing plans for the new Student Union Building Renewal Project, and menu flexibility to substitute products for more local and seasonal produce (Group 27, 2008).
- Interviews were conducted with representatives from AMSFBD's two main produce suppliers, *Central Foods* and *Allied Foods* to gather information about current procurement practices and perceived challenges and opportunities. Based upon these interviews, the following was found:
 - Produce items currently sourced in highest volume include: carrots, onions, potatoes, peppers, cucumbers, mushrooms and lettuces (Group 27, 2008).
 - Both produce suppliers indicated willingness to accommodate the needs and any special requests outlined by the AMSFBD. *Central Foods* indicated that they are willing to accept orders for local foods as specialty items; and *Allied* is willing to work with the AMSFBD to procure as much local produce as possible if the produce meets the company's acquisition standards (Group 27, 2008).
 - *Allied Foods* indicated that when both local and non-local produce sources are available, local sources seem to be 10-15% cheaper than the non-local ones, mainly due to decreased freight charges, particularly related to fuel costs. However, *Allied* reported that in a given year they procure approximately 80% of their produce from the United States, namely California (Group 27, 2008).
 - Constraints in procuring local produce from growers for both Central and Allied Foods, included: uncertainty in length of advance notice given by local suppliers regarding when and where products are going to be available; making it more desirable to source products at an industrial scale from growers in areas that can produce year round such as California, inconsistencies in product supplies and quality from smaller local growers, handling convenience concerns, where many suppliers do not want to receive products with stickers on them such as *BC Hothouse* tomatoes, inability to meet volume demands, provincial climatic factors, where BC's prime harvest season is from June to early October characterized by temperature, precipitation and daylight constraints (Group 27, 2008).
 - *Central Foods* provided the most explicit information about product origins. The following is a list of products and their origins that AMSFBD currently procures in the highest volume:

<i>Cucumbers:</i>	<i>Other:</i>
• <i>BC Hothouse</i> Long English Cucumbers (B.C in small amounts)	• Mushrooms (B.C. year-round)
• Cheaper priced Long English Cucumbers (bulk from Mexico)	• Peppers (Mexico)
• White Spine Cucumbers (Mexico)	• Onions (Washington and Mexico)

<i>Carrots:</i>	<i>Potatoes:</i>
• Snap Top Medium Carrots (California)	• Small Red Potatoes (BC for 10months/year)
• Jumbo Carrots (California)	• Bakers Potatoes (80-count, from Washington)
• China Jumbo Carrots (China)	• Green Leaf Lettuce (California) (Group 27, 2008).
- It was shared that typically product sources do not change year round because establishing relationships with local suppliers was considered unfavorable and timely. Currently all mushrooms are sourced from BC, and small red potatoes are sourced from BC 10 months of the year, because it is too cold during the other three months and farmers' stored supplies tend to run out. Onions are sourced from Washington and Mexico, because it was found that local onions have high water content due to BC's wet climate resulting in finished product problems. All peppers are sourced from Mexico, mainly due to cheaper prices compared to those offered by BC Hothouse (Group 27, 2008).

Surveys:

- Developed and administered a survey to determine waste reduction behavior among the UBC faculty, students and staff, and support for participating in specific sustainability initiatives, such as a reusable container program. The survey was administered to 49 students, staff and faculty in the eating area of Pacific Spirit Place in the SUB. Based upon survey results, the following was found:
 - 41% of respondents indicated willingness to buy a reusable container.
 - 46% of respondents that did not bring their own container indicated willingness to purchase one from the AMS.
 - 25% of respondents that did bring their own container also indicated willingness to purchase an additional one from the AMS.
 - When asked about what factors would encourage respondents to bring their own container to campus, the following responses were cited: Larger bring-your-own container discounts (34%), option to purchase space efficient reusable containers in the SUB (17%), information about how much waste is produced from disposable containers (15%), other (13%), more information about the importance of reusable containers (11%), and access to sinks in the SUB (9.5%) (Group 18, 2008).

Targets:

- Based upon the above findings derived from literature reviews, interviews and surveys, all groups developed internal and/or interactive targets to inform the development of the "AMS Lighter Footprint Strategy" (AMSLFS). Targets were either directed towards AMS and/or AMSFBD, and are outlined below:

Internal:

- Source produce from the closest source possible, except if it is greenhouse grown, in which case products should be sourced from the next closest location (Group 6, 2008).
- Consider implementing an "overseas only if necessary policy" where products are only sourced from overseas if they are not produced or available in North America (Group 6, 2008).
- Before accepting supplier relationships, stipulate the necessity for provision of information regarding product origin, and methods of production (greenhouse grown, organic, etc.). Also request the necessity to provide information about other initiatives such as efforts to reduce greenhouse gas emissions, use of biodiesel fleets, etc. (Group 6, 2008).
- Seek to incorporate more organic foods in outlet menus (Group 6, 2008).
- Seek to identify a certain proportion of food that can be sourced by socially, ecologically conscious producers (Group 6, 2008).
- Seek to establish a second compost bin on the main floor of the SUB by the end of fall 2008, and hire a student to maintain bins at an hourly rate. Seek additional funding to establish compost bins at every major exit in the SUB by the beginning of 2010 (Group 18, 2008).
- Implement Group 18's proposed waste reduction strategy. Specifically, consider replacing current biodegradable takeout ware with the *Aspenware WUN Product Line*, as soon as possible. Purchase a sample of recommended *Rubbermaid* collapsible containers and begin selling them at AMSFBD outlets by fall of 2008. Increase the current discount for bringing reusable containers to AMSFBD outlets and implement proposed "Composting Road Signs" widely in the SUB at all waste bins, building entrances and specific outlet exit points. Establish a committee to implement the interactive composting game "Bin Basketball" in the SUB, twice in term 1 (September to November) and once in term 2 (January to March) to educate people on proper composting procedures at UBC (Group 18, 2008). Label all compostable paper bakery bags and cups with a stamped or pressed phrase – "compost me" within the next two years. Print Group 18's proposed composting quiz in the upcoming *2008-09 AMS Student Agenda* (Group 18, 2008).
- Agree upon and provide a clear definition of the term 'local' for the AMSFBD by September 2008, to help track and ensure that products meeting this criteria are being purchased (Group 27, 2008).
- Publicly recognize that mushrooms purchased from *Central Foods* are 100% local year round (Group 27, 2008).

Interactive:

- Begin harmonizing all composting and recycling signage between UBCFS and AMSFBD food service outlets by fall 2008 (Group 18, 2008).

- Hold discussions between UBCFS and AMSFBD about the potential of having all food service staff wear Group 18's proposed "Get Caught Composting" button. If deemed desirable, aim to have all staff wearing them by fall 2008 (Group 18, 2008).
- Begin discussion with UBC Waste Management to perform a waste audit in the SUB as soon as possible. Aim to have an audit conducted to determine the impact that composting bins are having on the amount of compostable material found in the garbage both prior and after implementation of proposed increased compost bins and marketing strategy components (Group 18, 2008).
- Work with current suppliers to become more sustainable, by asking them to provide more transparency in products by asking for identification of product origins, about why certain products are being sourced from long distances, and about the ethics of sources (Group 19, 2008).
- Require that AMSFBD suppliers provide information on their packaging by using the "Packaging Scorecard", as soon as possible with results to be used to identify suppliers who are working toward more sustainable packaging practices (Group 19, 2008).
- Create a food purchasing committee with representatives from AMSFBD, UBC Food Services (UBCFS), and UBC Farm, etc. The committee could serve as a forum to discuss challenges and opportunities in increasing sustainability of operations, and could allow for network building opportunities, etc. Meetings should be held on a regular basis to provide updates and to establish good working relationships (Group 19, 2008).
- Conduct ongoing research to determine a list of product suppliers who practice sustainability that can meet the needs of AMSFBD (Group 19, 2008).
- AMS should consider increasing accessibility to sustainable fresh food on campus, by investigating the feasibility of holding a regular food market near the SUB, where local producers and growers could sell local goods to the campus community (Group 19, 2008).
- Develop a tracking system in coordination with AMSFBD's primary produce supplier - *Central Foods* to electronically track both the volume and geographical source of produce sourced within BC. Begin by tracking eight high volume items used by AMSFBD (carrots, tomatoes, onions, cucumbers, peppers, potatoes, mushrooms and lettuces), and complete process by September 2010. Tracking information will enable AMSFBD to create a strong baseline of current local food procurement, creating clear opportunities for areas of improvement (Group 27, 2008).
- Specify the desire to purchase local products when in dialogue with suppliers and request relative price differences between local and non-local produce (Group 27, 2008).
- Express the need for additional storage facilities in the SUB Renewal Project immediately for local crop extension during the approaching project design phase (Group 27, 2008).

Key Recommendations:

AMS Food and Beverage Department:

- Continue to purchase 100% local mushrooms year round with *Central Foods* (Group 6, 2008).
- Conduct formal marketing research on customers' preferences and willingness to pay more for a sustainably produced meal (Group 6, 2008).
- Increase awareness of current AMSFBD sustainability initiatives by making signage of initiatives visible, ensuring signage is not removed, and that staff are trained on the placement of signage (Group 6, 2008).
- Create a purchasing policy whereby bids for produce contracts are only accepted if suppliers are able to provide information on product origins. Efforts should be made to purchase produce from the closest organic source that are not greenhouse grown, and no products should be purchased that are imported from overseas unless necessary (i.e. product is not grown on this continent) (Group 6, 2008).
- Ask *Neptune* supplier to request product information (i.e. origin of the ingredients) from their suppliers and provide this to AMSFBD, and include on all reports (Group 19, 2008).
- Require suppliers to provide information on their packaging by using the recommended "Packaging Scorecard". Results can be used to identify suppliers who are working toward more sustainable packaging practices (Group 19, 2008).
- Create a food purchasing committee with representatives from AMSFBD, UBCFS, and UBC Farm, etc, to facilitate potential purchasing relationships when looking for suppliers (Group 19, 2008).
- Conduct further research to determine food suppliers who rank highest in sustainability practices to aid in the development of criteria when selecting suppliers (Group 19, 2008).

- Seek funding to construct additional compost bins in the SUB, and to hire a student at an hourly rate to maintain the new bins (Group 18, 2008).
- Work with UBC Waste Management to perform a garbage audit, similar to the audit conducted by Felder in 1998 to determine the impact that composting bins are having on the amount of compostable material found in the garbage (Group 18, 2008).
- Consider replacing current biodegradable takeout ware with *Aspenware WUN Product Line*, which could significantly reduce AMSFBD's ecological footprint (Group 18, 2008).
- Increase composting awareness in the SUB by implementing Group 18's proposed "Composting Road Signs". Before signs are implemented, distances between compost bins and signs must be calculated, and a waste audit of total organic waste that ends up in garbage bins should be performed prior to implementation to determine strategy's success (Group 18, 2008).
- Purchase a sample of recommended *Rubbermaid* collapsible containers by fall 2008 and consider selling at a few AMSFBD outlets on a trial basis. The containers should be promoted in a marketing campaign that advertises the container and the incentives of using one, such as the reusable container discount. If the strategy is successful then consider selling these containers at all AMSFBD outlets by spring 2009 (Group 18, 2008).
- Consider working with current suppliers to develop labels or logos with the "compost me" phrase for all paper cups and bags. If a substantial cost is associated with implementation, consider seeking sponsors who could be recognized for their contribution, by having phrases like "sponsored by XXX" placed on the cups and bags (Group 18, 2008).
- Consider printing Group 18's proposed composting quiz in the *2008-09 AMS Student Agenda* (Group 18, 2008).
- Consider the feasibility of establishing a committee to implement the interactive composting game "Bin Basketball" in the SUB for the 2008-08 year (Group 18, 2008).
- Determine a baseline of origins of produce procured to enable the establishment of specific quantitative targets that can emerge from the existing general qualitative targets (Group 27, 2008).
- Establish a hierarchy of preferences that should be addressed when establishing targets. Specifically assign preferences based on a product's various core characteristics such as its geographic source (regional, provincial, national or international), farm source ownership type (independent, cooperative or corporate), and the farming practices used in its production (organic, integrated pest management or conventional). Assigning well defined targets priority levels can allow an institution to measure the performance of each goal independently to facilitate categorical comparisons and to track annual achievements and challenges (AASHE et al., 2007, in Group 27, 2008).
- Create an action plan to guide the process for achieving listed targets. The action plans should specify who will do what and when, along with a corresponding timeframe of implementation and anticipated completion. Both short and long-term strategies should be included within the action plan (Group 27, 2008).
- Create an evaluation plan for established indicators that will enable one to determine which targets have been achieved, etc. Once a tracking system is implemented devise an annual evaluation plan for local food procurement. The evaluation process can allow for the identification of challenges and opportunities, helping to create a clear picture for areas of improvement (Group 27, 2008).
- Improve communication of sustainability efforts and accomplishments. Specifically, improve the accessibility of AMSFBD's listed sustainability efforts, by making it a central feature on the AMS website, where efforts and accomplishments are frequently updated (Group 27, 2008).
- Investigate enhanced transportation options. Specifically, further investigate the ability for AMSFBD to secure use of a UBC vehicle for local food product purchasing on a regular basis. If deemed feasible, use the vehicle to pick up local produce from local farms that are not able to deliver to UBC (Group 27, 2008).

AMS Food and Beverage Department and UBC Food Services:

- Replace plastic utensils with biodegradable *Aspenware WUN* wood utensils. Look for corporate sponsorship to offset the cost (Group 18, 2008).
- Harmonize composting and recycling signage between all campus food service outlets. Consider using the same signs that AGSC 450 2007 colleague's (Group 8, 2007) created for *Caffe Perugia* throughout campus (Group 18, 2008).
- Discuss the potential of having all UBCFS and AMSFBD food service staff wear Group 18's proposed "Get

Caught Composting” button (Group 18, 2008).

Scenario 3: Exploring Ways to Lighten Alma Mater Society (AMS) Food and Beverage Department’s Ecological Footprint (Groups 5, 15, 24, 28 & 29)

Objectives:

- To inform the development of the food system component for the “AMS Lighter Footprint Strategy”, by investigating alternative menu items at a selection of AMS Food and Beverage Department (AMSFBD) outlets that could lighten their ecological footprint. Some suggestions that needed further investigation included increasing the selection of “lighter footprint” menu options such as items that do not contain dairy or beef products.

Specific Objectives:

- To propose ways that AMSFBD could decrease their ecological footprint at its food outlets, including: *Pie R Squared* (PRS) (Group 5, 2008), *Blue Chip Cookies* (Group 15 & 28, 2008), and *The Pendulum* (Group 24 & 29 2008), as well as their food procurement practices for all food operations (Group 28, 2008).

Central Findings:

Literature Review:

Ecological Footprint Analysis of Food Products:

- All groups conducted a literature review of ecological footprinting analysis, and more specifically the relationship between food products and humanity’s ecological footprint was investigated. Based upon this literature review, the following was found:
 - Currently, humanity's ecological footprint is 23% higher than the estimated sustainable level, thus highlighting the need for its reduction (Global Footprint Network, 2007 in Group 15 & 29, 2008).
 - Approximately 30% of our ecological footprint can be attributed to food-related activities (Wackernagel and Rees, 1996 in Group 5, 2008). Many factors contribute to the ecological footprint of food products, including the distance food has traveled, the quantity of resources used to process it, and how many consumable calories are left from all the combined efforts (Group 5, 2008).
 - Foods derived from animal products have a high ecological footprint, with 70% of grains grown in the US being directed to animal feed, many of which are grown with the use of fertilizers and pesticides. Approximately one-third of all raw materials and fossil fuels used in the US are dedicated to animal production. Raising animals for food consumes more than half of all the water used in the United States, is responsible for 85 percent of U.S. soil erosion, and requires approximately 2,500 gallons of water to produce a pound of meat, compared to about 25 gallons required to produce a pound of wheat. Twenty times more land is required to feed a meat-eater than to feed a pure vegetarian (PETA, n.d in Group 5, 2008).
 - Foods that require less transportation and resources for production were found essential to reducing the ecological footprint of our food, as well as reducing dietary intake of animal based products such as meat and cheese products (EHPHP, 2007 in Groups 5 & 15, 2008).
 - Between 1961 and 2003, the ecological footprint of an average Canadian nearly doubled to 7.6 gha, giving Canada the fourth highest ecological footprint in the world. If the global population consumed at an equivalent level, we would exceed the Earth’s carrying capacity by four-fold (Mitchell, 2007 in Group 15, 2008). Furthermore, animal-based products account for approximately three quarters of the food footprint. A considerably larger amount of resources is required to produce meat than is required to produce an equivalent amount of plant-based products (Chambers *et al*, 2005 in Group 15, 2008).
 - Different tools of analysis were found to determine the ecological footprint of food products. One tool of measurement found was expressed as the sum of hectares (ha) of land required to produce one tonne (t) of product and to absorb green house gases (GHGs) emitted as the result of production. Using this measurement, the following ecological footprint of six food products was determined: beef (22.89 ha/tonne), butter (17.42 ha/tonne), fish (8.03 ha/tonne), poultry (7.95 ha/tonne), eggs (7.62 ha/tonne), whole milk (2.35 ha/tonne) (Barret *et al*, 2002 in Group 15, 2008). Furthermore, based

upon a review of five food product categories, the ecological footprint was determined and expressed in unit of hectares per tonne. These five categories were found to have the following average ecological footprint in decreasing order: meat products (11.66), milk and dairy products (6.9), beverage products (6.67), bread and cereal products (2.79), and vegetable & fruit products (1.14) (Barrett, J. et al., 2002 in Group 15, 2008). In summary, animal-based products are responsible for 77% of the total food ecological footprint, while plant-based products contribute towards approximately 23% of the total (Wilson J. & Aneilski, M., 2005 in Group 15, 2008). The animal-based footprint was found to be more than three times higher than the plant-based footprint (Group 15, 2008).

- Specific food products were identified at *The Pendulum* that can be placed within a spectrum of high to low ecological footprints. Based upon this review, it was found that dairy products, namely cheese and butter are the largest contributor to *The Pendulum's* footprint, where it was found that cheese requires ten litres of milk to produce one litre of cheese. The second largest contributor to the outlet's ecological footprint found was beef, and fruits and vegetables were found to have the lowest ecological footprint multiplier (Group 24, 2008).
- Five specific food products were identified that are used at *Blue Chip Cookies* that may be placed within a spectrum of high to low ecological footprints, including: butter, eggs, flour, processed fruits, and processed vegetables. Two sources were consulted for the review: Collins and Fairchild who based their ecological review of conventional food products in Wales, and Gerbens-Leens who conducted a review of the same conventional food products in the Netherlands. Based upon these reviews, it was found that butter is a food product with a very high ecological footprint, eggs have a lower ecological footprint than butter, and flour, and processed fruits and vegetables are on the lowest end of the ecological footprint spectrum as can be seen in **Table 1** below. It was concluded that plant-based food products have a significantly lower ecological footprint than animal-based food products and therefore eating lower on the food chain can reduce our ecological footprint. It was assumed that flax seed and oats are in this same ecological footprint range as flour, where they have a slightly higher ecological footprint than processed fruits and vegetables but lower than animal-based products. It was also emphasized that by no means are these values absolute since ecological footprint values will differ significantly throughout the world, depending on the methods of production and transportation (Group 28, 2008).

Table 1: Ecological Footprint of Food Products:

Industrially Produced Food Products	Collins and Fairchild, 2007 in global hectares per kilogram (gha/kg)	Gerbens-Leens, 1999 In metres squared per kilogram (m ² /kg)
Butter (local)	0.0115	13.8
Eggs (local)	0.0012	3.5
Flour	0.0007	1.6
Processed Fruits (e.g. apple sauce)	0.0005	0.5
Processed Vegetables (e.g. canned)	0.0005	0.3

(Group 28, 2008).

Ecological Footprint Reduction at Lower Mainland Restaurants:

- All groups conducted a literature review and corresponding interviews with restaurants in the lower mainland and post-secondary campuses in Canada and the US to obtain information about initiatives taken to reduce the ecological footprint of their operations. Based upon this review, the following was found:

Brown University:

- Brown's Community Harvest program purchases local and ethical food and includes a public education component (Brown University Dining, n.d. in Group 28, 2008).

C Restaurant, NU restaurant, and Raincity Grill:

- All three restaurants incorporate sustainable practices and environmental programs. Notable examples include participation in the *Ocean Wise Program*, creation of the Hi-Res-Lo-Imprint module, which emphasizes his business's enthusiasm toward reducing environmental damages, and cooperation with

Wisent Environmental, which promotes environmental ideas. By working with Wisent Environmental, these restaurants will conserve approximately 58 trees, 563 pounds of land-filled waste, 2,400 pounds of green house gas (CO₂) and 35,948 gallons of water this year (UD, 2007 in Group 5, 2008).

- *Raincity Grill* was also found to offer a 100 Mile Tasting Menu, featuring foods derived from four farmers on Vancouver Island and in southern BC as well as foods sourced from their primary food suppliers (Group 5, 24 & 29, 2008).

Duke University:

- Duke incorporates environmental factors into food provider assessments to encourage ecologically friendly food. Duke documented its food system and has made funding available to make dining operations more green (Duke University. n.d in Group 28, 2008).

Harvard University:

- Harvard's dining association purchases local foods and features seasonal menus (Harvard University, n.d. in Group 28, 2008).

Portland State University- Food For Thought Café:

- This café has identified indicators for ethically sourced foods to be: locally and sustainably grown, less packaged, more recycled, more composted, affordable, and provide living wages/working conditions. The café features local, seasonal, organic, sustainable, and fair trade products on its vegetarian menu. The university's dining uses locally and sustainably produced foods (Portland State University, n.d. in Group 28, 2008).

Rocky Mountain Flatbread Company:

- *Rocky Mountain* purchases most of their food from local, organic farmers and supports producers who treat their animals humanely. They also participate in the *Ocean Wise Program*, use biodegradable packaging, and compost all food waste (Group 24, 2008).

The Fairmont Hotel and Restaurants

- These restaurants have implemented a 100 Miles Buffet, farmer-chef meet and greet event, and an Eco-cuisine menu, with approximately 20% of food served on the menu as certified organic. Also, they support local and organic food producers, such as Rodney Strong Vineyard, who use solar power for wine production (GLN, 2007 in Group 5, 2008).
- The Fairmont restaurant at the Vancouver Airport was one of the earlier restaurants to join the *Ocean Wise Program*, which requires the removal of unsustainable items from their menu and replacement with sustainable items, every 6 months until they cannot remove any more unsustainable items (OP, 2007 in Group 5, 2008). An *Ocean Wise* logo will appear on the menu beside each ocean-friendly item, which "must be in abundant supply and harvested without damage to the habitat or other species" (OP, 2007 in Group 5, 2008).

UBC-Place Vanier Residence:

- In 2007-2008 year Vanier Dining introduced 40 new recipes featuring local products and is currently working with their suppliers to source more local produce (Group 28, 2008).

University of Toronto:

- University of Toronto negotiated a contract with *Aramark*, a food service management company, to commit to purchasing a percentage of their food from *Local Flavour Plus* (LFP) certified producers. LFP is a non-profit organization that certifies farmers and food processors who have met their standards, and partnered with the University of Toronto in September 2006 to increase the sustainability of their food procurement (Group 24, 2008).

Yale University:

- Yale created purchasing guidelines for determining sustainability of items, where local is considered first, and then organic and fair trade from other regions. Foods have a two or three tier system for determining

their level of sustainability which is considered in purchasing. The food services offer seasonal dishes to better utilize the local fair (Yale University, n.d in Group 28, 2008).

AMSFBD Ecological Footprint Reduction Proposals:

- Based upon secondary research, interviews and/or surveys, all groups proposed ways that AMSFBD can reduce its ecological footprint at a selection of one of the following food outlets: *Pie R Squared (PRS)*, *The Pendulum* and *Blue Chip Cookies*. Below is a summary of group's proposed plans for lightening the ecological footprint of specific AMSFBD campus food outlets.

Pie R Squared (PRS):

Interviews:

- Face-to-face interviews were conducted with representatives from AMSFBD including the PRS Manager. Interviews were held to gather information about current operations, as well as input on developing ways to lighten the ecological footprint of operations. Based upon these interviews, the following was found:
 - The consumption ratio between vegetarian and meat-based pizzas used was noted to be roughly 1:15 in early 2000, and in 2008 the ratio was now approximately 1:3.
 - It was observed that meat-eaters often buy both meat-based and vegetarian pizzas because of their unique tastes.
 - The manager is constantly working on new vegetarian pizza recipes that incorporate locally produced ingredients with the ultimate goal to enhance the purchase of vegetarian pizzas through the marketing of taste and health benefits rather than focusing on its environmental friendliness because of the belief that customers will prioritize the food taste over its impact on the environment.
 - The Manager had recently developed a cheese-less pizza recipe a few weeks prior to the interview, and was selling two of them a day to get customers familiar with the new item. No form of corresponding advertising was implemented. Although the cheese-less pizza had already been developed, it was noted that more work was needed to make it successful. Specifically, it was discussed that customer input should be obtained, and a marketing strategy should be developed to help ensure the success of the pizza (Group 5, 2008).

Nutritional Analysis:

- A nutritional analysis was conducted for the cheese-less pizza, where it was found to have about 1.72 grams of fat, 50kcal, zero cholesterol, and about 40mg of sodium compared to its vegetarian counterpart which was found to have 9 grams of fat, 127kcal, 18mg of cholesterol, and about 2855 mgs of sodium per serving (Group 5, 2008).

Survey:

- A tasting survey of the cheese-less pizza was conducted at PRS to determine its market potential. Upon being given a consent form to participate, customers were asked to sample the pizza and to fill out a short survey. Prior and during sampling, participants were not informed that the pizza was cheese-less, however upon completion of the survey they were informed that the pizza was cheese-less, vegan and eco-friendly. Based upon survey results, the following was found
 - 6% of respondents were lactose intolerant and 5% of respondents were vegans.
 - 68% of respondents indicated willingness to purchase the pizza.
 - 87% of respondents indicated that it was "tasty and flavourful".
 - 69% of respondents indicated willingness to pay a higher price for an environmentally friendly product.
 - The most frequently cited suggestions to improve the pizza included: add salt, more flavour (i.e. a balsamic glaze), more sauce, and provide year round availability of the pizza (Group 5, 2008).

Promotional and Educational Materials and Tools:

- To help ensure the success of the cheese-less pizza, a marketing strategy was developed. Overall, it was decided that the pizza needed to be promoted for its unique features that would help establish a market base. Several reasons were formulated that were thought could aid in convincing customers of the benefits

for trying or switching to cheese-less pizzas. Specifically, it was proposed that the cheese-less pizza be marketed as having:

- 1) A lower ecological footprint, since meat and cheese products were found to contribute to a significant proportion of our ecological footprint;
- 2) Vegan and lactose intolerant friendly, which could help create a new customer based for PRS since these groups would normally not frequent the outlet;
- 3) Lower in fat, calories, and sodium and containing zero cholesterol, especially compared to its vegetarian counterparts which showed significant differences as described above under the section "nutritional analysis";
- 4) Better in taste and appearance, where it could be argued that with the absence of cheese other ingredient flavours such as with seasonings and vegetables which are usually masked by cheese can be enhanced contributing to a unique and different taste;
- 5) Less expensive, where depending on the ingredients used, the cost of production can be lower, which has the potential of being translated into lower retail prices for the consumer (Group 5, 2008).

- Two promotional materials were developed including a table flyer and a poster, conveying the promotional messages outlined above. It was proposed that table flyers should be placed on all the tables at PRS, and posters should be displayed at the cash register, and in the vicinity of the outlet. Also, it was proposed that a menu board should be created just outside the outlet, clearly stating the name of the pizza and the toppings that it includes (Group 5, 2008).
- It was proposed that the cheese-less pizza be gradually phased into the menu and a "Go Cheese-less Day" should be held as a promotional day to give recognition to the new pizza item. On this day, the cheese-less pizza should be made highly available, with one provided to every meat pizza for the entire day. Flyer posters should also be distributed to aid in promotion (Group 5, 2008).
- Also, it was proposed that a monthly "Eco-Friendly Day" be held where all pizzas sold will be vegetarian throughout the entire day or during particular hours (Group 5, 2008).
- For additional promotion it was suggested that a coupon be provided in the *2008-2009 AMS Agenda* for the cheese-less pizza, as well as information about other sustainability initiatives that PRS has implemented (Group 5, 2008).

The Pendulum:

Interviews:

- Face-to-face interviews were conducted with representatives from AMSFBD including *The Pendulum's* manager. Interviews were held to gather information about current operations, as well as to obtain input on developing ways to lighten the ecological footprint of operations. Based upon these interviews, the following was found:
 - Meat and dairy products were found to make up many of the menu items currently offered at *The Pendulum* (Group 29, 2008).
 - Support was expressed to increase vegetarian and vegan options and the use of locally grown food as a way to reduce the outlet's ecological footprint (Group 24, 2008).
 - The following items were cited as ideal local menu additions: legumes, hominy, green onions, tomatoes, zucchini, and basil. Other foods that were expressed as less desirable menu additions included: nuts, tofu, and eggplants due to poor visual appeal, cost and/or packaging issues (Group 24, 2008).
 - Current prices ranges reported for *The Pendulum's* salads ranged from \$3.50-\$4.25 (Group 24, 2008).
 - Interest was expressed in having marketing strategies developed to promote eco-friendly menu items at *The Pendulum* (Group 24, 2008).
 - The manager expressed willingness to implement a test marketing trial of the "Beet-a-licious Salad" recipe to evaluate customer responses (Group 24, 2008).
 - New menu items are regularly introduced into *The Pendulum* menu, including vegan and vegetarian dishes (Group 29, 2008).
 - Many waste reduction initiatives were found to be in place at *The Pendulum*, including cardboard, cans, and paper recycling, kitchen waste composting, and the reuse of large plastic containers to store products (Group 29, 2008).

- Preference was expressed for the introduction of new menu items without meat or cheese over making small changes to a number of items, such as reducing the total amount of meat and cheese (Group 29, 2008).
- Interest was also expressed in the idea of introducing an eco-label and stamp-card at *The Pendulum* to identify and reward food choices with a low ecological footprint (Group 29, 2008).

Surveys:

- Developed and administered a survey to determine respondent's level of knowledge about the concept of an ecological footprint, if they considered ecological footprint factors when making food choices, and if they would participate in an incentive program rewarding low ecological footprint food choices. The survey also functioned to determine how frequently respondents consumed high ecological footprint food items, as well as their reasons for patronizing *The Pendulum*. The survey was administered to 100 participants on-site at *The Pendulum* and within its vicinity. Based upon survey results, the following was found:
 - 72% of respondents indicated familiarity with the concept of an ecological footprint, 14% of respondents cited "sort of" familiar, and 14% of respondents expressed no familiarity with the concept.
 - 42% of respondents indicated that they "sometimes" considered the environmental impact of their food choices, 34% of respondents indicated "rarely" or "never", and 24% indicated that they "usually" or "always" do.
 - 38% of respondents indicated that they "never" or "rarely" considered the locality of their food, 33% of respondents indicated that they "sometimes" do, and 29% indicated that they "usually" or "always" do.
 - 46% of respondents indicated that they "sometimes" considered whether their food was organic, 38% indicated that they "usually" or "always" do, and 16% indicated that they "never" or "rarely" do.
 - 83% of respondents indicated willingness to purchase a low ecological footprint menu item at least once per week, or 55% once per day if rewarded with an incentive such as a stamp-card with potential for a free item.
 - The most frequently cited responses when asked why people chose to dine at *The Pendulum* included: "location" (58%), "taste" (53%), "value" (43%), "atmosphere" (43%), and "quality" (39%). The only response that was chosen significantly less frequently than others was the "healthy" factor (33%) (Group 29, 2008).

Menus and Recipes Development:

- Developed a recipe for a "Beet-a-licious Salad". Ingredients included beets, apples, goat cheese, apple cider vinegar, olive oil and honey. Apples and beets served as the main salad ingredients, contributing towards 89% of the total ingredients. These were chosen because they were found to have the lowest footprint multiplier, were low cost and seasonally available for most of the year. Also, the honey, beets and apples were found to be all produced locally in the Lower Mainland and surrounding areas, with beets and apples available from July to April, and honey available year round. The other ingredients (apple cider vinegar, olive oil, and goat cheese) are readily available according to the 2008 AMS inventory list. Goat cheese was chosen because it was felt by the group as well as the sensory panel to add flavour and made the salad more aesthetically pleasing. However, it was also noted that the recipe is flexible and can be made without the goat cheese (Group 24, 2008).
- Both purchasing and retail costs were determined for the "Beet-a-licious Salad". Based upon current supplier prices, a raw food cost was calculated at \$0.57 per serving, and a minimum selling price of \$1.58 per serving was determined factoring in a 36% food cost. Time estimations involved in salad preparation were done, with a generous estimated of approximately 40 minutes to prepare 60 servings of the salad if the beets are shredded with a food processor. A nutritional analysis was conducted to test for nutritional viability. Analysis results showed that the salad is high in potassium, folate and fiber, was low in saturated fat, contained 155 calories per serving, and contained only natural sugars, zero cholesterol, has monounsaturated fatty acids, and the additional benefits of antioxidants (Group 24, 2008).
- A test marketing trial of the "Beet-a-licious Salad" was held at *The Pendulum* to evaluate customer responses. A four litre batch of the salad was prepared and displayed in the regular display case. A point of purchase sign was developed by the group and displayed adjacent to the salad. The salad was sold for \$3.50 per serving which corresponded with the other salads sold. The salad sold out by the end of day,

with positive customer feedback, and it was also noticed that no leftovers remained on any of the tables cleared. Staff expressed support for the salad, and appreciated the three day shelf life since this enabled the salad to be made in large quantities in advance saving labor costs. One suggestion for improvement was noted by the manager, about changing the sweetener source in the salad from honey to maple syrup to create demand by vegan customers (Group 24, 2008).

Sensory Panels:

- A sensory panel was conducted at *The Pendulum* to determine the market potential for the "Beet-a-licious Salad", where overall very positive feedback was received. Respondents indicated they would be willing to pay \$3.00-\$5.95 per serving (Group 24, 2008).

Procurement:

- It was found that the UBC Farm produce beets from July to October which could be used for the "Beet-a-licious Salad", depending upon further negotiations. Potential for supply of UBC Farm apples to *The Pendulum* was cited as possible for fall 2009 depending upon harvest forecasts (Group 24, 2008).

Promotional and Educational Materials and Tools:

- A point of purchase sign was developed to promote the new "Beet-a-licious Salad" menu item. The sign was designed to showcase its ecological, social, and health benefits. Specifically, the sign contains a list of the ingredients and emphasizes the local, seasonal and health benefits of the salad in reducing AMSFBD's ecological footprint (Group 24, 2008).
- A marketing strategy was developed to raise awareness and encourage support for low ecological footprint food choices at *The Pendulum* and other AMSFBD outlets. The marketing strategy involves four steps and is summarized below:

Step 1: Apply each menu item an ecological footprint criteria:

- A set of criteria for low ecological footprint items was developed and a formula (an Ecological Footprint (EF)-calculator) that can be used to calculate the ecological footprint of menu items at *The Pendulum* or other food outlets.
- A step-wise evaluation process was developed to determine whether a menu item would be considered as having a low ecological footprint or not. The first step involves assigning an ecological footprint value to the ingredients of a recipe, using the EF-calculator. The resulting value is compared to a table of cut-off points, and depending on the cut-off point, recipes can qualify as having a low ecological footprint, may require additional evaluation where a secondary set of criteria is applied, or may be excluded for further evaluation altogether. Cut-off points for the ecological footprint of menu items were determined by considering the ecological impact of the food ingredient on four areas: arable land, pasture land, sea, and fossil energy, and also took into account nutritional requirements for protein and essential vitamins and minerals. Each successive cut-off point includes foods with increasingly greater impacts on ecological footprint. For the first cut-off point, eggs and milk were included as a small percentage of the overall ecological footprint (Level 1); the second cut-off point includes a small percentage of poultry (Level 2); the third cut-off point includes a small percentage of pork (Level 3); and the fourth cut-off point includes a small percentage of cheese (Level 4). Recipes whose value goes beyond the fourth cut-off point (Level 5) cannot be labeled as having a low ecological footprint, regardless of other criteria being met.
- Once determining the ecological footprint level of a recipe, a set of secondary criteria was developed and recommended for application. For Level 1 menu items, further analysis is not necessary and those recipes may be labeled as having a low ecological footprint. Recipes above the first cut-off point must be at least: 1) 50% local, 2) 50% organic, and/or 3) 50% unprocessed. Level 2 recipes must meet any one of the secondary criteria; Level 3 recipes must meet any two of the secondary criteria; and Level 4 recipes must meet all three of the secondary criteria.
- These eco-label criteria were applied to selected recipes at *The Pendulum*, where the manager provided the group with estimated volumes of each recipe ingredient. Using the ecological footprint calculator, a selection of menu items was analyzed. Results indicated that the "Vegan Stew" and "Winter Roasted Vegetables" matched Level 1 criteria; the "Couscous Salad with Feta and Basil", "Chicken and Pesto Pasta", and the "Veggie-Bird" matched Level 2 criteria; the "T-Bird" fell matched Level 3 criteria; the "Chicken Quesadilla", "Bowtie Shrimp", "Black Bean Burrito Casserole", and "Breakfast Burrito" matched Level 4

criteria; and the "Salmon Quesadilla" and "Beef Dip" went beyond Level 4, and were excluded from further analysis (Group 29, 2008).

Step 2: Place an "Eco-Label Sticker" on appropriate menu items:

- An "Eco-label Sticker" was developed to identify food choices with a low ecological footprint, and was designed to be placed on corresponding menu items (Group 29, 2008).

Step 3: Post an informational poster to educate customers about eating ecologically:

- An informative poster was developed depicting various impacts food choices have on the earth, the definition of ecological footprint, as well as brief section about proposed eco-labels and incentives for choosing these menu items (Group 29, 2008).

Step 4: Offer an "Eating Ecologically Stamp-Card" as an incentive for low ecological footprint food choices:

- It was believed that an incentive should be provided to customers to encourage consumption of low ecological footprint menu items. Based upon the current AMS coffee card which rewards the use of reusable coffee mugs, an "Eating Ecologically Stamp-Card" was developed to reward low ecological footprint food choices. Specifically, each time a customer purchases a low ecological footprint menu item, they will be given a stamp, and after receiving ten stamps the customer receives a complimentary low ecological footprint salad item (Group 29, 2008).

Blue Chip Cookies:

Interviews:

- Face-to-face interviews were conducted with representatives from AMSFBD including the *Blue Chip Cookies* manager. Interviews were held to gather information about current operations including suppliers and product sales, as well as input on developing ways to lighten the ecological footprint of operations. Based upon these interviews, the following was found:
 - An estimated 200-300 cookies, 25 dozen muffins, 4 dozen scones and 2 dozen croissants are sold daily, not taking into account specialty goods such as cupcakes, biscotti and hot cross buns (Group 15, 2008).
 - The majority of items sold at *Blue Chip Cookies* contain butter, eggs and milk products (Group 15, 2008).
 - Changing ingredients for menu items was generally expressed as more feasible than introducing new items (Group 15, 2008).
 - Interest in developing a new item to add to the cookie lineup was expressed, namely in developing a ginger spice cookie (Group 15 & 28, 2008).
 - Interest was expressed in implementing more compost bins in the SUB, however it was noted that approximately \$1000 is required to make a three side-by-side multi-bin unit (Group 15, 2008).
 - Currently all AMSFBD outlets offer mug and container discounts, however it was expressed that customers rarely bring their own containers. As a result it was noted that more strategies were needed to educate consumers and increase awareness of mug and container discounts, and to create more washing stations at the SUB which was believed to help encourage more people to bring their own containers (Group 15, 2008).
 - Little demand was noted to exist at *Blue Chip Cookies* for vegan options based upon the fact that not many customers made these product requests; however at *The Pendulum* demand does exist, evident by high sales of the vegan banana bread (Group 28, 2008).
 - It was advised that in addition to creating new lighter footprint menu items, it would also be useful if replacing existing ingredients with more ecologically friendly ingredients was investigated. One suggestion included determining the feasibility of switching to organic flour, since this is already used for some menu items at the AMSFBD outlet - *Bernoulli's Bagels* (Group 28, 2008).

Surveys:

- Two groups developed and administered surveys to determine current customer purchasing behavior, customer demand for vegan and other eco-friendly menu options, willingness to pay more for sustainable

products, and general input on ways to reduce the ecological footprint of *Blue Chip Cookies*. A total of 279 responses were received from the online survey (Group 15, 2008), and 148 responses were received from the on-site survey (Group 28, 2008), creating a sample size of 426 respondents. Based upon combined survey results (unless otherwise noted), the following was found:

- When asked how often respondents will buy vegan baked goods if they were offered, 37% indicated "seldom", 30% indicated "sometimes", and 25% indicated "not interested" (Group 15, 2008).
- When asked about what criteria is most important when choosing a product from *Blue Chip*, the following responses were cited in descending order: taste, price, appearance, low fat, and locally produced (Group 15, 2008).
- The on-site survey showed that the majority of survey participants cited "local food/food miles" and "certified organic" as the two most important ecological concepts that should be addressed at *Blue Chip Cookies* (Group 28, 2008).
- The on-site survey showed that 81% of the respondents are willing to pay more (average \$0.33) for more environmentally friendly food options (Group 28, 2008).
- When asked to rank the desirability to purchase a selection of vegan products at *Blue Chip Cookies*, the following were cited with highest frequency ranked in descending order: berry muffins, seasonal fruit muffins, carrot muffins, pumpkin muffins, pumpkin spice cookies and zucchini muffins (Group 15, 2008).
- When asked about what baked goods respondents would like to see offered at *Blue Chip Cookies*, the following options were suggested: taro muffins, granola bars, vegan cupcakes and brownies, carob-based baked goods, ginger and cinnamon cookies and apple-sauce cookies (Group 15, 2008).
- When asked for suggestions about ways to decrease the ecological footprint of *Blue Chip*, the following options were suggested: discounts for bringing your own container, using post-consumer recycled products for packaging, using more milk alternatives (soy milk, almond milk), and using fair-trade and organic sugar and chocolate. Based upon these responses, a low level of awareness of current sustainability initiatives was evident, namely a lack of awareness existed among many respondents about AMSFBD's used of compostable cups and their reusable mug campaign which offers discounts (Group 15, 2008).
- A high demand was expressed for chocolate substitutes, moderate demand for local ingredients, and lower level of interest was expressed in desire to purchase vegan products at *Blue Chip* (Group 15, 2008).
- In addition to the online survey a tasting survey of the vegan "Ginger Spice Cookie" and the "Apple Spice Cookies" was conducted with 11 staff members at *Blue Chip Cookies* and the AMSFBD Manager to determine market potential of proposed vegan cookies. Based upon survey results, the following was found:
 - 91% of the staff expressed that they liked the taste of both vegan cookies.
 - 64% of the staff believed that both cookies would have the potential to become popular as long as an appropriate marketing strategy is developed. Specific components of the marketing strategy suggested included: creating an appealing name for the cookie, and creating a small display to advertise the new products.
 - 82% of the staff commented that they would personally promote the vegan cookies at work due to their exceptional taste and their lower ecological footprint.
 - 82% of the staff also indicated that they would buy vegan cookies if they were regular customers at *Blue Chip*.
 - The AMSFBD Manager expressed interest in both cookies, but preferred the vegan "Ginger Spice Cookie". As a result, the recipe was requested and plans to develop a batch during the summer were agreed upon (Group 15, 2008).

Menus and Recipes Development:

- Developed two recipes, including a vegan "Ginger Spice Cookie" and a vegan "Apple Spice Cookie". Substitutions for commonly used animal products, such as eggs, butter and milk, were replaced with vegetable oils, molasses and various fruits. It was decided that both products should be chocolate free, and contain a distinct flavour with the use of spices such as ginger, cinnamon and cloves to differentiate it from current products offered. Ground ginger, ground cinnamon, ground cloves, soy milk, and molasses

were used to develop the "Ginger Spice Cookie". A nutritional analysis was conducted where it was found to be cholesterol free, low in fat and high in both iron and calcium (Group 15, 2008).

- Developed two recipes including a vegan "Pumpkin Ginger Molasses Cookie" and a "BC Bar", a fruit bar featuring seasonal local ingredients. Both items were chosen because they corresponded well with the group's proposed ranking of low ecological footprint parameters, where the top parameters included the elimination of animal products and the incorporation of local food (Group 28, 2008).
- A conventional animal product containing recipe was adapted to develop the vegan "Ginger Molasses Cookie". Canned pumpkin was chosen as an ingredient to replace butter, since butter was found to have an ecological footprint 23 times larger than processed vegetables, such as canned pumpkin (Collins and Fairchild, 2007 in Group 28, 2008). Furthermore, the cookie does not contain eggs, which have an ecological footprint 2.4 times larger than processed vegetables (Collins and Fairchild, 2007 in Group 28, 2008). A cost analysis was conducted, where a food cost of approximately 21 cents was determined per cookie, which *Blue Chip Cookies* generally sells for about \$1.70, leaving a food cost percentage of only 12%, allowing for considerable profit mark-up potential. A corresponding nutritional analysis was conducted, where it was found to contain 296 kcalories per 100g with 82% kcal from carbohydrate, 12% from fat and 6% from protein. This was found to be highly nutritious when compared to President's Choice's Ginger Cookies, which contain 480 kcalories per 100g of cookies with 40% kcal from fat and 5% from protein (President's Choice, 2008 in Group 28, 2008). In addition, the cookies were found to constitute a good source of iron and folic acid (Group 28, 2008).
- The "BC Bar" was created to enable the use of various British Columbia produced fruit fillings in season or as available from suppliers. Approximately 40% of the "BC Bar" contained BC produced foods and depending on the time of year, BC apples, pears, berries, rhubarb, pumpkin, and cranberries can be rotated as fillings for the BC bars. The food cost of these bars was worked out to be approximately \$0.33 cents each, which *Blue Chip Cookies* generally sells similar items such as scones for about \$2.00, leaving a food cost percentage of approximately 17%. A nutritional analysis was conducted for the fruit bar, where it was found to contain 434 kcal with 29% kcal from fat and 65% kcal from protein. The bars were also found to constitute a good source of iron (Group 28, 2008).

Procurement:

- In addition to the proposed strategy to lower the ecological footprint of *Blue Chip Cookies* by introducing new lighter footprint menu items, it was also proposed that their ecological footprint should also be lowered by changing current suppliers of ingredients used in current menu items to more local and organic ones. Specifically, alternative local and organic suppliers of sugar and flour were investigated. It was determined that significant price differences exist between most of these suppliers and current ones. It was found that *MacGillivray's* organic sugar was closest in price to current sourced sugar options (Group 15, 2008).
- The potential to replace commonly used conventional ingredients at *Blue Chip Cookies* with organic and/or local counterparts was investigated. It was found that both flour and chocolate were used in high quantities and both contributed to a high ecological footprint, not only due to lengthy distances traveled, but also due to the reliance on inputs such as pesticides and herbicides in production. As a result, both these items became targets of investigation, since replacing them with more sustainable counterparts could significantly reduce *Blue Chip Cookies* ecological footprint, and would not alter the flavour, texture or nutritional content (Group 28, 2008).
- It was found that switching to organic and more local flour could significantly reduce the amount of fossil fuels involved in the production phases of wheat, as well as the transport. Only one company was found that produced organic and relatively local flour – *Anita's Organic Mill*. Anita's obtains organic grain from BC, Alberta and Saskatchewan. A cost analysis was conducted for switching these flours, and it was found that by incorporating the organic flour, *Blue Chip Cookie's* flour cost would be approximately doubled, working out to a food cost increase of about two cents per cookie (Group 28, 2008).
- Alternative suppliers for chocolate were also investigated. A company – *Cocoa Camino* was proposed as a good supplier for organic and fair trade chocolate products. A cost analysis was conducted for switching these products, and it was found that by incorporating organic fair trade chocolate chips would result in a food cost increase of about six cents per cookie (Group 28, 2008).
- Based upon a review of ecological footprint analysis of conventional food products found in the literature, as well as the group's collective knowledge, a set of six lighter ecological footprint constituent parameters

were identified and ranked in order of importance. Specifically, the following parameters were developed and ranked in the order found below:

1. local/mode of transportation/seasonality
2. animal/plant origin
3. organic/free-range/shade grown
4. processing/packaging
5. healthy *
6. fair-trade *

* It was noted that a more comprehensive approach to ecological footprint analysis should be taken, where both nutrition and socio-economic parameters are used as criteria to inform food policies guiding sustainable food consumption (Group 28, 2008).

- The following rationale was provided to justify choice of criteria as well as the order of ranking:
 - Local was ranked above organic because of the added benefit of being able to more effectively influence the sustainability of local agriculture due to proximity and close contact.
 - Both local and animal-product free were ranked higher than organic because it was felt that organic, in the mainstream sense has less opportunity to reduce the ecological footprint of food items. If *Blue Chip Cookies* were to switch its ingredients to organic it would most likely be sourcing from large-scale organic producers and therefore the only benefit would accrue from a reduction is the pesticide and herbicide application. Although this reduction is very important it was also felt that sourcing local and animal-free foods would reduce the ecological footprint of *Blue Chip Cookies* more dramatically (Group 28, 2008).
- A purchasing policy was developed to guide AMSFBD in choosing sustainable products. The proposed purchasing policy incorporates the above lighter ecological footprint parameters and is also informed by Yale University Dining Service’s ordering policy. As outlined below, the proposed purchasing policy contains specific guidelines for vegetables, fruits, and meat and poultry purchasing and is grouped into three tiers in order of importance.

Table 2: Purchasing Policy

Vegetable Guidelines		
First Tier (ranked in order of preference)	Second Tier (ranked in order of preference)	Third Tier (ranked in order of preference)
1. BC organic 2. BC ecologically-grown 3. Regional organic 4. Regional ecologically-grown 5. BC conventional (small) 6. Regional conventional (small)	1. BC conventional (medium) 2. Regional conventional (medium) 3. Canadian/US. organic (small) 4. BC conventional (large) 5. Regional conventional (large) 6. Canadian/ U.S. ecologically-grown (small)	1. Candia/ U.S. organic (medium/large) 2. North America organic 3. Canadian/ U.S. ecologically-grown (medium/large) 4. International organic 5. Canadian/ U.S. conventional
Fruit Guidelines		
First Tier (ranked in order of preference)	Second Tier (ranked in order of preference)	
1. BC organic 2. Regional Organic 3. BC conventional (small) 4. Regional conventional (small) 5. BC conventional (medium)	1. Regional conventional (medium) 2. Canadian/ U.S. organic (small/medium) 3. BC conventional (large) 4. Canadian/ U.S. organic (large) 5. International organic 6. Canadian/ U.S. Conventional	
Meat and Poultry Guidelines		
First Tier (ranked in order of preference)	Second Tier (ranked in order of preference)	
1. BC free-range/pasture-fed 2. BC organic	1. Canadian/ U.S. free-range/pasture fed 2. Canadian/ U.S. organic (small/medium)	

3. Regional free-range/pasture-fed	3. Conventional (small/medium)
4. Regional organic	4. Canadian/ U.S. organic (large)
5. Regional conventional (small)	5. Canadian/ U.S. conventional (large)

(Group 28, 2008).

Promotional and Educational Materials and Tools:

- Based upon survey results, it was determined that a need existed to raise awareness of current AMSFBD sustainability initiatives in general including those already in place at *Blue Chip*. As a result, promotional materials were developed to advertise current sustainability initiatives at *Blue Chip* and to promote sustainable purchasing and associated behaviors. Specifically, two promotional advertisements were developed suitable for display in the storefront, including a 1) “*Bring a Reusable Mug – It Saves*” poster, depicting associated current incentives in place, and 2) “*Think Greener – Let’s Reuse, Reduce and Recycle*” poster depicting current sustainability initiatives implemented at all AMSFBD Outlets. It was suggested that both promotional tools could be developed into posters or incorporated into a pamphlet or cards (Group 15, 2008).
- It was suggested that proposed vegan cookies and any other new upcoming vegan products be promoted at *Blue Chip*, by giving the cookies a creative name and displaying a sign reading “Ask about our vegan options”. Also, it was proposed that the health benefits of the vegan products be highly promoted to help differentiate it from other non-vegan products currently offered, helping to create a market niche (Group 15, 2008).
- Developed an “Ecological Footprint Label” for AMSFBD products. The label addresses three categories which correspond with the group’s established low ecological footprint parameters – Local, Organic and Vegan. Local, organic and vegan were chosen as categories due to public interest generated from surveys and interviews, the affect each category was found to have on the size of ecological footprints, and the ease of which each category can be easily classified. Each category contains a box which can be checked off if the item meets any of the criteria. Beside each category is a bracket where additional information can be provided. The label was designed to be laminated and placed on each menu item. In addition, an educational poster was developed to help customers learn what the label is about and why supporting the line of lighter footprint menu items is important, as well as the significance of reducing our ecological footprints in general (Group 28, 2008).
- It was believed that by switching from conventional flour and chocolate to organic counterparts price increases would need to be implemented to absorb increased costs. It was noted that since organic was rated as one of the top two ecological concepts that survey respondents wished to be addressed at *Blue Chip*, that it could easily serve as a marketing tool since customers already related with this concept and are thus more likely to be supportive of any changes. Also, as noted in the survey results, the majority of respondents (81%) expressed willingness to pay more (average \$0.33) for more environmentally friendly food options. Furthermore, the use of organic flour and chocolate compliments the groups “Ecological Footprint Label” proposal, where a checkbox is included for “organic”. Since flour is used in almost all items at *Blue Chip*, a high percentage of the “organic” category boxes can be checked off (Group 28, 2008).

Key Recommendations:

AMS Food and Beverage Department:

- Collaborate with UBC Waste Management to provide more compost bins in the SUB (Group 15, 2008).
- Ensure that all the food outlets are using bio-degradable containers (Group 15, 2008).
- Implement the proposed “Ecological Footprint Label” for all food items sold at AMSFBD outlets, as well as the corresponding informative poster (Group 28, 2008).
- Switch from conventional to organic flour (*Anita’s Organic Mill*) for all baked goods produced in the SUB (Group 28, 2008).
- Switch from regular to fair trade cocoa products (*Cocoa Camino*) for all baked goods produced in the SUB (Group 28, 2008).
- Consider implementing proposed purchasing policy to guide procurement of vegetables, fruit, meat and poultry items (Group 28, 2008).
- Consider revising AMSFBD’s current purchasing system by connecting to more local and organic providers (Group 29, 2008).

Pie R Squared (PRS):

- Consider adding a balsamic glaze to the cheese-less pizza to help address customer demands for the addition of more salt and flavour to the pizza. The glaze can address both of these issues and improve mouth feel (Group 5, 2008).
- Consider gradually increasing the quantity of cheese-less pizza served from the two pizzas currently served per day (Group 5, 2008).
- Consider implementing a "Go Cheese-less" day as a promotional event to give recognition to the new pizza item (Group 5, 2008).
- Promote the cheese-less pizza through proposed table flyers and posters in the vicinity of the PRS outlet (Group 5, 2008).
- Host a monthly "Eco-Friendly Day" where all pizzas sold during particular hours of the day, or throughout the entire day are vegetarian (Group 5, 2008).
- Consider adding a coupon for cheese-less pizza in the *2008-2009 AMS Agenda*, as well as including information about some of PRS's other sustainability initiatives (Group 5, 2008).
- Consider reducing the current ratio of meat to vegetarian pizzas from 3:1 to 2:1 during busy outlet hours (Group 5, 2008).
- Consider reducing cheese portions by 50% on all meat pizzas, gradually in the span of five months, whereby the cheese can decrease by 10% per month. Reduction in cheese portions can further help decrease the ecological footprint of PRS (Group 5, 2008).
- Consider reducing cheese portions by 30% on all vegetarian pizzas, gradually in the span of 5 months, whereby the cheese is reduced by 6% per month (Group 5, 2008).
- Consider requesting products be shipped with minimal packaging from current suppliers, and inquire whether they would be able to re-use their shipping boxes and pallets (Group 5, 2008).

Blue Chip Cookies:

- Introduce the vegan "Ginger Spice Cookie" and promote its nutritional and environmental benefits (Group 15, 2008).
- Consider changing some commonly used ingredients in menu items to more sustainable ones. Specifically, decrease the amount of animal-based ingredients at the outlet by using plant-based substitutes (i.e. vegetable oil, dairy-free plant based margarine), incorporate more locally produced ingredients, and consider introducing more vegan items to aid in further reducing *Blue Chip Cookies* ecological footprint (Group 15, 2008).
- Increase promotions and awareness of the initiatives that *Blue Chip Cookies* and AMSFBD have taken to decrease their ecological footprint through incorporating group's proposed posters in a campaign. All promotions should emphasize immediate benefits to customers such as cash discounts in addition to the long-term environmental benefits (Group 15, 2008).
- To further enhance the success of newly introduced vegan goods, consider providing associated nutrition facts in the storefront or by the cash register to attract more customers (Group 15, 2008).
- Introduce the vegan "Pumpkin Ginger Molasses Cookie" into *Blue Chip's* menu (Group 28, 2008).
- Introduce the "BC Bar" using BC fruit, butter and eggs into *Blue Chip's* menu (Group 28, 2008).

The Pendulum:

- Incorporate the "Beet and Apple Salad" served with goat cheese as part of *The Pendulum's* daily menu (Group 24, 2008).
- Incorporate the proposed point of purchase sign to promote the new menu item in the showcase enumerating its ecological, social, and health benefits (Group 24, 2008).
- Hold consultations with UBC Farm representatives to discuss the potential of supplying beets and apples to *The Pendulum* (Group 24, 2008).
- Adopt proposed marketing strategy, including the "Eco-Label Sticker" and the "Eating Ecologically Stamp Card" program at *The Pendulum* restaurant and other AMSFBD outlets to raise awareness about the ecological impact of food, and ultimately, encourage consumers to make low ecological footprint food choices (Group 29, 2008).
- Introduce more and promote low ecological footprint food items by applying the developed ecological footprint criteria (Group 29, 2008).

Scenario 4: Creating a "UBC Farm to Campus Food Provider Program" (Groups 3, 16, 20 & 25)

Objectives:

- To develop a business proposal to inform the development of a "UBC Farm to Campus Food Provider Program", including determining food outlet supply demands, UBC Farm production capability, and corresponding logistics.
- To propose ideas for related educational and research opportunities.

Central Findings:

Literature Review:

Farm to Institution Programs:

- All groups conducted a review of other campuses that have established farm to institution programs and determined whether lessons can be drawn that might help inform the development of an "UBC Farm to Campus Food Provider Program" (Groups 3, 16, 20 & 25, 2008).
- Based upon a review of literature, it was found that farm-to-institution or farm-to-cafeteria programs are increasingly popular, indicated in the emergence of a growing number of these programs particularly in the US. Some examples of these programs can be found at: Olaf College, University of Wisconsin-Madison, (Group 3, 2008) UC Davis, Beech Hill Farm, Evergreen State College (Group 20, 2008), University of Illinois (Group 25, 2008), and the most notable example at the University of California Santa Cruz (UCSC) (Group 3, 16, & 20, 2008).

Interviews:

- Electronic, face-to-face and telephone interviews were held with representatives from UBC Farm, Sage Bistro, Place Vanier and AMS Food and Beverage Department to gather preliminary input on their business proposals (Groups 3, 16, 20 & 25, 2008).

"UBC Farm to Campus Food Provider Program" Business Proposals:

- Based upon secondary research and interviews all groups developed a business proposal to inform the development of a "UBC Farm to Campus Food Provider Program". Below is a summary of group's proposed plans for creating programs between the UBC Farm and specific campus food outlets.

Sage Bistro:

Mission Statement:

- To create a business proposal that will aid in building a strong market connection between UBC Farm and UBC Food Service's (UBCFS) *Sage Bistro* to increase the amount of local food consumed on UBC campus.

Short-term Goals:

- 1) Establish a one month contract between UBC Farm and *Sage Bistro* for weekly deliveries of butternut squash, and extend duration if successful.
- 2) Establish an ongoing memorandum of agreement for *Sage Bistro* to purchase various produce items firstly from UBC Farm.
- 3) Develop a UBC Farm guided tour for *Sage Bistro* servers where they can be given a tour of foods that they serve, informed about how they are produced, and explained some of the benefits of local sustainable farming.
- 4) Begin discussions regarding the creation of a joint root cellar to serve as a storage facility for produce during the winter months between UBCFS and UBC Farm.

Long-term Goals:

- 1) Develop contracts between UBC Farm and *Sage Bistro* that incorporate an extensive list of produce items for several months.
- 2) Develop a root cellar for UBCFS produce at UBC Farm, and consider creating corresponding contracts for produce with UBCFS during winter months.

UBC Farm Product Demands:

- Based upon consultations with the Head Chef of *Sage Bistro*, the following was found:
 - Currently 1/8th of produce bought at *Sage Bistro* is sourced from the UBC Farm.
 - All UBC Farm products that are incorporated into *Sage Bistro* dishes are advertised on their menu.
 - While UBC Farm purchases are approximately 25-50% more expensive than current distributors, purchasing more food from the UBC Farm would fit into *Sage Bistro's* budget since the most costly items are proteins (half the menu cost is protein, half is produce, canned goods, dairy, etc.).
 - A strong desirability was expressed to purchase any produce that the UBC Farm can provide, including unprocessed items.
 - Willingness to establish a contract between the Farm and Sage was deemed desirable and considered part of a larger vision of a restaurant that serves only local food.
 - Barriers to establishing a contract with UBC Farm include inconsistent weekly demands of Sage's catering operations. As a result, it was suggested that establishing a contract should be developed to supply products for the breakfast and lunch services, rather than for catering operations.
 - A list of vegetable varieties were selected by the Chef and from *The West Coast Seeds Catalogue*, and the following list of vegetable varieties were selected and desired to be purchased from the UBC Farm:
 - Nasturtiums
 - Cheddar Cauliflower
 - Gai Lan
 - Romanesco Broccoli
 - Red cabbage for the winter
 - Celeriac
 - Parsnips
 - Butternut Squash
 - Danvers Carrots, Snow white, Atomic Red
 - White and Peach Corn
 - Japanese style Thin cucumbers
 - Fennel bulbs
 - Purple Kohlrabi
 - Leeks
 - Asparagus
 - Fava and Pole Beans (Not Dragon's tongue style)
 - Butter Beans
 - Mizuna (does not desire large quantities)
 - English Sugar Snap Peas
 - Basil (Thai and Traditional)
 - Maxibel bush beans
 - Beets (Candy Cane, and Winter variety)
 - Winter Onions and any other variety
 - Potatoes (except for Purple Russian)
 - Tomatoes (any Heirloom type) (Group 16, 2008).

Farm Product Supply:

- Based upon consultations with the UBC Farm Production Coordinator, the following was found:
 - Barriers to establishing a contract with *Sage Bistro* included that demand for farm grown produce fluctuates significantly due to catering functions.
 - Based upon the list of desired UBC Farm produce items stipulated by *Sage Bistro*, the following items were listed to be feasible to produce and supply:
 - Butternut Squash
 - Basil (Thai and Traditional)
 - Fava beans
 - Pole Beans
 - Sugar Snap Peas
 - Maxibel bush beans
 - Japanese Style Thin cucumbers
 - Nasturtiums
 - Willingness was expressed in creating a formal contract for more storable items, and those with well-established yields and growing techniques, such as butternut squash. It was also suggested, that in

the near future, UBC Farm eggs could potentially be incorporated into a contract, since the Farm has increased its flock of egg laying chickens.

- A list of additional UBC Farm items specified by *Sage Bistro* were determined by Farm representatives that were best to be supplied to *Sage Bistro* under a memorandum of agreement, providing flexibility and time to master farming techniques, and the possibility of future contract formalization (Group 16, 2008).

Pricing, Harvesting and Packaging Details:

- Estimates of *Sage Bistro* desired UBC Farm product’s volume, pricing, harvesting and packaging details were determined, and are outlined in the **Table 1** below:

Table 1: UBC Farm Produce Chart

Produce Item	Estimated Volume Farm can provide	Estimated Volume required by Sage	Cost per Unit	Estimated Preliminary Time for Harvesting	Post Handling Harvesting Practises	Packaging Requirements
Butternut Squash	2 tons (4000 lbs) over 4 months	50 lbs per week	\$1.80/ per lb	60% of harvest in September, & 40% in October	Field cure for 10 days in the sun or indoors in warm room for 4-5 days. To prevent mould, sponge skins with solution (10 parts water + 1 part Chlorine bleach). Store at 50-55°F with low humidity and good air circulation.	No special requirements
Fava Beans	60 lbs over 2 weeks	Wide variability each week	\$2.92/ per lb	August - September with possible harvest in July & October	Store at 40-45°F and 95% RH. Chill-injury may occur below 38°F.	No special requirements
Pole Beans	150 lbs	25 – 50 lbs per week	\$2.92/ per lb	August - September with possible harvest in July & October	Store at 37-41°F with 95% RH.	No special requirements
Maxibel Bush Beans	150 lbs	25 – 50 lbs per week	\$2.92/ per lb	August-September with possible harvest in July & October	Store at 40-45°F and 95% RH; chill-injury may occur below 38°F.	No special requirements
Basil -Thai & Traditional	10 lbs over two months	Wide variability each week	\$16.12/ per lb	September - October	Spreads leaves out on screens and dry in a dark, dry, well-ventilated room.	No special requirements
Japanese style Thin cucumbers	50 lbs	20 lbs per week	\$1.70/ each	50% of harvest in August, 40% in September, & 10% in July	Store at 50-55°F & 90-95% RH; chilling damage may occur at temps below 45°F & yellowing will quicken at higher temps.	No special requirements
Sugar-Snap Peas	200 lbs over 3 months	Wide variability each week	\$2.90/ per lb	70% of harvest in September, 20% in July, & 10% in	Cool after harvest to avoid loss of sugar content. Store at	No special requirements

				October	32°F & 85-95% RH.	
Nasturtium	8-10 flowers in a bag	Wide variability each week	\$2.00/ per bag	July - September, & occasionally in October	n/a	No special requirements

Delivery Schedule:

- It was determined that the UBC Farm can deliver produce on a weekly basis, on Friday afternoons between 3 and 9 PM to *Sage Bistro* (Group 16, 2008).

Purposed Contract and Memorandum of Agreement:

- Based upon consultations, a contract and memorandum of agreement were developed and is summarized below:

1) A contract was proposed, stating that the UBC Farm will provide 50 lbs per week of butternut squash to *Sage Bistro* for one month (totalling 200 lbs supplied; where 50 lbs x \$1.80/per pound = \$90 per week x 4 weeks = \$360 for 4 weeks (one month). This contract will supply *Sage Bistro* with their demand for breakfast and lunch services and additional amounts can be purchased for their catering needs. A one month contract was decided upon so that it can provide flexibility to both establishments and if the one month contract is successful, it can be renewed for another month or longer duration.

2) A memorandum of agreement was developed, indicating that *Sage Bistro* will purchase firstly, when possible, the following items from UBC Farm: nasturtiums, basil (Thai and traditional), sugar-snap peas, fava and pole beans, Maxibel bush beans, and Japanese style thin cucumbers. These items were included in an agreement to enable flexibility in both the amount supplied and demanded (Group 16, 2008).

Promotional Strategies:

- Proposed that UBC Farm items continue to be promoted on *Sage Bistro* menu with clear corresponding labels to aid in enhancing awareness of the UBC Farm (Group 16, 2008).
- Proposed that *Sage Bistro* servers should be required as part of their job description to attend a mandatory tour of the UBC Farm, guided by Farm staff. Creating a UBC Farm tour, would enable servers to become familiar with some of the products that they are serving, gaining intimate first hand experience of local sustainable food production, which could help inspire and inform the transferring of this knowledge to their customer base (Group 16, 2008).

Other:

- Based upon discussions with representatives from UBCFS, interest was expressed in exploring the idea for the construction of a root cellar at UBC Farm. The root cellar would serve as a produce storage facility, and would extend the availability of produce sold to UBC food outlets throughout the winter months. Interest was expressed by UBCFS in contributing funding towards its development, however on the condition that a sound business plan is created, clearly outlining the storage facility's costs, as well as its educational purposes.
- Other benefits thought to accrue from the construction of a root cellar included extending the year-round availability of UBC Farm produce, increasing consistency of market relations with UBCFS outlets, creating educational opportunities to demonstrate a low energy method of storing food items. Also, it was thought this could also help the UBC Farm be considered by the community as an essential campus food provider, which could help enhance the argument that current UBC Farm land is needed to enable adequate provision of this service over proposed housing developments.
- Based upon consultations with UBC Farm representatives, a lack of interest was expressed in prioritizing the construction of a root cellar since it was believed that UBC Farm priorities currently lie in improving efficiency and productivity, and increasing connections with campus. Alternately, if the UBC Farm increases storage facilities, preference was indicated for offsite storage sites or the use of greenhouses to extend their growing season (Group 16, 2008).

Place Vanier Dinina Hall:

Mission Statement:

- To create a business proposal to facilitate ways the UBC Farm can gain more exposure on campus through supplying produce to *Place Vanier Dining Hall*.

Short-term Goals:

- 1) Create a one-day a week menu item, composed of all or mainly UBC Farm produce for the early fall 2008 semester.
- 2) Display pamphlets and posters depicting featured menu items which contain Farm products, to promote information about educational opportunities at the Farm, including volunteer opportunities and field project proposals.
- 3) Organize a short (hour long) tour of the UBC Farm for *Place Vanier* kitchen staff to increase their awareness regarding origin and production methods of the food that they prepare.

Long-term Goals:

- 1) Consider establishing a strategy where the UBC Farm can supply more items than would be required to produce a weekly menu item.
- 2) Consider supplying *Place Vanier* with fruits once the UBC Farm Land and Food Systems Orchard is established.

UBC Farm Product Demands:

- Based upon consultations with the Head Chef of *Place Vanier*, a list of desired UBC Farm vegetable varieties were selected, which included the following:
 - Beets
 - Herbs (basil and others)
 - Cherry tomatoes (other varieties)
 - Kale
 - Asian Vegetables: Bok choy, Gai lan, Sui Choy, Chinese long beans, Baby bok Choy
 - Fennel bulb & tops (need 12- 24 heads/week)
 - Leeks
 - Scallions
 - Spinach (need 15lb/day)
 - Swiss Chard (Group 20, 2008).

Farm Product Supply:

- Based upon consultations with the UBC Farm Marketing Coordinator, the list of desired farm produce items stipulated by *Place Vanier* was shown, and the following UBC Farm items were listed to be feasible or potentially feasible to produce and supply:

Feasible:

- Kale
- Asian Vegetables: Bok choy, Gai lan, Sui choy, Chinese long beans, Baby bok choy
- Fennel bulb and tops
- Leeks
- Scallions
- Spinach
- Cabbage
- Squash

Potentially Feasible:

- Swiss Chard
- Basil
- Herbs
- Cherry tomato (or other varieties)

Pricing, Availability, and Harvesting Details:

- Estimates of availability and pricing (UBC Farm, 2008b) were determined for desired UBC Farm product items for *Place Vanier*, and can be found in **Table 1** below:

Table 1: UBC Farm Product and Pricing

Name	Unit	2006:	2007:	Availability'06	Availability'07
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		cost	cost		
Scallions	bunch	\$0.30	\$1.00	Jun-Aug	Jul-Aug
Swiss Chard	bunch	\$1.25	\$2.00	Jun-Oct	Jun-Oct
Fennel	pound	\$2.00	\$3.00	Jul-Oct	Jul-Sep
Kale	bunch	\$1.20	\$1.50	Jul-Nov	Jul-Oct
Leeks	bunch	\$2.00	\$2.50	Sep-Oct	Oct
Herbs	bulk		\$20.00		Jul-Oct
Bok Choy	Each	\$0.30	\$1.50	Jun-Jul Sep-Nov	Jun-Aug Oct

- Estimates of relative abundance for selected UBC Farm produce in 2007 seasons were obtained (UBC Farm, 2008b) and can be found in **Table 2** below:

Table 2: UBC Farm 2007 Produce Availability

Name	April	May	June	July	August	September	October
Scallions				20%	80%		
Swiss Chard			10%	20%	20%	30%	10%
Fennel				60%	20%	20%	
Kale				30%	20%	40%	10%
Leeks							100%
Herbs			10%	30%	30%	30%	10%

Ordering and Delivery Schedule:

- Based upon consultations with the UBC Farm Marketing Coordinator, it was recommended that orders be placed by *Place Vanier* on a weekly basis. Harvest forecasts are provided and submitted to buyers on Tuesday or Wednesday, while orders need to be placed on Thursday for Friday delivery.
- Based upon consultations with the *Place Vanier* chef, the proposed ordering and delivery schedule was accepted. Specifically, it was noted that the following week’s menu can be confirmed or changed upon notification of the harvest forecast, and then the items can be stored over the weekend for Monday preparation, to be served on Tuesday. It was stated that menus are flexible enough that would enable changes in availability of produce (with a one-week advance notice), where adjustments could easily be made to suit entrees (Group 20, 2008).

Purposed “UBC Farm to Campus Food Provider Program” Strategy:

- Based upon consultations held with the Head Chef of *Place Vanier* and the Marketing Coordinator of UBC Farm, the following strategy was proposed:
 - *Place Vanier* feature UBC Farm produce for one or two days a week during the fall months, which was deemed workable by both *Place Vanier* and UBC Farm representatives. A weekly order should be placed, once the weekly harvest forecast has been obtained.
 - While flexibility on behalf of *Place Vanier* was expressed on changes in orders, crops with strong yields were preferred. Specifically, crops showing greatest promise were fennel, kale, scallions, leeks, and Asian vegetables such as bok choy, gai lan, sui choy, and Chinese long beans.
 - Processing being a concern, *Place Vanier* often chooses to buy washed, chopped, sliced, and/or diced vegetables when possible, rather than pay union wage to a cook to perform these tasks. However, the vegetables mentioned above arrive with minimal, if any, processing from their current suppliers, so little to no extra costs would be incurred if these items were procured from the UBC Farm.
 - Greatest potential was expressed in Asian vegetables, especially bok choy, due to their increasing popularity and high demand from students. Asian-style vegetable crops are not huge sellers at the UBC Farm Saturday Market and thus, the Farm expressed capability to provide enough quantities for *Place Vanier* who currently order about 30 pounds of bok choy twice a week; the price per unit offered by the UBC Farm is \$1.50/each.
 - Strong interest was also expressed in purchasing fresh herbs such as basil, parsley, and cilantro from the UBC Farm for menu flavour enhancement and decorative purposes. It was expressed that they are not needed in large quantities and thus making it feasible for *Place Vanier* staff to wash and chop

them in a short period of time. Herbs seemed feasible from both the UBC Farm and food provider perspectives; however, uncertainty was expressed in their upcoming seasons yield. However it was believed that adequate yields could be achieved if the herbs are grown inside the hoop house where they are protected against excessive rain, heavy dew, frosts and wind.

- Strong interest in purchasing fennel was expressed and UBC Farm representatives indicated desirability in its provision. Fennel use was desired for soups, salads, stews, pizzas, pastas and many other food products. As fennel is not a huge seller at the Saturday Market, enough quantities can be grown and supplied to *Place Vanier's Dining Room*. The estimated volume and cost for fennel would be between 12 to 24 heads per week at a whole-sale price of \$3 per pound.
- Strong interest was expressed by *Place Vanier* in purchasing kale in the future. Currently, this item is purchased from a local food distributor, *Allied Foods*, in an unprocessed form. As a result, switching suppliers would not significantly affect the manual operations of *Place Vanier's* kitchen.

Promotional Strategies:

- A laminated sign was developed to be displayed at the *Place Vanier Dining Hall* to depict UBC Farm featured products.
- Based upon consultations with the *Place Vanier* Head Chef, it was suggested that to help promote the UBC Farm, a couple of UBC Farm flower bouquets be displayed in the entrance to the dining hall and pumpkins for the decorative autumn/Halloween season to place on the dining tables.

Other:

- While enthusiasm was expressed by the *Place Vanier* Head Chef and management to host a short (hour long) tour of the UBC Farm for kitchen staff, it was also believed that barriers exist, such as cost-feasibility for a paid required field trip for their unionized staff (Group 20, 2008).
- One of the produce items the Head Chef at *Place Vanier* inquired about was pre-washed beets. Currently, beets are roasted and featured regularly in salads and have been very popular and well-liked among customers. However, according to the UBC Farm Marketing Coordinator, the washing and bunching of beets is too labour-intensive and at the moment, they do not have enough volunteers to process large amounts. Instead, cabbage was recommended but these were rejected by *Place Vanier* due to extensive processing requirements.
- Based upon consultations with the UBC Farm representatives the idea of constructing a root cellar to serve as a long-term storage facility at the UBC Farm was proposed. While desirability was expressed, due to substantial costs involved in construction, it was expressed that it would only be a viable option if funding, materials and labour could be secured (Group 20, 2008).

AMS Food and Beverage Department:

Mission Statement:

- To create a business proposal that will strengthen existing and create new relationships between the UBC Farm and the AMSFBD outlets (Group 3, 2008).

Short-term Goals:

- 1) Establish a strategy whereby the UBC Farm expands production of beets, cabbage, carrots, and herbs (rosemary and oregano) to supply for AMSFBD (Group 3, 2008).

UBC Farm Product Demands:

- Based upon consultations with the AMSFBD Manager, the following was found:
 - AMSFBD outlets (excluding catering operations) have been purchasing UBC Farm produce since 2006. UBC Farm purchases have included: winter and summer squash, salad mix, ground cherries, beets, apples, corn and lettuce and cabbage.
- AMSFBD currently procures a significant amount of unprocessed produce from its current distributor, creating opportunities to source from the UBC Farm while meeting their labour constraints.

- The possibility of providing the UBC Farm with advance payments for products was expressed as a possibility to help the UBC Farm secure funds early to finance production inputs.
- Desirability was expressed in purchasing items from the UBC Farm that are currently not used in high volumes to help offset increased costs and meet quantity needs (Group 3, 2008).
- Based upon consultations with the AMSFBD Manager, a list of desired UBC Farm vegetable varieties were selected, which included the following:
 - Beets
 - Cabbage
 - Carrots
 - Herbs
 - Potatoes
 - Winter vegetables (Group 3, 2008).

UBC Farm Product Supply:

- Based upon consultations with the UBC Farm Marketing Coordinator, it was found that approximately 500lbs of butternut squash were provided to AMSFBD during the fall 2007 semester (Group 3, 2008).
- Based upon the list of desired UBC Farm produce items stipulated by AMSFBD, the following items were listed to be feasible to produce and supply:
 - Beets
 - Cabbage
 - Carrots
 - Herbs (rosemary and oregano) (Group 3, 2008).

Delivery Schedule:

- It was determined that the UBC Farm can deliver produce on a weekly basis, on Fridays between 3 to 7 PM to the Student Union Building (SUB) (Group 3, 2008).

Proposed "UBC Farm to Campus Food Provider Program" Strategy:

- Based upon consultations held with the AMSFBD Manager and the Marketing Coordinator of UBC Farm, it was proposed that the UBC Farm increase production of beets, cabbage, carrots and herbs (rosemary and oregano) to supply to AMSFBD (Group 3, 2008).

Promotional Strategies:

- A laminated sign was developed to indicate weekly UBC Farm product features, which was proposed to be displayed at specific AMSFBD outlets that procure associated produce (Group 3, 2008).

Honour Roll. The Moon, and The Pendulum:

Mission Statement

- To create a business proposal that will raise awareness of the UBC Farm, build support for local agriculture by enhancing relationships between the UBC Farm and AMSFBD (Group 25, 2008).

Short-term Goals:

1) To create a proposal of trade, whereby UBC Farm carrots are incorporated into three AMSFBD outlets who currently do not procure any or little Farm produce, for one month of September 2008, to promote local food production and consumption. The program will start with a one month supply by the UBC Farm of 25 to 50% of total AMSFBD carrot consumption during the month of September (Group 25, 2008).

2) To recommend that AMSFBD source all other carrots that cannot be supplied by the UBC Farm, with local BC carrots from their current supplier, *Central Foods* who currently sources them from the US (Group 25, 2008).

UBC Farm Product Demands:

- Based upon consultations with the AMSFBD Manager and Purchasing Manager, the following was found:
 - AMSFBD is constantly striving to increase local food procurement practices.
 - Current barriers expressed in sourcing produce from the UBC Farm, included difficulty in obtaining guaranteed crops, availability of crop selection, inconsistencies between the peak growing season (June to mid-October) and the peak campus market season (September to April), storage space limitations, where AMSFBD has a small storage warehouse in the SUB, and requires product turn

around within four to five day intervals, making it difficult to order and store large amount of Farm produce early in the season.

- Currently two of AMSFBD outlets - *The Honour Roll* and *The Moon*, do not procure any UBC Farm produce, and another outlet - *The Pendulum* currently procures small amounts. Each of these three outlets currently uses carrots in menu items.
- Currently all carrots procured from AMSFBD's current fresh produce supplier *Central Foods* are grown in the US (Group 25, 2008).
- Based upon consultations with the AMSFBD Manager, a list of desired UBC Farm vegetable varieties were selected, which included the following:
 - Beets
 - Carrots (Group 25, 2008).

UBC Farm Product Supply:

- Based upon consultations with the UBC Farm Marketing and Program Coordinators, the following was found:
 - Currently, the UBC Farm produces over 200 varieties of produce.
 - September constitutes the highest harvest month for produce.
 - Squash constitutes the highest volume crop under production.
 - Approximately 66% of UBC Farm sales are derived from their Saturday Farm Markets, 11% from their Community Support Agriculture (CSA) box program, and 19% from direct sales campus and external outlets. The ideal sales ratio strived for was 33% for each market.
 - Currently, the UBC Farm is considering expanding production of root vegetables.
 - In 2007, the UBC Farm produced a total of 500 bunches of carrots (Group 25, 2008).
- Based upon the list of desired UBC Farm produce items stipulated by AMSFBD, the following items were listed to be feasible to produce and supply:
 - Carrots (Group 25, 2008).

Pricing, Harvesting, Volume, Packaging and Post Harvesting Details:

- Estimates of pricing, harvesting, volume, packaging and post harvesting details were determined for AMSFBD's desired UBC Farm carrots, and are outlined in the **Table 3** below:

Table 3: UBC Farm Carrot Supply Capacities:

UBC Farm		
Total Capacity		500 bundles (approx. 500lbs)
Production		
<i>Availability upon harvest</i>		June - October
<i>Estimated plantation periods</i>		April - July
<i>Estimated time required for maturation</i>		60 – 120 days
Delivery Schedule		Friday 3 – 9 pm each week
Post harvest Processing		Washing, boxing and quality assurance ^a
Asking Price		\$1.50 / lbs
AMS		
Total Consumption		208.50 lbs
Buying Price		\$0.48 / lbs

^a Quality assurance by basic hazard analysis (*Appendix D*)

- Estimates of specific required volumes for three AMSFBD outlets who rely on approximately 200lbs per month are outlined in the **Table 4** below:

Table 4: AMSFBD Carrot Demand

	Carrots (lbs) used in September				
	Week 1	Week 2	Week 3	Week 4	Total for September
Honour Roll	11.5	19.9	24	18.5	73.9
The Moon	29.95	40.8	43.5	0	116
The Pendulum	1.85	4.4	5.75	6.5	18.5

Delivery Schedule:

- It was determined that the UBC Farm can deliver carrots to AMSFBD on a weekly basis, every Friday between 3 to 9pm (Group 25, 2008).

Proposal of Business Trade:

- Based upon consultations held with the AMSFBD Manager and Purchasing Manager and the Marketing and Program Coordinators of UBC Farm, a proposal of trade was developed, and is summarized below:
 - UBC Farm will supply AMSBD outlets (*The Honour Roll, The Moon and The Pendulum*) with 20-25lbs per week of carrots for one month (4 weeks) of September 2008 (totalling a total 80-100lbs of carrots), constituting approximately 25-50% of total month of carrot consumption at AMSFBD within the month of September 2008. An establishment for price trade shall be ranging from \$0.48 to \$1.50 per pound of carrots.
 - AMSFBD augment the remaining carrot volume demand of 100 to 120lbs with supply of local carrots from their current supplier *Central Foods* for the month of September (Group 25, 2008).

Promotional Strategies:

- Proposed that a one day event be launched in the SUB to promote the use of UBC Farm products in SUB outlets, and to increase awareness of the UBC Farm. Specifically, it was proposed that Sprouts, Friends of the Farm, UBC Farm and AMSFBD set up booths in the SUB where they could set up information booths to supply related UBC Farm information. Current "Think Globally, Eat Locally" pamphlets designed by previous AGSC 450 students and features at SUB outlets should also be available at information booths. Also, it was suggested that stickers and pins be created that depict the UBC Farm logo and catchy local food messages. It was suggested that pins be worn by AMSFBD employees during the event to help encourage customers to become more aware of the UBC Farm, and that products be featured in AMSFBD outlets. It was suggested that UBC Farm logo stickers be placed on menu boards, and product signs to depict items which feature these products (Group 25, 2008).
- Proposed that an "Eat Local" webpage be added to the AMS website to provide information to the UBC community about where they can purchase UBC Farm products and other local goods in the SUB, as well as provide a space to list related local food events. An email list server could be developed whereby interested members would receive updates about new product features and events (Group 25, 2008).

Key Recommendations:

Sage Bistro and UBC Farm:

- Review proposed contract for supplying *Sage Bistro* with weekly delivers of UBC Farm butternut squash at specified quantities for one month at outlined prices, and if deemed desirable, agree upon the contract with *Sage Bistro* (Group 16, 2008).
- If butternut squash contract is deemed successful at the end of the one month time frame, consider extending the contract duration (Group 16, 2008).
- Review proposed Memorandum of Agreement (MOA) for *Sage Bistro* to purchase the proposed selection of UBC Farm produce (Butternut Squash, Thai Basil, Traditional Basil, Fava beans, Pole Beans, Sugar Snap Peas, Maxibel bush beans, Japanese Style Thin cucumbers, Nasturtiums firstly from the UBC Farm before other distributors, if possible. If deemed desirable, agree upon MOA with *Sage Bistro* (Group 16, 2008).
- If butternut squash contract is deemed successful, consider creating further contracts for produce items specified in the Memorandum of Agreement (Group 16, 2008).
- Work with *Sage Bistro* to establish a schedule for their servers to come to the UBC Farm for a guided tour. *Sage Bistro* should consider making this tour mandatory for all servers. The tour should be guided by a farm staff representative who should explain the benefits of local and sustainably produced foods, and showcase crops that are currently sold to *Sage Bistro* (Group 16, 2008).

UBC Farm:

- Follow up contact with UBC Food Services (UBCFS) to discuss the potential of constructing a shared root cellar (Group 16, 2008).
- Research potential opportunities for funding regarding the construction of a root cellar (Group 20, 2008).

- Consider allocating land and resources for the production of specific crops for the AMSFBD including: cabbage, carrots, beets and herbs (Group 3, 2008).
- Seek to consolidate a working data set between the AMSFBD and the UBC Farm including produce exchanges, quantities, prices, and availability of products (Group 3, 2008).
- Follow up contact with AMSFBD to discuss the potential of allocating more land to supply AMSFBD with carrots for the month of September (Group 25, 2008).
- Consider expanding research at UBC Farm in ways that could contribute to increasing the Farm's production capabilities, such as with the squash bio-fertilizer trials that were conducted in 2007 (Group 25, 2008).

Place Vanier Dining Hall and UBC Farm:

- *Place Vanier* feature UBC Farm grown produce for one or two days a week during the fall months, which was deemed workable by both *Place Vanier* and UBC Farm representatives. A weekly order should be placed, once the weekly harvest forecast has been obtained.
- While flexibility on behalf of *Place Vanier* was expressed on changes in orders, crops with strong yields were preferred. Specifically, crops showing greatest promise included: fennel, kale, scallions, leeks, and Asian vegetables such as bok choy, gai lan, sui choy, and Chinese long beans (Group 20, 2008).
- Other crops that *Place Vanier* considered desirable in purchasing from the UBC Farm included fresh herbs such as basil, parsley, and cilantro. Follow up discussion should be pursued to determine the feasibility of production and supply.
- Other crops suggested by Farm representatives that were believed to be feasible to supply to *Place Vanier* included cabbage. Follow up discussions with *Place Vanier* should be pursued to determine the desirability of these products (Group 20, 2008).

AMS Food and Beverage Department (AMSFBD):

- Continue enhancing the business relationship with the UBC Farm by following up negotiations for increased supply of cabbage, and ordering carrots, beets and herbs (rosemary and oregano) (Group 3, 2008).
- Consider creating contracts for proposed items, whereby advanced payment is provided to the UBC Farm (Group 3, 2008).
- Consider creating more permanent advertising space in the future renovation of the new AMS Student Union Building (SUB) that could provide opportunities to promote of local sustainable food served in AMSFBD outlets as well as the UBC Farm (Group 25, 2008).
- Consider highly promoting the UBC Farm and local food consumption annually every September, through featuring UBC Farm products such as carrots and providing related information booths in the SUB (Group 25, 2008).

AMSFBD and UBC Farm:

- Set up a meeting to discuss proposed business of trade for provision of carrots to three AMSFBD outlets- *The Honour Roll*, *The Moon* and *The Pendulum* for the month of September, where by the Farm supplies AMSFBD with a approximately 20-25lbs of carrots for 4 weeks. Specifically, work on negotiating a mutually beneficial price for a minimum order of carrots that both parties can agree upon (Group 25, 2008).
- Consider creating a UBC Farm tour for managers and employees at AMS Food outlets for August 2008, to increase awareness among employees of origins and productions practices associated with the Farm products they serve, which will ideally inspire staff to communicate this information with customers (Group 25, 2008).

Scenario 5: Practicing Urban Agriculture Right Here: Integrating the Land and Food Systems (LFS) Garden with the Faculty of Land and Food Systems Community (Groups 1, 4, 7 & 17)

Objectives:

- To develop a business proposal to inform the expansion of the Land and Food Systems (LFS) Garden to the west side of Macmillan building in an effort to provide food to the LFS community, to create

opportunities for research and education, and to further enhance UBC's contribution to small scale organic food production and food security.

Central Findings:

Literature Review:

Campus Gardens:

- All groups conducted a review of other campuses that have established food gardens and determined whether lessons can be drawn that might help inform the development and management of the *Land and Food Systems (LFS) Orchard Garden*. Various other campuses were found that contain campus gardens, including:
Milwaukee's University of Wisconsin, Stanford University, University of Washington, Berea College, UC Santa Cruz, Evergreen State College, Fleming College, Gettysburg College, University of Alberta and the University of Toronto (Groups 1, 4, 7 & 17).

Production Capability:

- All groups conduct a review of resources (i.e. *West Coast Seed Catalogue* and *BC Direct Farm Market Association Guide*) to determine how seasonal production works in the province, and more specifically to determine what the *LFS Orchard Garden* is capable of producing.

Land Use Plans:

- All groups conducted a review of land use plans for the current south side location of the *LFS Orchard Garden* as well as the planned west side area for garden expansion. During the course of the term, based upon consultations with representatives from Campus and Community Planning, a temporary land lease was granted for garden usage, however in the future it may be considered for new building developments (Group 4, 2008).

Soil Analysis:

- Soil sampling was conducted for the west side proposed garden site by members of some groups in collaboration with LFS faculty and a directed studies student. A corresponding soil analysis was conducted by Pacific Soil Analysis in Richmond, BC. As a result, soil characteristics were determined, and suggestions for the use of additions, such as fertilizers, were made.
- It was determined that the garden site contains a mixture of two soil types: 1) the native soil, which is made up of sand, silt, clay, gravel, and rocks; and 2) the non-native soil, comprised of sand, pebbles, compost, and woody particles. Differences were found between both soil types, where tests demonstrated differences in mineral/chemical and nutrient composition. Differences were generally attributed to the history of site use, where after removal of portable buildings the site interior had been amended with a mixture of compost and sand (Groups 4, 7 & 17, 2008).
- A nutrient analysis of the soil indicated that both the salinity and the level of organic matter (at roughly 10% for both native and non-native soils) appeared normal, and low levels of potassium, magnesium, and nitrogen were found in the soil sample, particularly for native soil. Thus, mineral replacement and fertilization were considered viable options to restore potassium and magnesium levels (Group 4, 2008). Also it was found that the pH of the native soil was acidic (5.8), and it was recommended that dolomite lime be applied after potatoes are harvested to achieve the ideal pH of 6.5 (Group 7, 2008).

Interviews:

- Electronic, face-to-face and telephone interviews were held with representatives from Land and Food Systems faculty and staff, Agora Café, Agriculture Undergraduate Society (AgUS), UBC Farm, Friends of the Farm, UBC Plant Operations and UBC Waste Management to gather preliminary input on their business proposal for the *LFS Orchard Garden* (Groups 1, 4, 7, & 17 2008).

Garden Business Proposal:

- Based upon secondary research and interviews all groups developed a business proposal to inform the development for the expansion of the garden to the west side of Macmillan building. Below is a summary of groups specific proposed plans for various components of the garden:

Layout/Infrastructure Plans:

Perimeter:

- It was proposed that a permanent temporary fence be constructed in the short term around the garden. An ongoing project was proposed whereby a garden perimeter could be constructed by building a cob wall. Cob construction is a natural building technique that requires sand, clay and straw, which is formed and stacked into walls over a period of time. Cob walls collect and hold solar energy which provides insulation and thermal mass benefits, enhances soil warming, and allows for extended growing seasons by taking advantage of solar energy in the low seasons (Group 1, 2008).
- Based upon input of community stakeholders, it was determined that a perimeter needs to be established around the garden that is both aesthetically pleasing and functional. A recta-linear six-foot perimeter along all sides was proposed which would allow for easy maintenance such as mowing, and could give the garden a sense of permanence. Overtime, it was proposed that a more aesthetically appealing border, such as berry bushes and hedging should be established (Groups 4, 7 & 17, 2008).

Pathway:

- Constructing a pathway with woodchips was recommended since they are lightweight, self-generated from plant clippings around campus, and can be densely packed to prevent weeds from growing. It was recommended that pathways be approximately three feet wide to ensure a wheelbarrow could pass through. It was proposed that in order to prevent weed growth, cardboard or carpet could be laid underneath the woodchips (Group 4, 7, & 17, 2008). Other suggestions included that a pathway could be constructed out of cover crops (i.e. clover and alfalfa) which could serve as a long term rotational strategy by inverting pathway and bed locations (Group 7, 2008).

Beds:

- The creation of a rectangular raised bed system was recommended since it can help enhance soil drainage, speed up soil warming, provide easier maintenance, and can easily provide designated separate sites for various projects. It was recommended that beds be no longer than four feet wide to ensure ease of maintenance, however bed length could easily vary (Group 4, 2008).

Other:

- Locating a composting system on the north side of the garden (closest to Agora Café) was recommended, so that food wastes from both *Agora Cafe* and Agricultural Students Undergraduate Society (AgUS) can be easily disposed (Groups 4 & 17, 2008).
- In order to create an inviting social space, benches were proposed to be placed in the garden (Group 1, 4, & 17, 2008). It was recommended that benches be constructed from crates, donated from companies who could include their name on the bench (Group 4, 2008), or constructed from cob materials (Group 1, 2008).
- An amphitheatre was proposed to be built, containing a permanent table, terraced seating and a herb lawn to serve as an outdoor learning and social space (Group 1, 2008).

Production Plans:

Present Plans:

- The *LFS Orchard Garden* was plowed, fertilized and then tilled on April 2, 2008, where two varieties of early potatoes – Cal-white and Pontiac (donated by *Helmer Farm* in Pemberton) were planted. Potatoes were planted because they are considered to serve as a good test crop to determine the vitality of the soil. At the same time planting potatoes were considered ideal because they could help fill a gap at UBC Farm, where due to a high number of wire worm pests they are unable to grow potatoes successfully. Also, the potato planting provided for an early crop, allowing for future production flexibility; where a cultivation strategy that emphasizes late-season production could be implemented smoothly. Potato harvest dates

were anticipated for early to mid-June, and it was recommended that they be given to the UBC Farm to be sold at their Saturday Farm Market (Groups 1, 4, 7 & 17, 2008).

Future Plans:

- All groups developed detailed production plans for the garden site, as outlined below. Common themes included a focus on late season production, over-wintering strategies, and a focus on crops that the UBC Farm currently does not grow, such as potatoes, edible flowers and mini fruits.
- Group 1 proposed that the garden include annual beds and perpetual harvest beds, herbs, tea spirals, fig tree guilds, kiwi trellis, herb lawn, fruit trees, raspberry canes, edible flowers, and mini fruits (Group 1, 2008).
- Group 4 proposed that the garden include approximately 19 raised beds, where a variety of vegetables be planted, including: lettuce, peas, onions, spinach, carrots, bush beans, pole beans, cucumber, tomato, brussel sprouts and zucchini. It was also proposed that two herb spirals be created, to include a variety of herbs. Proposed that plants with similar needs be kept together, that tall plants be used to create shade for cool-weather crops, annuals and perennials be located in separate beds, garlic and mint be interspersed throughout the garden to repel pests, and dill be planted next to tomatoes to repel tomato worm (Group 4, 2008).
- Group 7 proposed that the garden be separated into six plots oriented around a central rectangular space, where each plot will have a specific use or theme. Plot A, B, and C will be used to cultivate crops for Agora, AgUS, the UBC Farm, and other on-campus food facilities. Plot D located in the middle of the garden will be a theme garden that seeks to demonstrate perma- and poly-culture production techniques. The bottom two plots of the garden (plots E and F) will be cover-cropped (combination of clover, vetch and rye/winter wheat) to conserve resources and to delegate time and work to be focused on the development of the other four sections of the garden. A general plot rotation strategy was recommended, where a minimum of one bed is left fallow and cover cropped. This last section will allow for flexibility and responds to the impermanency of the planning process. The selection of plots for production is flexible and may need to be resituated depending on soil quality. Late season over wintering strategies were envisioned and Linda Gilekson's book *Year-Around Harvest Winter Gardening on the West Coast* was recommended as a useful associated resource (Group 7, 2008).
- Group 17 proposed that the garden be divided into four quadrants, where two quadrants could be used for AgUS and Agora food production, two quadrants could be used various student projects or serve as an ornamental landscape, and the remaining two quadrants can be used for cover crops until labour permits their further development. In general, three crops were proposed to serve as key garden features: kale, herbs and squash which can be harvested during the academic year. Each of these crops was identified as ideal to meet the needs of Agora Café (Group 17, 2008).

South side garden:

- The south side garden was originally designed and cultivated by a former student exists as a periphery from the newly developed west side garden and was found to create challenges pertaining to continuity and resource diversion. As a result, it was suggested that the original smaller south side garden be transformed into a low-input herb garden to conserve resources and energies for production on the new main site (Group 7, 2008).
- Moreover, it was proposed that the garden showcase herbs for use at *Agora Café* as well as edible and non-edible flowers that could be used for borders. Herbs suggested included: dill, mint, parsley, oregano, basil, thyme, chives, rosemary and cilantro. Borders and beds could be constructed from wooden ladders which would merely need to be laid down horizontally to create a unique rustic/country look (Group 17, 2008).
- Alternatively, it was suggested that if adequate resources are made available, that the three-year crop plan proposed by Steedman (2007) be implemented, integrating other proposed crops as the garden becomes more stable (Group 4, 2008).

Distribution Plans:

- Proposed that the once the potato crops are harvested in June 2008 that they be donated to UBC Farm and sold at the UBC Saturday Farm Market, and other crops planted later be used by Agora Cafe and AgUS in the fall. Based upon communication with Agora representatives, it was determined that they would like

to purchase Garden crops beginning with their first order placed in the third week of September. The Agora inventory manager was recommended to be the best person to coordinate this relationship. Agora places their orders on Fridays, and the orders are delivered on Mondays. The following garden crops were requested by Agora:

- Tomatoes (30-50/week)
 - Cucumbers (12/week)
 - Lettuce (5 heads/week)
 - Kale/Chard (2 bunches/week)
 - Winter Squash (4 medium/ biweekly)
 - Parsley, rosemary, sage, thyme, cilantro (various amounts/weekly)
 - Other items that can be used for quiche, or newly proposed menu items will be considered (Groups 1, 4 & 7, 2008).
- It was determined that *Agora Café's* menu will be shifting in fall 2008 to include more quiches and soups, and a higher reliance on seasonal crops. As a result, it was determined that they should primarily procure three crops that are anticipated to be used in high volume – squash, herbs and kale (Group 17, 2008).
 - Based upon communication with AgUS representatives, it was determined that a garden liaison position could be created if interest existed. The liaison could help coordinate distribution from the Garden. The following crops were identified of interest by AgUS: garlic and onions (used at every BBQ), green peas and corn (which could be frozen and kept in the AgUS freezer). The menu at AgUS is fairly flexible, and if supply of a garden item is short it could easily be supplied from elsewhere. AgUS menu is planned two weeks in advance, and require produce one day prior to the BBQ (Group 1 & 4, 2008).

Management Plans:

- All groups proposed that the garden be managed by a hired student garden coordinator, who would be helped by members of an envisioned "LFS Orchard Garden" management committee, consisting of faculty, students and staff. Generally groups envisioned that the management committee's primary role consist of providing mentorship to the Garden Coordinator and volunteers, provide support when needed, help ensure successful operation of the garden and that production and education objectives are met, to help ensure the continuity of the garden, and to take over the management of funds (currently held by Friends of the Farm), and be responsible for drafting and updating the Garden Coordinator job description. Based upon preliminary communication with staff and faculty, groups managed to elicit tentative agreement to participate in the committee from representatives of UBC Plant Operations, Agora Café, AgUS, and LFS faculty and staff. (Groups 1, 4, 7, & 17, 2008). It was also noted that CUPE 116 (UBC's trade union) be contacted to inform them of the garden project to avoid any misunderstandings, as well as to determine whether they would like to share their input on garden design (Groups 1, 4 & 7, 2008).
- During the term, an email was developed and sent out to the entire LFS undergrad society to recruit a volunteer to fill the Garden Coordinator position, where it was outlined that the position may become a paid-volunteer position; however at the time of paper submission no volunteer was found. Overall, the main duties proposed for the Garden Coordinator by groups included: recruiting and organizing volunteers maintain continuous care for the crops and garden site, liaise with Agora and AgUS to coordinate food needs, costs and delivery process, develop budget and elicit donations, and collaborate with community stakeholders for ongoing input (Groups 1, 4 & 7, 2008).
- It was proposed that a meeting be held at the end of April where all four group garden proposals are discussed and the next appropriate steps of action are agreed upon (Group 4, 2008).
- All groups recognized that one of the largest obstacles that the LFS Garden would likely face is maintaining a continual and committed team of volunteers, and as a result recommended that incentives be offered in return for volunteer hours (Group 4, 2008).
- It was suggested that a journal be maintained recording what is planted and when, dates of maturity, crop yield, weather conditions, any pest problems, and other pertinent observations (Group 4, 2008).

Signage:

- Based upon communication with UBC Plant Operations and others, the need for signage that contained the name of the garden as well as contact information should be created. As a result groups developed a temporary sign which included the garden name "*Land and Food Systems Orchard Garden*". The name of

the garden was chosen to give recognition to the land's past as a food production site. However, a larger more permanent and weather tolerant sign still needs to be designed and built (Groups 1, 4, 7, & 17, 2008).

- Other physical signage recommended included creating educational signs indicating various student projects in the garden (Group 4, 2008), and creating signage to identify crops and highlight nutritional information (Group 1 & 7, 2008).

Waste Management Plans:

- Groups proposed that waste generated from *Agora Café* and AgUS be contributed to the garden. This compost could help fertilize the soil, create educational opportunities for research in soil management, create a closed loop system and decrease the ecological footprint of the LFS community. Currently, all recyclable compost material from both food operations is contributed to UBC Waste Management's composting system, which is in shortage of compost materials; however support was expressed from staff to divert the compost for use at the garden (Groups 1, 4, 7 & 17, 2008).
- Groups investigated various composting systems for consideration to be implemented in the garden, to both be used to compost organic materials from the garden and from Agora and AgUS. The following composting systems were investigated, outlined below:

1) Windrow Composting:

- Is a method whereby organic matter is piled into long rows, and turned to aerate the soil and maintain porosity. It can help ensure that aerobic composting is occurring. The cons of this method are namely that it is not as aesthetically pleasing since it is not contained (Groups 1 & 4, 2008).

2) Sheet Composting:

- Is a method whereby organic matter is directly placed on the soil and is left to decay, and is ultimately hoed into the ground before flowering. This method has been documented to better prevent nutrient loss than other methods (Group 1, 2008).

3) Single-bin System:

- Can be purchased for about \$115 or constructed from a variety of materials. It is typically used for smaller amounts of compost (especially for backyard gardens), is aesthetically pleasing, and is not labour intensive (Group 1 & 4, 2008). The main drawback of this method is that it likely will not be the most suitable choice for the large size of the garden (Group 1, 2008).

4) Three-bin System:

- Can be purchased for about \$300 or constructed from a variety of materials. It is capable of holding a large amount of compost, and demonstrates different stages of composition. This composting system requires that one bin be filled with fresh materials, one bin that has materials that have been turned, and one bin that contains finished compost. It requires a minimal amount of labour (Group 1, 2008). A three bin system typically produces about 700kg of organic fertilizer every 6 months from about 2000kg of organic waste (Group 17, 2008).

- In sum, one group recommended the implementation of the single-bin system (Group 4, 2008) and three groups suggested that a three-bin system be built (using recycled wood materials – building instructions available on GVRD's website: <http://www.gvrd.bc.ca/recycling-and-garbage/composting.htm>), with clearly labeled signage indicating which materials can be placed in each bin (Group 1, 7, & 17, 2008).

Budget Plans:

- All groups developed projected budgets specifying anticipated labour and supply costs. Total projected budgets developed were as follows: \$7400.00 (Group 1, 2008), \$2973.00 (Group 4, 2008), \$190.00 + labour (Group 7, 2008), and \$4519.00 (Group 17, 2008). Budgets varied significantly primarily because some groups incorporated anticipated supply donations into budget calculations, and one group incorporated projected net income from anticipated crop sales.

- Representatives from scenario groups developed a proposal and budget which was submitted as a joint application with the UBC Farm for the 2008 AMS Grad Class Council (GCC) Gift⁸ to obtain funding for the garden, and a student coordinator salary. Groups were told that the application status would not be known until the end of May, thus posing challenges in proposing detailed production and management plans.
- All groups communicated with campus stakeholders regarding the potential of obtaining donations for garden supplies. Below is a description of *potential* sources for donations:

Potential Donors:	Potential Donations
UBC Plant Operations	<ul style="list-style-type: none"> • Items: Woodchips (garden pathway), soil (from in-vessel compost), a drop box site (to dispose surface materials such as sod). Donations for hedging material was also sought, however due to budget limitations, they could not be provided but potentially could in the future. Also it was determined that tools could not be borrowed (Group 1 & 4, 2008).
UBC Properties and Trust	<ul style="list-style-type: none"> • Items: Lumber for constructing raised beds, fencing and signage. UBCP&T were noted to have in the past donated lumber to UBC Botanical Gardens (Group 1, 4, & 17, 2008).
UBC Material Recovery Facility	<ul style="list-style-type: none"> • Items: Lumber for constructing raised beds, fencing and signage. (Group 1, 2008).
UBC Botanical Gardens	<ul style="list-style-type: none"> • Items: Plants (Group 1 & 17, 2008).
City of Vancouver	<ul style="list-style-type: none"> • Items: Start-up compost. It was determined that the City of Vancouver gives free compost for gardens on public land (Group 1, 2008).
Faculty of Land and Food Systems	<ul style="list-style-type: none"> • Items: Variety of tools (stored in west side exterior stairwell of Macmillan). It was determined that an opportunity to source more tools was possible, provided that a supply list of other required items is made (Group 4 & 17, 2008).
UBC Farm	<ul style="list-style-type: none"> • Items: Tools, fertilizer (Group 1 & 17, 2008), irrigation hoses (Group 1, 2008), and compost (Group 7, 2008).
Private sector	<ul style="list-style-type: none"> • Items: Benches. It was suggested that bench donations would constitute an ideal donation to be sought from companies who could in turn have their name placed on them (Group 1, 2008).

Education and Research Opportunities:

- All groups investigated the potential to create linkages between the garden with education and research opportunities, as outlined below.
 - The majority of groups strongly recommended that the garden be integrated into AGSC 100, where students are required to complete a specified number of community service hours on campus. The garden was considered to be an ideal site for students to complete these hours, where students could benefit from a range of learning opportunities, and may also elicit a returning and committed team of volunteers over the course of their UBC careers (Groups 4 & 7, 2008).
 - Based upon interviews with LFS representatives it was determined that high potential existed for the garden to be incorporated into courses offered in the Agroecology department. Recommended courses for this integration included: AGRO 402, SOIL 502 (Group 7, 2008), AGRO 490 (Topics in Agroecology), AGRO 461 (Applied Agroecology), and AGRO 497 (Directed Studies). It was proposed that the garden could be used as a site to engage in hands on learning in a variety of areas including soil sciences, pest management, and horticulture (Group 4, 2008).
 - Furthermore, it was proposed that the garden could also be incorporated into AGSC 496 (career development internship), where students could work closely with the Garden Management Committee

⁸ The AMS Grad Class Council (GCC) Gift is a grant provided by the Council to a program, or programs they decide needs it the most. In 2008 the GCC had a total of \$25,000 to be awarded to programs, of which \$12,000 could be awarded to a single program (cited in Group 7, 2008).

and Coordinator, who would provide mentorship pertaining to small-scale organic horticulture (Group 4, 2008).

- Integration of the garden with courses offered *outside* of the LFS included the following suggestions: BIOL 140 where students could use the garden as site to be introduced to the concept of an ecosystem, connections between plants, foods, the environment and other living organisms; BIOL 209 could ask students to use the garden for their lab portion (Non-vascular plants), BIOL 210 (Vascular plants), and BIOL 343 (Plants & People), as well as BIOL 317 (Weed Science). The Science One program available at UBC may also be able to include the garden into their curriculum as they encourage field trips (Group 1, 2008).
- It was proposed that learning opportunities could be created for primary school children on weekends. Specifically, local elementary schools, such as University Hill Elementary School could be contacted, where garden volunteers could work with children to teach basic gardening and harvesting skills (Group 1, 2008).
- Interactive workshops could also be provided whose purpose would be to update the knowledge of volunteers and the teaching faculty about how to grow foods and how to maintain the garden for the long term. Suggested workshops might include how to keep the garden lush through the summer without using too much water (Group 1, 2008).
- Gardening experts could host several seminars in the garden, and build a network with other similar university gardens around the province, such as the University of Victoria who could share their experience of growing, harvesting, and maintaining their respective gardens (Group 1, 2008).
- Other educational opportunities were proposed including creating a project whereby students conduct a nutrient profile of the garden's crops, others work on ways to monitor success of composting and plant propagation (Group 4, 2008).
- The creation of a blog by the Garden Coordinator was proposed to serve as a public forum for the garden. Specifically, it was recommended that this blog contain photographs, personal experiences of garden users, successes and failures, request for volunteers and projects, serve as an up-to-date tool for creating discussion about the garden, and serve as a resource for other campuses and communities who wish to start their own garden (Group 4, 2008).
- Creating educational opportunities at the garden for secondary and post-secondary students who are studying nutrition was proposed. Specifically, projects could be developed whereby students come out to the garden to create signage for the crops, identifying specific crop names as well as list of any nutritional information or other benefits associated with crops (Groups 7 & 17, 2008).
- Directed studies courses and student directed seminars were also considered suitable classes that could integrated the garden with course learning outcomes (Group 17, 2008).
- The AMS Mini-school Series was identified as a potential set of courses that the garden could be integrated within learning outcomes (Group 17, 2008).
- A specific outline of proposed projects and courses within the Faculty of Land and Food Systems (Group 7, 2008), as well as courses from outside the LFS that the garden could be integrated was developed (Group 7, 2008).

Key Recommendations:

UBC Food System Project Coordinator:

- Coordinate a meeting with the interim committee that was proposed and share group's business proposals to determine best components and to form a permanent garden management committee to ensure the smooth operation of the garden in order to fulfill the education and production objectives of the garden project (Group 4, 2008).

Orchard Garden Committee:

- Create a more "permanent" temporary fence than the caution tape that is currently around the garden (Groups 1 & 4 2008).
- Review directed studies student (Ashley Peterson) project findings and recommendations (Group 1, 2008).
- Determine the application status of the graduating students' gift which was applied for jointly with the UBC Farm, and determine the potential of creating an undergraduate student garden coordinator position (Groups 1 & 4, 2008).

- Organize a group of volunteers together to do weeding in the south side of the garden (Group 1, 2008).
- Determine who will harvest potatoes in June and communicate with UBC Farm staff to coordinate how they can be sold at the UBC Farm Market (Groups 1 & 4, 2008).
- Begin construction of the garden (Group 1, 2008).
- Review the current proposed sign for "The LFS Orchard Garden" and if deemed desirable develop this into a larger, more permanent sign (Group 1 & 4, 2008).
- Ensure that if students begin various educational projects within the garden work that they are required to mark their space with a sign, indicating the goals of their project (Group 4, 2008).
- Present layout plans to Landscape Architecture and Plant Operations for their input and determine the acceptance of the layout with faculty, students and stakeholders on campus (Group 1, 2008).
- Develop a detailed management plan including a volunteer plan and investigate how volunteering for the garden could be incorporated into courses (Group 1, 2008).
- Develop a detailed budget after determining what supplies can be donated (Group 1, 2008).
- Determine which supplies can be sourced through donations and recycling and which ones need to be purchased (Group 4, 2008).
- Determine how funds from the current garden fund, held in the Friends of the Farm account, can be used most efficiently for garden development (Group 4, 2008).
- Create a LFS Orchard Garden account that is separate from Friends of the Farm (Group 1, 2008).
- Consider purchasing a composting system such as the bin system for the garden where the majority of the materials come from waste produced currently by the Agora Café and AgUS (Group 4, 2008).
- Communicate with representatives from CUPE 116 regarding project plans (Group 1, 2008).
- Establish and maintain a relationship with Campus Community Planning to ensure current land use for the garden will be maintained, especially considering that only a six month land lease has been obtained (Groups 1 & 7, 2008).
- Ensure that a seed log is kept for everything that gets planted which can be used in student-led research on the nutritional output of the garden (Group 4, 2008).
- Consult with faculty from the LFS Agroecology department to determine whether the garden can be connected to current Agroecology courses, as specified in "Educational and Research Opportunities" section (Group 4, 2008).
- For the south side garden, consider maintaining the initial envisioned three-year crop plan (Group 4, 2008), or consider creating a low input herb garden (Group 7, 2008).

LFS Garden Coordinator (for summer 2008):

- Establish member composition for the garden committee based upon recommendations from group proposals (Groups 1, 4, 7, & 17, 2008).
- Develop educational components for the garden, such as crop identifiers, nutritional profiles and inviting instructors to incorporate the garden into their courses (Group 17, 2008).
- Develop professional buyer-seller relationships with Agora Cafe's and AgUS liaison (Groups 7 & 17, 2008).
- Determine a garden name, signage and design promotional resources, such as a LFS Garden website (Group 17, 2008).
- Create a blog to serve as a public forum to communicate written and visual updates for the garden, experiences, challenges and successes (Group 4, 2008).
- Implement design, production and harvest plans for the garden (Groups 1, 4, 7 & 17, 2008).
- Establish proposed connections with various stakeholders who can provide resources and consultation for the garden (Groups 7 & 17, 2008).
- Create and reinforce educational links to the garden, by following up proposed educational opportunities (Groups 1, 4, 7 & 17, 2008).
- Determine the feasibility of incorporating the garden into AGSC 100 curriculum, where students could conduct their required service learning hours (Group 7, 2008).
- Determine the feasibility of incorporating the garden into course curriculum outside of the LFS Faculty, by contacting external faculty to determine a list of interested instructors. If interest is found, determine the feasibility of obtaining a course fee from students in these courses to help pay for expenses of maintaining and regenerating the LFS Orchard garden (Group 7, 2008).
- Research bursaries, awards, grants and other opportunities for further garden funding (Group 17, 2008).

- Reapply for the Grad Class Council Gift, Victor Runeckles Grant and the UBC Student Environment Center fund every year (Group 7, 2008).
- Provide regular progress reports to the committee (Group 7, 2008).

Scenario 6: Developing a Sustainable Food Outlet for UBC Food Services in the New Beaty Biodiversity Centre (Groups 8, 10, 11 & 22)

Objectives:

- To develop a business proposal to inform the development of a new UBC Food Services (UBCFS) outlet in the Beaty Biodiversity Building as a true model of a sustainable food operation on the UBC campus.

Central Findings:

Menu and Recipe Development:

- Developed four seasonal menus for fall, winter, spring and summer. Each menu features two sample meals for breakfast and for lunch. Menus were developed taking into consideration limitations posed by space and equipment. Sample menus were designed to showcase local seasonal foods such as berries, spinach, and apples as well as a variety of food that this food outlet is capable of creating. Each sample recipe includes at least one nutrition claim, which was created using information obtained from a nutrient analysis conducted for the proposed menu items using *Diet Analysis Plus* (Group 8, 2008).
- Developed two seasonal recipes along with corresponding nutritional analysis, including a "very berry smoothie" and a "roasted root vegetable salad". Recipes were designed to showcase seasonal local items that can be sourced from the UBC Farm (berries, squash and root vegetables) as well as elsewhere in BC when produce can not be obtained from the Farm. Proposed that menu prices be range from \$6-\$8 (Group 10, 2008).
- Developed a seasonal menu for lunch items including panini sandwiches, salads, to-go snacks and beverages. Sample menus were designed to showcase seasonal local foods, and include a colour code to showcase specific items that correspond with their growing season. Menus were developed taking into account recommendations from *Canada's Food Guide* and were designed to feature abundant fruit and vegetables, whole grain products, low-fat dairy and meat products, and foods limited in high fat or sugar. Four recipes were developed along with a corresponding nutritional analysis which was conducted to test for nutritional viability using *Data Analysis Plus*. Analysis results showed that sample recipes were low in saturated fat and sodium, high in fiber, and provided plenty of fruit and vegetable servings, whole grains, and contained low-fat meat and dairy products. Items not listed on the proposed menu but were recommended to be made off-site and transported to the *Beaty Café* include quiche, soups, and fresh baked goods (Group 11, 2008).
- Developed two seasonal menus for fall/winter and spring/summer, along with a sample of two recipes for: "Cajun Spaghetti Squash Breakfast Patties" and "Caramelized Tofu" which highlight nutritional facts. Each menu incorporates seasonal local foods and contains the following features:
 - a) Daily specials** were developed for both breakfast and lunch featuring seasonal local food where possible in order to provide a varied menu for regular customers.
 - b) Everyday items** for breakfast include yogurt, seasonal fruit, and/or granola bar, and for lunch include made-to-order sandwiches/wraps, baked sweet potato fries and salad, and for dessert/snacks include gluten free, vegan, organic baked goods and COBS breads. Also it was suggested that staff could pack the remaining breakfast yogurt/granola/fruit into cups and sell them later in the day for healthy snacks
 - c) Zero Mile Mondays** were proposed as a concept where the Monday daily special could include at least one item from the UBC Farm. Higher prices for *Zero Mile Mondays* specials were proposed to reflect the UBC Farms higher selling prices.
 - d) Less meat-based menu** was proposed and designed where less than half of the week's daily specials contain meat products. By creating a menu that relies less on animal products the *Beaty Café* could help promote environmental sustainability since modern-day meat production is associated with large amounts of greenhouse gases emissions and animal waste production, and relies on a large amount of energy involved in the meat processing, animal feed production and transportation. Furthermore it was found that

there is lack of vegetarian/vegan outlets on campus which could give The *Beaty Café* a differential advantage (Group 22, 2008).

Food Suppliers and Seasonal Availability:

- Developed a "*Seasonal Availability Chart*" depicting seasonal availability of produce for Allied Foods, UBC Farm and BC" (Group 8, 2008).
- Proposed that UBC Farm be considered a supplier of selected produce items. Other alternative suppliers that could supply local foods were researched, and four other potential suppliers were proposed below:
 - 1) Terra Breads:**
 - Produces breads which are made from organically grown Canadian grain, and is milled in the Lower Mainland. Terra Breads already currently delivers to the Sage Bistro campus restaurant.
 - 2) Anita's Organic Mill:**
 - Produce a multigrain waffle mix which is made from Canadian grain milled in Chilliwack, BC which could be used in a variety of breakfast items offered.
 - 3) Naturally Homegrown Foods:**
 - Sells "Hardbite Potato Chips" which come in a variety of flavours and are made in Maple Ridge, BC using local potatoes and oil with a healthier fat profile. These chips can also be obtained through Neptune Foods.
 - 4) Duso's Enterprises:**
 - Produces pasta manufactured in Burnaby, BC, using Canadian grain. Duso's pastas are also available through Neptune Foods, and have a large food services market (Group 8, 2008).
- Both current and potential additional suppliers were researched and contacted that could supply local foods. Based upon this research the following three suppliers were proposed:
 - 1) Allied Foods:**
 - While UBCFS already sources fresh produce from Allied Foods, it was suggested a formal request be made to supply specified seasonal local ingredients.
 - 2) Discover Organics (DO):**
 - Suggested that UBCFS contact DO to determine alternative sources for local produce (Group 10, 2008).
 - 3) UBC Farm**
 - Based upon communication with UBC Farm staff, it was found that the Farm is interested in being a supplier to the *Beaty Café*. Specific items that are expected to be available in larger quantities for the 2008-09 seasons include (blackberries, broccoli, cabbage, carrots, cucumbers, flowers, various herbs, kale, purple sprouting broccoli, radishes, sorrel, salad mix and squash). A preliminary list of produce and prices that the Farm staff has forecasted to be available in larger quantities during specific months was developed (Group 10, 2008).
- Developed a 1) "*UBC Farm Market Produce Pricing and Availability Chart*" depicting seasonal availability of produce and corresponding prices and 2) "*Chart of Seasonal Availability of Locally Produced Food*" depicting seasonal availability of dairy, fish, fruit, grain, meat, nuts, seafood and vegetables products, as well as times that products are obtained from greenhouses, storage or fields (Group 11, 2008).
- Both current and potential additional suppliers were researched and contacted that could supply sustainable foods. Based upon this research the following three suppliers were proposed:
 - 1) UBC Farm:**
 - A list of items that will be available was identified in accordance with seasonal availability along with prices per unit.
 - 2) Biovia Organic Link:**
 - Specializes in providing restaurants with local organic food.
 - 3) Organic World:**
 - Specializes in BC produced, organic, nitrate/nitrite-free luncheon meats and is located in Maple Ridge, BC. Organic cheeses will be provided in the near future.
 - 4) Avalon Dairy and Olympic Dairy:**
 - Both suppliers produce local organic milk and other dairy products.
 - 5) Terra Breads:**

- Produces breads made from organically grown Canadian grain, and is milled in the Lower Mainland. Produces a variety of bread appropriate for making paninis using organic ingredients (Group 11, 2008).
- Both current and potential additional suppliers were researched and contacted that could supply sustainable foods. Based upon this research the following four suppliers were proposed:
 - 1) **Organica:**
 - Distributes a wide range of organic produce and food products and was recommended by representatives from *Discovery Organics*. Based upon communication with staff a high level of enthusiasm was expressed regarding the potential of working with UBCFS's new sustainable food outlet. *Organica* aims to provide the 'best prices in the city' and quoted prices as "cost+25%".
 - 2) **Pro-Organics:**
 - Distributes produce, staples, dairy, and baking supplies. Based upon communication with staff a high level of enthusiasm was expressed to partner with UBCFS. *Pro-Organics* tries to support local organic farms and publishes a separate "B.C. Grown" list during local seasons.
 - 3) **COBS Breads:**
 - Produces unique healthy breads for sandwiches, rolls and a variety of baked goods. Based upon communication with staff, it was expressed that COBS is very flexible with ordering and delivery and would be more than happy to give a discount to UBCFS.
 - 4) **The UBC Farm:**
 - Proposed that a selection of items be sourced from the Farm for specials on "Zero Mile Mondays" at the *Beaty Café*. Mondays were chosen based upon communication with UBC Farm staff who felt this corresponded best with their delivery schedule. Staff members send out a weekly UBC Farm availability list every Wednesday to all of their restaurant customers letting them know what will be available for the coming Friday. Orders need to be returned by Thursday lunchtime to confirm them. During the winter months it was suggested that for 2009 it is likely that Farm eggs will be available and may be used for "Zero Mile Mondays". Other items that could be sourced for the Farm include berries and garlic which could be bought in bulk and preserved for use over the winter (Group 22, 2008).

Promotional and Educational Materials and Tools:

- Proposed that educational tools be developed as part of a marketing strategy to raise awareness of the proposed outlet's unique sustainability mandate. Specifically, the following educational tools were proposed:
 - Coffee cups are labeled with eco tips/facts.
 - Large posters with local farmer and supplier profiles are displayed around the café.
 - LCD menu screens are used to highlight quick eco facts and tips pertaining to café outlet features.
 - Information/sample booths are held at the SUB during special events (Group 8, 2008).
- Proposed that educational tools be developed to encourage effective participation in composting, and support for sustainable food options. Specifically, the following educational tools were proposed:
 - Composting posters, brochures and table signs be created similar to those used at *Caffe Perugia*.
 - Posters with pie charts and bar graphs about food miles and sustainability ratings of different foods be created and be displayed throughout the Cafe. Bar graphs could outline specific initiatives the outlet has adopted to reduce energy such as savings from efficient lighting methods, and waste and pie charts could depict the economics and social aspects of how the consumer dollar is divided between local farmers, processors, and on-site staff, and percentage of specific menu item ingredients that are local, seasonal, organic, fair trade, etc.
 - Facts about sustainability and composting could be printed on napkins (Group 10, 2008).
- Proposed that promotional and educational tools be developed to reflect the *Beaty Café's* objective of promoting local and sustainable food systems, such as the importance of consuming local seasonal foods, lowering carbon emissions, and reducing ecological footprints. Proposed that tools employed include a combination of print advertisements, in-store promotions, awareness stickers, and grand opening events. Specifically, the following strategies were proposed:
 - During the week of the grand opening of the *Beaty Café*, free food samples of select menu items at specific times, be distributed throughout the day within and near the immediate vicinity of the café.

- A stamp card program be implemented exclusive to the *Beaty Café* whereby customers are given a stamp card which entitles them to a free menu item once customers bring their own container or mug nine times to the Café.
- Free stickers be developed depicting a slogan such as "I bring my own mug" and "I bring my own container" to encourage people to bring their own reusable containers.
- Posters, pamphlets and stickers be developed depicting one of five promotional slogans that represent some of the ideals of the sustainable food outlet, including: 1) "*Reduce your footprint. Eat at the Beaty Café*", 2) "*Lower your food miles. Eat at the Beaty Café*", 3) "*Appreciate the seasons. Eat at the Beaty Café*", 4) "*Make healthy choices. Eat at the Beaty Café*" and 5) "*Take green actions. Eat at the Beaty Café*" (Group 11, 2008).
- A public sustainability bulletin board be created where community members can post related flyers or event notices. Near the bulletin board, a pamphlet rack could be created containing brochures of the Beaty Café and other campus clubs, programs, and initiatives that resonate with the Café's mandate (Group 11, 2008).
- Developed a series of promotional and educational materials including:
 - 1) Friends of The Beaty Garden Café card**
 - An initiative to encourage people to bring their own utensils was created. Every time a customer brings their own utensils, they not only can save \$0.25, but also earn a stamp on a "Friends of The Beaty Garden" card entitling them to a free baked good or coffee upon receiving the 10th stamp. This initiative could not only help by decreasing the use of disposable containers customers use but also help promote a sense of community and encourage regular customers.
 - 2) Educational poster**
 - Designed one poster that depicts "*8 reasons to eat local*" and suggested that it be displayed on a wall at *The Beaty Garden Café* which could help increase the community's awareness of why they should eat more local food.
 - 3) Wall murals**
 - Designed two wall murals to be displayed on walls at the *Beaty Garden Café* each depicting a quote that describes the goodness of local foods (Group 22, 2008).
- Proposed that the following tools and methods be adopted as part of a marketing strategy to raise awareness of the proposed outlet's unique sustainability mandate.
 - 1) The following tagline "*The Beaty Garden Cafe – 'We know our food'*" be adopted and used with a variety of tools. Specifically it was proposed that the tagline be used in conjunction with: a) an ingredients list of each menu item on cards at display cases or on the LCD monitors which could empower customers by knowing what is in their food and also makes choices easier for those with allergies; b) a nutrition and facts display depicting seasonal local foods featured in the daily specials on LCD monitors; c) Labels or logos displayed on menu boards or dishes indicating the source of the food which can help consumers to see that local food can taste great, get in touch with seasonal foods, and encourage local eating.**
 - 2) Proposed that "*Zero Mile Mondays*" be adopted whereby ingredients from the UBC Farm are featured in a selection of menu items. Notices about featured ingredients and the Farm could be displayed on the LCD screen and also potentially be sent out through UBC Farm server lists (Group 22, 2008).**

Waste Management:

- Proposed that side-by-side composting, recycling and garbage bins be available both inside and outside the outlet to promote composting among customers (Groups 8 & 11, 2008).
- Proposed that staff and management consider the following five components to engage and promote sustainable waste management practices in an effort to reduce, reuse, recycle, and return (to the earth through composting):
 - a) Gain firm and visible management support for waste reduction:**
 - Set goals for waste reduction within the food outlet by educating staff on the importance and benefits of waste reduction and encouraging employee commitment in waste reduction.
 - b) Designate an enthusiastic and motivated waste-reduction coordinator:**

- The coordinator's main role should be to plan and coordinate waste-reduction activities, and advocate the staff's active involvement in waste reduction. The coordinator can act as a link between management and employees, reducing the load on the management.
- c) **Continue involvement in UBC Waste Management's (UBCWMM) Organic Collection Program:**
 - The designated waste-reduction coordinator should contact the Organic Collection coordinator at UBCWMM to determine the cost of organic waste disposal and arrange collection frequencies, depending on the amount of waste production. If necessary, a small green collection bin can be purchased from UBCWMM at a cost of \$10.
- d) **Conduct waste assessment:**
 - The manager and waste-reduction coordinator should carefully assess the amount of waste generated at *The Beaty Cafe*, review purchasing policies, and evaluate waste stream content. A waste assessment is recommended because it helps to identify target areas for 'reducing, reusing, recycling, and returning'. In addition, assessment of waste demonstrates to employees the types and quantity of waste generated. To determine the waste composition, a waste sort can be conducted where one day's waste is collected and sorted.
- e) **Train employees and continue promotion:**
 - The manager/waste coordinator of the food outlet should explain to staff how waste reduction can benefit both the restaurant and the environment, and describe the goals. Mandatory orientations for waste reduction could be given to acquaint employees with recycling and composting. Training should be repeated periodically to ensure employees are able to separate compostable materials from contaminants. Various composting and recycling campaigns may be organized to make the training process more interesting. Employees should be encouraged to increase customers' awareness on the importance of waste reduction, recycling and composting through communication, such as by giving staff rewards when seen actively encouraging customers to bring their own containers (Group 22, 2008).

Serving Ware:

Bio-based disposable containers:

- All groups researched companies who could supply the *Beaty Café* with biodegradable serving ware. Below is a description of five companies which groups investigated:

1. Eco-Products:

- *Eco-Products* supply 100% compostable containers and utensils that are made from renewable resources, and the company uses carbon neutral shipping to supply the products.
- To achieve zero emissions (carbon neutral shipping) *Eco-Products* invests in projects which prevent the same levels of greenhouse gases from entering the atmosphere as their shipping contributes to. To minimize these levels, they only use trucks which run on clean-burning natural gas (which has minimal emissions), or bio-diesel. *Eco-Products* also use solar panels to provide more than 85% of their electricity. They believe in creating zero waste by creating compostable products, as well as recycling or composting all waste created at their facility. They even allow customers to bring their recyclable and compostable waste to the facility if they do not have access to any other means of recycling.
- Most of the products they make are heat resistant (up to 220°F) and made from non-GMO vegetable starches, such as corn or sugarcane fibers, which are biodegradable. *Eco-Products* sells a large variety of these products in different sizes for cups, containers, utensils, plates and trays. They also carry miscellaneous supplies such as bags, napkins, sugar, trays, and cleaning supplies (Group 10, 2008).

2. Biodegradable Solutions International (BSI):

- *Biodegradable Solutions* is a Vancouver-based company promoting sustainability in the food services industry. Their FibreWare products are made of sugarcane fibre, are heat resistant (up to 230°C) and includes various sizes and types of soup bowls, plates, clam shells, cups, plates and trays lunch boxes. FibreWare products are 100% biodegradable and compostable, and also recyclable in the conventional paper stream as well. Sleeves accompanying hot cups are 100% recycled and have the option of custom art design with vegetable based ink and cost \$75.00 per 1,000 sleeves (Group 8, 2008).

- Corn-based products are also available, including a selection of cold cups, clamshells, straws, cutlery and salad bowls. These corn-based products are derived from Polylactic Acid, which is currently one of the most popular compostable alternatives to plastic (Groups 8 & 10, 2008).
- BSI also provides cellulose bags which could be used for packaging 'to-go' orders. These bags are transparent, and are made from plant material acquired from non-rainforest tree farms. Bags are 100% biodegradable and degrade within 10 to 30 days when buried (Group 8, 2008).
- A price comparison was conducted between *Eco-Products* and *Biodegradable Solutions* samples – see Table 1 below.

Table 1. Price comparison between a small sample of Eco-Products and Biodegradable Solutions

Item	Eco-Products: Price per item	Biodegradable Solutions: Price per item
Utensils	\$0.068 (corn based)	\$0.088 (corn based) \$0.044 (potato based)
Clamshells	\$0.26 (insulated 8"x8"x3", sugarcane)	\$0.18 (8.4"x6.2"x2.5", sugarcane)
Clamshells	\$ 0.45 (clear 8"x8"x3", corn)	\$0.39 (9"x5", 25 oz, vegetable starch)
Soup bowl	\$0.08 (7 oz, sugarcane)	\$0.07 (10 oz, fibre)
Soup bowl lids	\$0.08 (7 oz, sugarcane)	\$0.05-0.10 (depends on bowl)
Plate	\$0.14 (10 inch, sugarcane)	\$0.12 (10 inch, fibre)

(Group 10, 2008).

3. Tater Ware:

- *Tater Ware* supplies 100% biodegradable serving ware made from potatoes that are GMO Free, heat stable to 375°F, freezer safe and micro-warmable (reheating only) and are suitable for hot and cold foods. Products include a selection of cold and hot cups, clamshells, utensils, and plates (Group 11, 2008).

4. BioCorp:

- Manufactures biodegradable and disposable serving containers. Containers from *BioCorp* are made from molded cellulose fibers or limestone, without containing any plastic resin, and are biodegradable in active compost systems (Group 22, 2008).

5. GenPak:

- Manufactures a variety of biodegradable and fully compostable serving ware. Products are made from annually renewable resources sourced from resources that are annually sustainable and are harvested within a 1 year growing season and include items such as corn, potatoes and other crops (GenPak, 2008).

Reusable Serving Ware:

- The use of disposable containers should be minimized by encouraging customers to bring their own containers, and by handing out disposables only as needed. Disposable cutlery should be kept behind the counter and handed out with meals as required. Foods that are going to be consumed at the *Beaty Café* should be served in disposable containers with less packaging compared to those taken off-site (Group 11, 2008).
- Reusable serving ware should be sold on site to customers and associated discounts for use should be provided. A Canadian-based company was contacted *Impression marketing*, who produces reusable serving ware from recycled material, customizable with logos (Group 22, 2008).

Interior Materials:

Lighting:

- To save energy, natural day-light should be relied on to reduce the need for electric lighting. It has been estimated that buildings which make full use "of diffuse, well-shaded daylight for illumination" are able to save their electrical energy use by more than 40%. The plan layout of the outlet shows that most of the walls are full glass and this will enable the outlet to use less artificial light, especially during the spring and summer months (Group 22, 2008).
- All groups proposed that energy-efficient lighting be used and proposed the following types below:

- ENERGY STAR (ES)-qualified products, which are endorsed by Natural Resources Canada's (NRCan) Office of Energy Efficiency's (OEE) should be adopted to help reduce energy usage and promote cost savings (Groups 8, 10, 11 & 22, 2008).
- All products should be sourced from a certified local supplier which can reduce transportation distance, amount of fossil fuels used, and CO2 emissions. A local supplier was found *CNA Lighting*, who is a certified supplier of ES-qualified products based out of Burnaby, BC. Based upon communication with a CNA Lighting's Sales Coordinator, the following three ES-qualified product lines were recommended for the new food outlet:

1) Compact Fluorescent Light (CFL) bulbs:

- CFL bulbs use 75% less energy than conventional incandescent bulbs and have up to ten times the longevity. Less frequent replacement in combination with lower energy usage is likely to offset the higher initial cost of procurement. Pricing ranges from \$2.99 - \$6.99 per bulb (Groups 8 & 11, 2008). However, CFL bulbs contain mercury, which creates complications with disposal procedures and may pose a health risk if broken (Group 11, 2008).

2) T5 Fluorescent Light Strip Fixtures (FLSFs):

- T5 FLSFs are similar to CFLs, have a long lifetime and use less energy than incandescent bulbs. While they are commonly used in business and commercial settings, they are often criticized for not being aesthetically attractive. Pricing ranges from \$19.99 - \$39.99 per strip (Group 8, 2008).

3) Light Emitting Diode (LED) puck lights:

- LED lights provide up to 100,000 hours of light compared to 8,000 hours for CFL and 1,000 hours for incandescent bulbs. LED bulbs are durable, generate little heat, and reduce the level of wasted light (Group 8 & 11, 2008). They have been proven to reduce energy consumption and costs by up to 90% when compared to an incandescent bulb and are commonly used for decorative lighting to improve aesthetics. 30-puck LED sets retail for \$139.99 before taxes at *CNA Lighting* (Group 8, 2008). Unlike CFL lights, LED lights are mercury-free (Group 11, 2008).
- For track or recessed fixtures, and flood or spot lights the Brite-Pro LED MR-16 lighting was recommended since it is a low watt, high efficiency light with an average lifespan of approximately 50,000 hours (Group 10, 2008).
- If lamps are incorporated into the new outlet, a small bi-pin ceramic metal halide (CMH) lamp was recommended. This lamp is produced by *General Electric* and *Philips* and contains reflectors which increase the amount of light without extra energy input, and produces less waste compared to using normal fluorescent and halogen lamps (Group 22, 2008).

Toilets:

- Purchase water smart toilets, such as "Profile Toilets" which feature an integrated hand wash basin and allows water used for hand washing to fill up the tank and then be used to flush the toilet. The profile toilet can save more than 70% of water consumption and 10% savings compared to the best water-smart toilets with a separate hand basin. They are available through *Sustainable Solutions International* (Group 10, 2008).

Furniture:

- Source furniture certified by the *Forest Stewardship Council (FSC)*, which ensures that products are derived and harvested from sustainably managed forests. Through *Habitat for Humanity Restores* materials such as reclaimed stalks of the sorghum plant or recycled wood off-cuts are available (Group 11, 2008).
- Source recycled wooden furniture and/or second hand furniture from thrift stores. Consider having artists in the UBC community paint second hand furniture outdoors by Main Mall to help promote the outlet and aid in community building (Group 22, 2008).
- Source benches, tables, garbage receptacles and bike racks made from Wishbone Industries, a Langley based company who makes products from recycled plastics and metals such as milk jugs and pop cans (Group 10, 2008).

Flooring, Cabinets/Drawers/ Countertops:

Flooring:

- All groups researched types of sustainable flooring options for the new outlet, and three of these options are outlined below:

1) Bamboo:

- Bamboo is an extremely durable renewable resource that can be harvested every four to five years or selectively every year and is the fastest growing land-based plant on earth. If harvested appropriately, replanting of bamboo stock is unnecessary as it grows back from the roots. The Canadian government's Environmental Choice Program offers an ECO-logo certified brand of bamboo flooring that contains no formaldehyde-laden, off-gassing resins, is low in volatile organic compounds (VOC) and formaldehyde content. Pricing varies but typically ranges from \$4.00-\$7.00 per square foot (Group 8, 2008).

2) Reclaimed or Recycled Wood:

- Reclaimed wood comes from timber structures such as old buildings, bridges and logs that are recovered from the bottom of rivers, and trees which are removed in urban and suburban settings. So using reclaimed wood flooring not only saves trees from deforestation, it also makes use of timbers that may otherwise need to be disposed of as waste (Group 8, 10 & 22, 2008).
- *Paper Stone* is a supplier of reclaimed wood and offers a *Paperstone Certified Product Series* which is the only surface currently on the market that is certified by the *Forest Stewardship Council (FSC)*, *Smartwood* and the *Rainforest Alliance*. Due to this it is referred to as "the greenest' architectural surface on the market today". *Paper Stone* is an ideal material because it is made from a combination of recycled paper, post-consumer waste, and petroleum-free resins. It is a composite material that is made when specially produced paper sheets saturated with phenolic resins, such as cashew nut shell liquid, are pressed together under heat and pressure which causes cross-linking of the resins. The result of this process is a hardwood-like, non-porous product with no detectable formaldehyde in it (Group 10, 2008).
- *The Healthiest Home* supplies Teka Engineered Wood which is Eco-logo certified and environmentally friendly, engineered wood. The "core is 'orchard salvage,' wood derived from rubber trees that would normally be burned at the end of their rubber-producing lifespan". They also supply reclaimed wood flooring of both river wood, harvested from the bottom of the Ottawa River, and wood from old buildings. Pricing researched ranged from \$3.00-\$8.50 for salvaged wood and \$7.22-\$11.26 for reclaimed wood (Group 8, 2008).

3) Cork:

- Cork is a renewable resource made from the bark of the cork oak and can be sustainably harvested every nine years by a process that does not damage the tree. Cork flooring is easy to clean and if sealed is water resistant. Pricing varies from \$3.05-\$4.75 per square foot depending on finish and format. Products should have no formaldehyde added and cork-vinyl composites should be avoided (Group 8, 2008).
- Many suppliers of sustainable flooring exist, including *PC Flooring* a Richmond based company (Group 10, 2008), *Green Works Building Supply* a Vancouver founded and based company (Groups 8 & 22, 2008), and *The Healthiest Home and Building Supplies (HHBS)* a Calgary based company (Group 8, 2008).

Countertop and Cabinet Materials:

- All groups researched types of sustainable materials for countertops and cabinets for the new outlet, and four of these options are outlined below:

1) Stainless Steel:

- Stainless steel is a highly durable, easy to clean and is considered a top recycled material providing a high strength-to-weight ratio as well as termite and fire resistance. Pricing ranges from \$45-\$65 per square foot (Groups 8 & 11, 2008).

2) Paper Composite:

- Paper composite is made from paper and a resin binder. It is a solid surface that is easy to clean, durable (particularly impact and heat resistant) and because it can be manufactured using recycled paper, it is a renewable resource. *PaperStone* is a popular paper composite brand made from recycled paper and is certified by the *Forest Stewardship Council (FSC)*, *Smartwood* and the *Rainforest Alliance*. Pricing varies

depending on thickness, size of surface, raw or manufactured material and starts from \$48-\$80 per square foot (Groups 8 & 22, 2008).

3) Marmoleum:

- Marmoleum is an all-natural material derived from linseed oil, wood flour, rosins, and limestone and is considered a good option for tabletops and floors. It possesses natural anti-bacterial and anti-static properties, which prevent the reproduction of many microorganisms and eliminate the need to use hazardous cleaning chemicals, as dusting and damp mopping is sufficient (Group 11, 2008).

4) Squak Mountain Stone:

- Squak Mountain Stone slab is a composite material composed of a mixture of recycled glass, coal fly ash and cement, and is used for countertop materials (Group 22, 2008).

Insulation:

- *UltraTouch Natural* cotton fibre insulation is comprised of 85% post-industrial recycled substance, 15% cotton, and does not contain any harmful chemicals, VOCs, and irritants (Group 22, 2008).

Key Recommendations:

UBC Food Services (UBCFS):

- Review groups proposed recipes and menus and consider adopting suggestions (Groups 8, 10, 11 & 22, 2008).
- Feature at least one produce ingredient from within 100 miles at all times (Group 10, 2008).
- Promote the grand opening in buildings located close to the *Beaty Biodiversity Centre* and offer food samples near the Café entrance (Group 11, 2008).
- The interior should reflect its sustainability theme and connecting the food on consumer's plates to the source – through having quirky and educational quotes and murals on the walls that may inspire people to think about the origins of their food (Group 22, 2008).
- Use innovative and eye-catching names for menu items to attract customers' attention (Group 11, 2008).
- Create pie charts to inform the public about sustainable principles adopted by the Café (Group 11, 2008).
- Follow up contact with *COBS Breads* to develop an agreement for supplying bread and pastries to The Beaty Garden (Group 22, 2008) and UBC Farm to determine specific item availability (Groups 10, 11 & 22, 2008).
- Work with *Allied Foods* to increasing local food sourcing by making a special request for specific items (Group 10, 2008).
- Advertise the benefits of eating at the Café in terms of its contributions towards sustainability (i.e. local seasonal food purchasing and waste management practices, etc.), and nutrition through the use of posters, stickers, and pamphlets at various campus food outlets operated by UBCFS (Group 11, 2008).
- If some higher menu prices are adopted for certain items, such as for the added expense of using biodegradable containers, UBC Farm produce, etc., explain why in pamphlets (Group 11, 2008).
- Encourage patrons to bring their own drinking containers and implement a "green" tax for those who require disposable cups (Group 10, 2008).
- Encourage composting by using educational materials such as informative posters, brochures, table signs found at *Caffé Perugia* (Group 10, 2008).
- Consider using *Eco-Products* or *Biodegradable Solutions* compostable containers, utensils and bags (Group 10, 2008).
- If possible incorporate a public sink into the Beaty Café dining area for washing containers which may encourage customers to bring their own containers (Group 11, 2008).
- Place a stamp or sticker on containers to remind customers to compost or recycle them (Group 10, 2008).
- Offer stamp cards to consumers as an incentive to promote bring-your-own container and frequent dining (Group 11, 2008).
- Hire students as part-time staff to provide opportunities for community building, to promote awareness of the *Beaty Café* among students, and to assist with their education financing (Group 11, 2008).
- Establish a community bulletin board at the Café where customers can view postings about events related to sustainability, information about healthy eating, and sustainable initiatives (Group 11, 2008).

- Source from local suppliers when selecting building material suppliers (Group 8, 2008).

Scenario 7: Investigating the Overall Ecological Footprint of the University of British Columbia Point Grey Campus Food System (Groups 2, 9 & 13)

Objectives:

- To review central literature on Ecological Footprint Analysis (EFA), to report what kinds of partial EFA have already at other campuses, and to determine the feasibility of conducting an EFA of the food system at the UBC Point Grey Campus.

Central Findings:

Literature Review:

- All groups conducted a literature review to obtain information about Ecological Footprint Analysis (EFA), such as what it is, how it is conducted and the different models available to conduct an EFA. Based upon this review, the following was found:
 - EFA is a concept developed by William Rees and Mathew Wackernagel to determine all ecological resources needed to support a population’s consumption, economic activity and waste production, including cropland, grazing land, forests, built-up areas, land for CO₂ absorption, fishing grounds, as well as fresh water and oceans (Rees, 2003 in Group 2, 2008). EFA is “an accounting tool that enables us to estimate the resource consumption and waste assimilation requirements of a defined human population or economy in terms of a corresponding productive land area” (Wackernagel & Rees, 1995, p.9 in Group 9, 2008).
 - According to the Redefining Progress’ latest footprint analysis, humanity is currently 39% over its ecological limit, meaning that more than one third of the earth’s biocapacity is needed to maintain the current global lifestyles (RP, 2008 in Group 2, 2008).
 - EFA can be measured in a variety of ways, depending on the purpose of the analysis and the specific type of land mass (Wilson & Anielski, 2005 in Group 2, 2008). The most common method of analysis is to calculate carbon emissions and study the differences between carbon uptake and absorption rates (RP, 2008 in Group 2, 2008).
 - While EFA can produce relevant information that can help society measure progress and inform decision making where efforts toward sustainability should be focused, some key limitations have been found in EFA calculations. The most frequent limitation ascribed to EFA is that it often produces over-simplifications of the true human demands on the earth (Group 9, 2008). Under-estimations of an EF are often due to the difficulty of defining factors, obtaining complex data, and limitations in the scope of analysis (Groups 2 & 9, 2008).
 - In order to produce accurate results, global hectare calculations must be standardized since many different methods exist. EFA calculations can only provide a rough estimate of the true EF needed to balance production, consumption and waste processing (Rees, 2003).
 - Many models were found to conduct an EFA, and two of the most prevailing models are summarized in **Table 1** below:

Table 1: Main Ecological Footprint Analysis (EFA) Models

Model	Classic Model	Eco-Index model
Analytical Approach	Top-down analysis approach	Bottom-up analysis approach
Process Analysis Methods	Compound based	Component based
Goal	To account for all the land that is used during the production and maintenance of each good and	To determine the ecological impact of products, processes, different lifestyles, organizations and sub-national regions

	service consumed by a particular community (Bicknell, 1998).	(Chambers, 2001). To calculate the impact of any form of travel (vehicles, planes, ships, etc.), primary energy usage, waste production and food consumption (Chambers et al., 2000 in Group 13, 2008).
Data sources	Primarily secondary sourced data (Bond, 2002), obtained from national statistics namely consumption and population figures (Lewan, 2001; Nicols, 2003).	Mainly primary sourced data (Bond, 2002), obtained from life cycle studies of a product or activity and local investigations (Lewan, 2001; Chambers et al, 2000).
Calculations	National consumption and population statistics are used to estimate the average per capita annual consumption for items in each consumption categories (Bicknell, 1998). Annual per capita consumption is divided by the average annual productivity taken from national statistics for each item consumed to yield approximate area used per person (Bicknell, 1998). Total per capita ecological footprint is obtained by adding all ecosystem areas used for each item consumed during a specified time period (Bicknell, 1998). Trade items are converted into bio-productive land consumed and waste generated to create them through the Land-Use-Matrix and measured against the nation's total bio-productive land giving the Ecological Footprint of the nation (Chambers et al, 2000; Nicols, 2003).	Human demand is compared with the bio-capacity of the same six land categories used in the top-down approach (Chambers, 2001). Calculations of the demand for resource production and waste assimilation are converted into global hectares by dividing the total amount by the global average yield (GFN, 2007). This area is then multiplied by the specific conversion factor to yield the total demand for each resource (GFN, 2007). Life cycle data is collated and converted to derive the footprint for a component and to capture impacts (Chambers et al., 2000 In Group 13, 2008). Calculating the impact of each of these components on fuel consumption, manufacturing, and maintenance energy involves acquiring the source of the land used and distance traveled and deriving an average ecological footprint estimate for a single passenger-km or other appropriate units (Chambers et al., 2000). This estimate is then used to calculate the impact of vehicle use at the individual, organizational, or regional level (Chambers et al., 2000 in Group 13, 2008).
Pros	<ul style="list-style-type: none"> • Considered well suited for application towards nations with clearly established boundaries, since it deals primarily with national trade flows and energy data (Chambers et al, 2000). • Considered most appropriate to conduct national EFA, since it is based upon national population and consumption data (Ryan, 2004). 	<p>Considered simpler and more educative since it is based on activities the population can identify and participate in (Lewan, 2001 in Group 2, 2008).</p> <p>Ease of communication, detailed instructions, and the breakdown of impacts by activity for those involved in policy-making decisions (Chambers et al., 2000 in Group 13, 2008). Considered well suited for measuring the EF of institutions and cities, since it keeps track of inputs and effects at different production levels deeper than aggregate data (Nicols, 2003).</p>
Cons	<ul style="list-style-type: none"> • Not considered appropriate for institutions that do not have readily available, cumulative data that can be tracked easily, or without clear and defined borders. 	<p>Problems can arise with this method, such as data variability and reliability, highly intensive work in calculating the direct and indirect life cycle impacts as small changes in assumptions, and yield of different results by the data (Chambers et al., 2000).</p> <p>Since this method relies on embodied energies,</p>

		it can be difficult to find and thus numerous assumptions may need to be made (Chambers et al, 2000).
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(in Groups 2, 9, & 13, 2008).

- All groups conducted a review of efforts at other campuses that have conducted an EFA. Based upon this review, the following was found:
- **University of British Columbia (UBC):**
 - To date an EFA has not been at the UBC Point Grey Vancouver campus, however at a smaller scale an EFA was conducted for an AMSFBD's outlet – *The Pendulum Restaurant*. Based upon this analysis, it was determined that the outlet's EFA was 340 ha/yr, and this was perceived to be an understatement due to limited data availability (Baynham and Dalton, 2005 in Groups 2, 9 & 13, 2008).
- **University of Toronto, Mississauga (UTM):**
 - UTM conducted an EFA based upon an ecological footprint calculator that they developed in 1994 to measure progress that the campus is making towards sustainability. The calculator has been updated to reflect the university's organizational structure and progress reports have been posted to their website (Steward, 2005 in Group 9, 2008).
- **Williamette University:**
 - An EFA is currently being conducted at Williamette based upon six consumption categories: food; local food; housing; transportation; goods; and services (Group 2, 2008).
- **Concordia University:**
 - An EFA was conducted at Concordia taking into account indoor environmental and air quality, transportation, space and planning, water, energy and waste management; community, health and well being; purchasing materials, economy, income and investments, governance, policy and implementation, research and curriculum (Wright, 2002 in Group 2, 2008).
- **Northeastern University (China):**
 - An EFA was completed for Northeastern University (China) using energy consumption, food consumption, waste disposal, water supply, transportation and paper consumption (Li et al., 2007 in Group 2, 2008).
- **Colorado College:**
 - An EFA was completed for Colorado College to analyze energy and material consumption, of food, water, and manufactured goods, waste production, and the area of land occupied (Wright, E., 2002 in Groups 2 & 13, 2008).
- **University of Redlands:**
 - A partial EFA was calculated which focused on water, solid waste, energy and transportation over a one year time frame (Venetoulis & Hempel, 2000 in Group 2, 2008).
- **Newcastle University (Australia):**
 - An EFA was conducted for Newcastle University including the following the categories: food, building, transportation, consumer goods and services. Findings indicated that Newcastle's total EF was 3592.1 Ha, representing 15% of the university's total land area. However, it was believed that this calculation was an underestimate due to data limitations, such as the exclusion of all food products except dairy, meat and alcohol among other issues (Groups 2 & 13, 2008).
- All groups reviewed current policies, strategies and obstacles that could affect ability for a reduction in UBC's food system Ecological Footprint as summarized below:

Policies:

- The following international, national and institutional level policies were found that could aid in the reduction of UBC's EF of the food system:

International level policies:

- In 1990 the Talloires Declaration was created which established a "ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities" (ULSF, 2001 in Group 2, 2008). The Declaration serves as an institutional commitment to sustainability and has been signed by UBC along with 350 other post secondary institutions worldwide (ULSF, 2001 in Groups 2, 9 & 13, 2008).

National level policies:

- In 1991 the Halifax Declaration was developed, which provided a unified direction that all campuses who became supporters could consider in education, training, research and interdisciplinary work (IISD, 2008 in Group 2, 2008).

Institutional level policies:

- In 1997 UBC became the first Canadian campus to develop its own Sustainable Development Policy to help create an environmentally responsible campus community by making ecological, economic and social modifications for a sustainable future (UBC Sustainable Development, 2005 in Groups 2 & 13, 2008).

Strategies:

- Both of UBC's food providers – AMS Food and Beverage Department (AMSFBD) and UBC Food Services (UBCFS) try to purchase as much locally grown produce as possible (Group 2, 2008).
- In January 2007, the Alma Mater Society (AMS) created an "AMS Lighter Footprint Strategy", which is a comprehensive plan to decrease the ecological footprint of all aspects of AMS operations from energy, procurement to waste (Group 9, 2008).
- The UBC Sustainability Office's Social, Ecologic, Economic Development Studies (SEEDS) program provides unique opportunities for UBC students to work with faculty and staff across campus on various sustainability projects (Group 9, 2008).
- UBC has a large in-vessel composting facility which is capable of composting 5 tonnes of organic waste a day (Group 2, 2008).
- UBC's Ecotrek program through rebuilding and retrofitting the infrastructure of nearly 300 academic buildings has reduced energy, water usage and greenhouse gas emissions, enabling UBC to meet Kyoto targets, five years ahead of time. As of 2006, the program has enabled a 20% reduction in total campus energy use, 30% reduction in campus water, and significant economic savings from energy reductions with \$3.8 million in energy costs over the last three years saved, and an additional \$2.6 million estimated to be saved annually. Other goals include establishing further reductions in the consumption of electricity, steam, natural gas and water, and to renew and enhance air conditioning, heating, ventilation, lighting and water-use facilities (Ecotrek, 2006 in Group 2, 2008).

Obstacles:

- The population of UBC's Point Grey Campus with over 40,000 students, 10,000 faculty and staff (UBC Human Resources), 11,000 residents and large variations between fall and spring term and summer populations (U-Town Library; 2008) could present challenges in conducting an EFA at UBC. To date comprehensive EFA were only found to be conducted at campuses ranging from 500 students, faculty and staff (Home Lacy College UK) to 20 000 (University of Newcastle), making it difficult to draw successful comparative models. Also, the large campus land area with rapid campus housing expansion makes it difficult to draw boundaries and makes data collection extremely time consuming (Group 9, 2008).
- It is anticipated that such a large campus population will pose additional complexities in collecting data, and in creating EFA calculations. A high number of data collection sources would need to be analyzed in order to conduct a meaningful EFA. Furthermore, hundreds of points of contact to trace materials coming onto campus would need to be made to analyze supply procurement, since no

centralized system exists that tracks this data, and there is lack of tracking systems for determining the very origins of food with many of UBC's food suppliers (Group 9, 2008).

- Moreover, conducting an EFA of this scale, by undergraduate students in a three credit course spanning 4 months is expected to be problematic due to human resources, skill levels, and time limitations. Conducting a campus EFA was found to be typically performed by graduate students or independent consultants. Secondly, time is expected to serve as major constraint in conducting an EFA, since collecting baseline data, calculations, etc. is believed to require more time than allocated within a single course semester (Group 9, 2008).
- Finally, another challenge of EFA concerns the very tool itself, which has a number of limitations such as over-simplifying true human impacts. Thus, it was believed that if an EFA is conducted at the UBC campus, that findings should namely be used to indicate the most certain and largest contributors to UBC's EF as well as an educational tool for UBC community members (Group 9, 2008).
- Based upon groups review of different EFA models and types conducted at other campuses, the most suitable approaches to conduct an EFA at the UBC Point Grey campus were recommended, as summarized below:
 - All three groups recommended that the most suitable method for conducting an EFA of UBC's food system was to use a Component Approach (Groups 2, 9 & 13, 2008). Advantages reported in using this method to conduct an EFA, included: 1) least time consuming in dealing with a decentralized system (Barrett et al, 2002; Chambers et al, 2000); 2) easily comparable results to other campuses, since most of them have used this method; 3) availability of comprehensive resources to conduct an EFA using this method, such as at the U of T who developed and Ecological Footprint calculator; and 4) potential for valuable, information to be found and used at the institutional level (Group 9, 2008).
 - One group believed that an EFA should be conducted for the whole-campus, rather than one pertaining only to the food system (Group 9, 2008). It was argued that this approach would be beneficial since more data is available from centralized sources, such as UBC Plant Operations, thus one could avoid the complexity of breaking up pieces of data that pertain only to certain sectors such as the food sectors (Group 9, 2008). While each group agreed upon the same approach to conduct the EFA, different steps and boundaries were proposed to conduct the analysis.
 - One group proposed four steps that they believed were required to conduct an EFA of UBC's food system, as outlined below:

Step 1: Calculate energy used within the system boundaries

- Calculate energy use for the following sources: fossil fuels (coal, natural gas, oil and derivatives), hydropower, biomass, and nuclear power (Group 2, 2008).
- Create system boundaries to include: supply, transportation, production, consumption and waste in the UBC food system, omitting human labor emissions, direct emissions from foodstuffs, buildings, and green space on campus from the analysis. Due to the nature of delivery and billing, data sources representing a four week timeframe was recommended. A list of inputs was determined that needed to be obtained for the production level for: 1) Suppliers (warehouse and manufacturing inputs, delivery quantities and frequencies, etc.); 2) Transportation and delivery supplier data (vehicle and fuel type, Distance traveled in km, and weight of goods transported - in tones, etc.); 3) Storage and consumption in retail outlet (building inputs in meal preparation (electricity, water, oil, refrigerants, Meal preparation materials and utensils); and 4) Waste production on Campus (garbage, composting, and recycling inputs) (Group 2, 2008).
- Only include the food establishments operated by UBC's two main food providers: 1) AMS Food and Beverage Department, and 2) UBC Food Services and exclude all independent food service establishments for the simplicity of data collection (Group 13, 2008).
- Focus on tracing the origin of the food only as far back as the suppliers within the Lower Mainland due to complexity in determining where the food was grown and the distance traveled to reach UBC (Group 13, 2008).

Step 2: Calculate associated carbon emission equivalents of the fossil fuel inputs in the system

- This can be done by creating an Excel spreadsheet of data inputs, and using the conversion factors based on the EPA's Carbon Calculator in the appendices of this report (Group 2, 2008).

Step 3: Calculating the Associated Biomass the land needed to absorb these emissions

- Calculating the biomass needed for absorption is labeled as the 'running footprint 2.0', which assumes that "the entire global ecosystem (oceans and land) absorbs excess carbon at its current net uptake rate of 0.06te-C/gha/yr (0.2 te-CO₂/gha/yr)". This concludes that the global ecosystem absorbs excess carbon at a rate of 0.2 tonnes (or 200kg) of carbon dioxide per hectare per year (Group 2, 2008).

Step 4: Compare the footprint to available biocapacity

- Compare UBC's population to the national population in order to determine the available biocapacity for UBC. Per capita footprints are evolving and will have changed, since the writing of this report. This method can be used to indicate UBC's footprint based on population size and availability of data (Group 2, 2008).
- One group proposed boundaries to conduct the UBC EFA should be based on the physical boundaries of UBC Point Grey Campus while omitting the South Campus (UBC Farm, BC Research Center, TRIUMF buildings, etc) and the UBC Hospital due to complexity. Steps to conduct an EFA of the entire campus were proposed for the four areas below:
 - 1. Food Providers** – AMS Food and Beverage Department and UBC Food Services:
 - To calculate the footprint of food products, the yearly total mass (in kg) for each food product could be determined by summing up the twelve months' order. Using a series of specific "footprint multipliers" for each food category, the amount of each type of land (in m²) can be determined for a particular mass of food in each category. The waste and energy use of the food establishments would be accounted for in the data obtained from UBC Plant Operations (Group 9, 2008).
 - 2. Transportation:**
 - To examine the EF of commuting, the distance traveled by the UBC population would need to be determined, which according to Hoffman and Chisholm (2001), the average commute distance to UBC is 17.3 km one way. After the kilometers traveled by the UBC population is calculated, the footprint can then be calculated by using the different conversion factors for different modes of transportation. For example, the footprint for bus is 0.03 hectare years per 1000 passenger Km (Chambers et al, 2000 in Group 9, 2008).
 - 3. UBC Plant Operations:**
 - Collecting baseline data for electricity and waste management was determined available and could be obtained by UBC Plant Operations to use for the EFA (Group 9, 2008).
 - 4. UBC Bookstore:**
 - Based upon communication with the representatives of the UBC bookstore, willingness and much enthusiasm was expressed to cooperate in an EFA, by providing any necessary information (Group 9, 2008).

Key Recommendations:

AGSC 450 2009 Teaching Team:

- Consider creating a campus ecological footprint action team to work within the existing framework of the Sustainability Office, to perform an annual campus EFA. The team should be responsible for handling the data compilation, media communication, and assisting with planning and executing sustainability related projects and studies that arise as a result of EFA performed, as well as communicating results and sharing resources through the creation of a website. Funding applications should also be made to the Student Environment Center (SEC), which could likely help initiate the formation of this team (Group 9, 2008).

- If an EFA is to be conducted for the entire UBC campus, split up the workload according to sources where data is available and sources where data needs to be compiled through surveys or other methods to enable individual teams to target each area and then compile together to create one comprehensive EFA for the campus (Group 9, 2008).
- Consider creating an EF calculator specific to the UBC campus based upon similar the EF calculator created at the University of Toronto Mississauga (<http://www.sustain.ubc.ca/eco-survey/>) (Group 9, 2008).
- Consider conducting an EFA only in areas of the food system believed to be most likely and able to make changes towards more sustainable operations. Specifically, consider refining terrain of inquiry under investigation to UBC's main food providers - UBC Food Services and the AMS Food and Beverage Department who have already made many positive changes in their operations and are open to input (Group 13, 2008).

Scenario 8: Investigating the Desirability and Feasibility of Incorporating more Local, Seasonal and Sustainability Produced Food Products into the Agricultural Student's Undergraduate Society (AgUS) Weekly BBQ Menus (Groups 14 & 26)

Objectives:

- Propose ways to increase the sustainability of the Agricultural Student's Undergraduate Society (AgUS) weekly BBQ's, by developing seasonal, local recipes and menu plans, and to investigate the feasibility of sourcing ingredients from sustainable suppliers.

Specific Objectives:

- To evaluate the sustainability of the AgUS BBQ by conducting an assessment based upon established social, ecological and economic indicators and other tools (Groups 14 & 26, 2008).
- To enhance the sustainability of the AgUS BBQ by developing a nutritious cookbook containing seasonal, local and healthy menus, a resource package including purchasing guides, and by establishing working relationships with local growers (Groups 14 & 26, 2008).

Central Findings:

Interviews:

- A face-to-face interview was conducted with the incoming 2008-2009 school year AgUS president to obtain input on proposed menus, and to determine information about upcoming budget and willingness to help other campus faculties set up a similar event. Based upon this interview, the following was found:
 - After sharing a selection of menus from the developed AgUS cookbook, it was noted that the salad and entrée options were feasible, but the dessert menus did not fit their criteria, due to limited infrastructure capabilities to prepare complex desserts.
 - When asked about the possibility of preserving foods available in the summer months to allow for seasonal extension into the fall months, it was noted that most AgUS members were not residents of Vancouver, thus making it difficult to conduct in the summer.
 - When asked about interest in helping other faculties set up similar events, little interest was expressed because it was felt that time needed to be devoted to the running of the AgUS BBQ and priority needed to be given in making additional improvements prior to helping other faculties start a BBQ of their own (Group 26, 2008).

Surveys:

- Developed and administered a survey to three AgUS members to obtain baseline information about the social, ecological and economic sustainability of the weekly Wednesday night BBQs. Based upon survey results, the following was found:

Economic Sustainability:

- Break-even profits are obtained in some weeks with negative returns in others, resulting in a lack of self-sufficiency.

- The AgUS members currently purchase vegetables for the BBQ from the *New Hill Market* and *Apple Hill Market*, and meats from the *Jackson Meats Store*. Condiments and bulk items are bought from *Costco* and other corporate stores. No food is purchased from the UBC Farm, mainly due to the lack of variety and small quantities offered.
- Menu themes for the weekly BBQ are decided during the weekly AgUS meetings, with considerations for theme selections being given to: the number of volunteers, meal diversity, choice availability, and the cost of food. The two most popular themes are Mexican and pirogues night.
- Approximately 80 to 100 people attend the weekly BBQs with capacity to support up to two hundred people (Group 14, 2008).

Social Sustainability:

- The event is run by 10-15 volunteers that consist of AgUS committee members and students of AGSC 100 working towards completing their mandatory volunteer credits.
- The BBQ is an event created to establish a sense of community and belonging for newcomers and those involved (Group 14, 2008).

Ecological Sustainability:

- Reusable dishes and utensils, such as glass plates and metal forks are used with the majority of food waste being recycled and composted.
 - Leftover food from the BBQ is given to those who want second servings, and the remaining is placed into plastic containers for the volunteers and staff members to take home. Overall, the waste management of the BBQ is considered well developed (Group 14, 2008).
- Two groups collaborated in developing and administering an online survey to determine current customer perceptions of the AgUS BBQ, demand for local, seasonal and organic foods, willingness to pay more for sustainable foods, and to gather input about how the BBQ could be improved. The survey was administered to UBC Faculty of Land and Food Systems' staff, faculty and students. A total of 116 responses were received (Group 14 & 26, 2008). Based upon survey results, the following was found:
 - 95% of respondents were from the Faculty of Land and Food Systems and 5% were from the faculties of Forestry or Engineering.
 - 64% of respondents who attended the BBQ were from the Food Nutrition and Health program; 13% were from the Agroecology program and 12% were from Global Resources Systems program.
 - 57% of respondents had attended the BBQ in the past. Of those respondents who replied "Yes" to attending the BBQ, 12% indicated that they went to the BBQ every time, and 48% indicated they would go occasionally.
 - Most respondents indicated that they were meat eaters or selective meat eaters, with 1.7% of the respondents indicating they were vegan, and several others noting medically influenced diet limitations, such as celiac, lactose intolerant or diets that require low sugar meals.
 - 72.6% of respondents reported that they did not know where the food served at the BBQs came from.
 - 60% of respondents replied that they would be more inclined to come to the BBQ if the menu provided "local, organic, and seasonal" choices, and 13.9% of the respondents said that they would be more inclined to attend the BBQ if there was a vegan option offered, and 9.3% of respondents indicated that they would be more inclined if a meal composed of raw foods was served.
 - 73% of respondents agreed that the current dinner price (\$5.00) was "affordable".
 - 3% of the respondents thought that the quality of the food could be further improved.
 - 19.4% of respondents felt that the BBQ was sustainable or appropriate, and most respondents felt that the meals are nutritionally balanced.
 - When asked if respondents would be willing to pay more if the food were local and seasonal, 70% of respondents answered "yes", with 45% willing to pay \$6.00, 21% willing to pay \$7.00, 16% willing to pay \$5.50, and 12% willing to pay \$6.50.
 - When asked about what aspects of the BBQ respondents felt were not sustainable, the most commonly cited responses included: 1) current food purchases, where it was expressed that the current foods offered at the BBQ are not economically and environmentally sustainable; and 2) waste management, where many respondents expressed uncertainty about how food wastes and leftovers are handled at the BBQ, noted the use of plastic cutlery and paper plates, and some also noted that prepackaged items are purchased and therefore contributed to excess waste from packaging.

- When asked about any suggested improvements be made to the BBQ, 11.5% of respondents reported that the BBQ does not need further improvements, and 35.4% felt that it could be improved. Suggestions for improvement included: purchasing more local and organic food, providing a greater variety of foods and beverages, educating consumers about organic/local/seasonal food, creating more sustainable menu options, having a cleaner facility with more space, moving the venue closer to the Student Union Building, ensuring there is an option for people with food allergies, and reporting imported goods while highlighting local options at the BBQ.
- Over 50% of respondents indicated they would like to volunteer for future BBQs (Groups 14 & 26, 2008).

Sustainability Assessment:

- All groups conducted a sustainability assessment of the AgUS BBQ based upon a set of developed sustainability indicators, which can be found in **Table 1** below (Groups 14 & 26, 2008)

Table 1: AgUS Sustainability Assessment Indicators

Economic	<ul style="list-style-type: none"> • Percentage of profit (Group 14, 2008). • Percentage of reliance on purchased off-local inputs (Group 14, 2008). • Degree of market flexibility (supply and demand) (Group 14, 2008). • Type of land use (ownership/lease) (Group 14, 2008). • Degree of financial stability (Group 26, 2008).
Social and Cultural	<ul style="list-style-type: none"> • Sources of income (Group 14, 2008). • Average amount of people that attend the BBQ (Group 26, 2008). • Degree and type of social networks established (percentage and frequency of BBQ attendance, type of UBC department) (Group 14, 2008). • Degree of conflicts of interest with social groups (competitors, suppliers, others outside of LFS) (Group 14, 2008). • Amount of volunteers required for food preparation, cooking, and clean up (Groups 14 & 26, 2008). • Degree of support for the local food system (Group 14, 2008). • Degree of connection with land use patterns and relationships (Group 14, 2008). • Degree of longevity (Group 14, 2008).
Environmental	<ul style="list-style-type: none"> • Type of waste management practices (Groups 14 & 26, 2008). • Type of food resources procured (Group 14, 2008). • Percentage of food that gets composted and recycled (Group 14, 2008). • Amount of food miles traveled from producer or grocer to campus (Group 26, 2008). • Percentage of CO₂ emitted during food transport from sources to campus (Group 26, 2008). • Amount of processed and packaged food in comparison to food products in their raw form utilized at the BBQ (Group 26, 2008).

- A sustainability assessment was conducted by allocating ratings for each indicator results on a scale of 0 to 3. Zero means the food system is not sustainable and shows signs of degradation. A score of 1 means there is a low level of sustainability, which is likely to result in degradation over time if current management is not properly modified. A value of 2 indicates a moderate level of sustainability with some notable areas for improvement, while 3 indicates a high level of sustainability with signs of longevity and resource health (AGRO 360, 2007 in Group 14, 2008). Based upon this analysis the following was found:

Economic sustainability:

- A rating of 2.0 was assigned. Although it was recognized that the goal of the BBQ is not to make profits, but serve to build community and social networks, it was believed that maintaining break-even earnings should be sought, thereby decreasing the dependence of the BBQ on AMS funding.

Social sustainability:

- A rating of 2.25 was assigned. It was found that more advertising and promoting was needed to attract more students to come to the BBQ, especially those from the FNH and AGRO programs. Also, it was found that no information was provided at the BBQ about the sustainability of the food served, and it was suggested that the concept of eating locally be encouraged by providing information on the

weekly menu regarding the origins of the food, bibliographies of the farmers involved, and information about the farming practices and inputs used to grow the food. It was noticed that a small group of people volunteered, which was felt could be expanded by placing efforts in making the volunteering at the BBQ mandatory for more LFS courses.

Environmental sustainability:

- A rating of 2.5 was assigned. It was found that many ecological principles were incorporated into the BBQ, particularly with waste management. It was found that the BBQ successfully managed to reduce waste, where between half to a full bag of garbage was produced each week. The BBQ encouraged reusing items, by providing ceramic plates and metal utensils, and through asking people to bring their own reusable ware. Recycling and composting was conducted of pre-consumer waste, and all kitchen and post consumer waste was found to be composted (Group 14, 2008).
- A sustainability assessment was conducted by applying established social, ecological and economic indicators to one AgUS BBQ. Based upon this assessment the following was found:

Economic sustainability:

- A sample was obtained from a BBQ held in January where it was found that approximately \$330 was spent to purchase all the ingredients for the BBQ, and only \$35 was earned in revenue. It was felt that revenue generated was very low, and could be improved by raising the cost of the BBQ from \$5 to \$6 per person, and through increased advertising.

Social sustainability:

- It was found that the BBQ requires between six to eight volunteers to prepare, cook and serve the dinner, and four to six people for assisting with the cleanup after the BBQ.
- It was felt that if desired, these numbers could be increased through officially advertising possible volunteer positions.

Environmental sustainability:

- Based upon an analysis one AgUS BBQ, it was found that of the twenty-seven items procured for the BBQ, 22% were locally produced or grown; 33% were produced or grown within Canada but outside of B.C.; and 44% of the food products used were from international sources such as Thailand, Turkey and Italy. It was found that most of the ingredients for the BBQ were bought from grocery stores that are found within the vicinity of UBC.
- It was found that nearly all the ingredients used for the BBQ were processed in some manner whether minimally such as washing and packaging of fresh fruits and vegetables, or more heavily processed, such as with soy milk, chick peas and prepared sauces.
- In terms of waste management it was found that most of the kitchen vegetable trimmings and unusable leftovers were composted along with the plate scraping during the clean-up of the BBQ. All packaging materials such as paper, plastic and metal were found to be recycled, and reusable utensils such as metal cutlery, plastic and glass plates were used for the entire dinner. All other waste that was not compostable or recyclable was thrown away in the regular garbage.
- It was felt that environmental sustainability of the BBQ could be greatly improved by sourcing more local, seasonal and organic products (Group 26, 2008).

Food Miles/Purchasing Template:

- A food miles analysis was conducted of current food products procured in the AgUS BBQ's. Food miles analysis is a tool used to calculate the ecological impact of food products traveling from the farm to the consumer (British Broadcasting Corporation, 2008 in Group 14, 2008). Specifically, an evaluation template was designed to track food origins, quantity, weight, and processing information where results were used to develop an estimate of food miles traveled. Furthermore, the *Fallsbrook Centre Food Miles Calculator* was used to calculate associated carbon emissions produced, with food miles, food weight, and mode of transportation (truck, plane, or train) being entered as parameters, with the assumption being made that all food from North America and Mexico were shipped by truck, while items from other origins traveled by plane (Fallsbrook, 2006 in Group 14, 2008).
- Several value added items were found to be procured, such as frozen berries, tahini and pre-made curry powders. Although total exclusion of these products may not be realistic, it was felt that value added products expend significantly more energy and water in their production, and therefore have a larger

environmental impact, and also funnel more funds toward food processors, rather contributing directly to farmer's incomes (Group 14, 2008).

Procurement:

- Alternative local suppliers and growers were investigated that could potentially supply the AgUS BBQ with local products throughout the year. A list of 20 Fraser Valley region farms were derived from the *BC Farm Fresh* website that were categorized as providing a "full variety of fruits/vegetables" (Farm Fresh, 2008 in (Group 14, 2008). Furthermore, other farms were contacted including four other farms and three wholesalers not listed on the *BC Farm Fresh* "Variety Category" on the website, as well as the UBC Farm. Each farm and wholesaler was contacted by email or phone to determine what products they could potentially provide, time of operation, prices and growing practices, distance from UBC and transportation practices used (Group 14, 2008). Based upon this analysis, the following was found:
 - Of the local farms contacted, five were identified as having high potential, while nine farms and three wholesalers were excluded. The top five farms identified as being potential providers for the BBQ included: *Ralph's Farm Market*, *Howard Wong*, *Yellow Barn Country Produce*, *Forstbauer Natural Food Farm*, and *Ross Down Farm Market*.
 - Criteria used to measure farm acceptability is described below:
 1. Farms more than a two hour drive from UBC were excluded, giving closer farms top priority, with a cut-off at 1.5 hours driving time.
 2. Farms had to be small or medium in size, and offer a variety of produce. In contacting farms an overall trend was found where some farms produced more staple products, but lacked in overall variety while others had a variety of produce which tended to be more specialty produce and lacked some staple foods for the BBQ such as apples, tomatoes, potatoes, onions, and legumes
 3. Farms ideally should practice polyculture and organic practices.
 4. Farms were given priority over wholesalers or retailers, since doing so could contribute to direct economic and social relationships with local farms; ideally creating symbiotic relationships.
 5. Wholesalers, or retailers, had to provide produce from local, small to medium scale farms, however it was found this criteria was difficult to apply (Group 14, 2008).
- Alternative local suppliers and growers were investigated that could potentially supply the AgUS BBQ with local products throughout the year. The following criteria were used to select producers: distance from the UBC campus, type of farming practices, size of the farm and pricing based upon a flexible \$500 BBQ budget. Total amount of produce and meats required for a per week basis for the designed menus was calculated, and this information was sent through email to the selected local farms to determine whether producers could meet these needs. Emails were followed up with phone calls a few days after initial emails (Group 26, 2008). Based upon this research, the following was found:
 - A total of five BC farms were contacted, including: *UBC Farm*, *Westham Island Herb Farm*, *Mary's Garden*, and *Ralph's Farm Market*. Of these five farms contacted, only two replied – UBC Farm and *Ralph's Farm Market*. Willingness was expressed by representatives from UBC Farm to supply AgUS with the following produce: parsley, mint, chives, green beans, carrot, rhubarb, broccoli, cauliflower, turnips (in fall), cucumber (in September), lettuce (in fall), and bell peppers (if grown in 2008). It was expressed that produce will be available for pick up or can be delivered to UBC on Friday afternoon immediately after harvest. According to representatives from *Ralph's Farm Market*, the quantity needs of AgUS was too small to meet minimum delivery standards, however it was recommend that AgUS could purchase some of their products from *Top Ten Produce* (10th Avenue).
 - Based upon contacts with potential meat suppliers, *Family Farm Natural Meats Ltd* expressed keen interest to act as the primary meat supplier for the BBQ. This farm is located in Forest Grove, B.C which is 487 km away from UBC, however despite the distance, it was expressed that delivery could be provided free of charge to UBC once a month. The specified quantities of meat stipulated by AgUS (approximately 8 kg/week or 70.4 lbs/month, or 4 specific types of meat each equal to 11 lbs) was noted could be met. Orders need to be placed in advance, with a down-payment where any balance owing at the time of delivery will be reimbursed. The farm also supports local economy by selling and delivering its products only within BC. The farm is a small and family run, and raises their livestock based on natural principals, where no antibiotics or growth-hormones are used. It sells products such as grass-fed beef, pasture-raised pork, pasture-raised lamb and free range chicken and turkey (Family

Farm Natural Meats, 2008 in Group 26, 2008). The animals are fed with appropriate diets, where cows are not fed grain, and are constantly rotated on pasture to give them access to fresh grass.

- Based upon communication with *Agora Café* representatives, one of their produce suppliers - *Biovia Organic Link* who delivers to Agora weekly was recommended as a good supplier of local and seasonal products (Group 26, 2008).

Menu and Recipe Development:

- Developed a recipe cookbook containing a total of 25 menus with 4 menus developed for each month from September to March, and one menu for the single BBQ in December. Each menu consists of a salad, an entrée, and a dessert and were scaled to feed approximately 100 BBQ attendees. A set of corresponding cooking instructions and shopping lists for each quantity of ingredients required were developed for each menu. Furthermore, a farm guide was developed where a list of potential regular suppliers were identified, and corresponding contact information was provided. Menus were developed to incorporate as many food products that could be seasonally grown in BC as possible with primary consideration being given to items that could be produced at the UBC Farm (Group 14, 2008).
- Developed a recipe cookbook containing menus for the September to April months of the school year. A total of 14 menus were developed, with two menus developed for each month except for the months of December and April where one menu was developed for each. Each menu developed was scaled to feed approximately 100 BBQ attendees, with a ratio of 50% vegetarian or vegan, to 50% non-vegetarian, and included a starter, entrée, and dessert. Many of the meals were developed with ethnic influences such as Japanese, Greek, Chinese and Indian. Menus were developed based on the availability of fruit and vegetables for each month, incorporated meat from animals that are raised in sustainable and ethical conditions, that are slaughtered at SPCA certified slaughter houses, and were designed incorporating budget, ingredient quantities, time for cooking and kitchen equipment available. All recipes were designed to be fairly simple and requiring little prep work. A corresponding nutritional analysis was also developed for each menu using the Dieticians of Canada *EATracker Program* which provided an analysis on caloric, macronutrient and micronutrient contents (Group 26, 2008).

Key Recommendations:

AgUS Committee:

- Incorporate proposed seasonal local menu guides into regular weekly AgUS BBQ's (Group 14 & 26, 2008).
- Follow up contact with five recommended local growers to determine the feasibility of supplying menu items to the AgUS (Group 14, 2008).
- Investigate alternative local food retailers and wholesalers who could provide the AgUS BBQ with local produce and other goods (Group 14, 2008).
- Use the developed resource package and work closely with UBC Farm to identify specific products they can provide to the weekly BBQ (Group 14, 2008).
- Consider selling healthy beverages, such as fruit smoothies at the BBQ at a price comparable to those found at the *Agora Café* (Group 14, 2008).
- Use the weekly BBQ as an opportunity to promote the concept of sustainability, such as by emphasizing the origin of ingredients with meals being served (Group 14, 2008).
- Minimize purchasing of processed and packaged foods (Group 14, 2008).
- Consider sourcing products for AgUS from the UBC Farm by contacting the farms at least one month ahead of time to determine what they can provide and the menus can be planned accordingly (Group 26, 2008).
- Follow up contact with *Family Farm Natural Meats Ltd* to obtain prices for meat products and determine the feasibility of creating a business relationship (Group 26, 2008).
- Consider submitting a joint produce order with *Agora Café* from *Biovia Organic Link* to help in sourcing more local and seasonal products (Group 26, 2008).
- Consider sourcing additional local products from *Choices Markets* and *Top Ten Produce* (Group 26, 2008).
- To extend the shelf life of the seasonal produce available during the fall months, food should be preserved during the summer months, where the AgUS could provide funds to hold a summer class in the preservation of food (Group 26, 2008).
- Consider raising the prices for each BBQ from \$5.00 to \$6.00 per person. This would allow for an increased spending budget at \$600.00 up from \$500.00 per BBQ, which could be used for sourcing more sustainable

products as well as provide additional revenue for kitchen equipment upgrades, and special projects to further enhance the sustainability of the BBQ (Group 26, 2008).

- Consider holding at least one BBQ a year that takes into consideration special diets, such as celiac, lactose intolerant and diets low in sugar (Group 26, 2008).
- Consider supplementing the cost for volunteers to take a "Food Safe 1" course (Group 26, 2008).
- Consider investing more time in marketing the BBQ, such as by making more in-class announcements and encouraging wider participation both from members within the faculty and external faculties. This can increase the economic revenue of the BBQ and also help increase efforts to build community connections (Group 14, 2008).
- Consider modifying the AgUS BBQ's mission statement to be more current and in line with faculty specified ideals (Group 14, 2008).
- Consider creating a bulletin board designated for the BBQ to provide information such as the menu of the week, its nutritional value (using those developed by the group), the farms that the products came from, as well as a volunteer signup sheet to attract volunteers to help with the BBQ (Group 26, 2008).
- If proposed menus are implemented, consider creating and administering a survey to BBQ attendees to determine response to the new menus (Group 26, 2008).
- Make more efforts to fill the position of an AgUS BBQ Planner by advertising the position to the Food Nutrition and Health and the Dietetics Program to recruit individuals with that particular field of interest (Group 26, 2008).
- Consider recruiting more volunteers for the BBQ since strong interest was expressed among more than half of respondents surveyed. Volunteer positions should be officially advertised and should include associated benefits such as networking opportunities and increased community involvement (Group 26, 2008).
- Determine the feasibility of AgUS using AMS funds to subsidize purchases of UBC Farm produce (Group 14, 2008).
- Consider holding fundraising events to elicit funds to improve the current kitchen facility, such as purchasing new equipment which could help improve the efficiency and variety of food produced (Group 26, 2008).

Outcomes:

In the following section, a selection of accomplishments that emerged from the 2008 term is shared. These accomplishments emerged *collaboratively* from a series of meetings the Project Coordinator held with project partners and other relevant food system actors throughout the summer and fall of 2008 where she presented and discussed a detailed summary of group reports and recommended action plans. As a result of these meetings recommended action plans were either implemented as is, modified to suit the needs of the stakeholders, or concluded that more work needs to be done before implementation. The following summary is not a comprehensive list, and instead contains a selection of key project outcomes such as the implementation of initiatives which we believe contribute to the continued enhancement of the sustainability of our campus food system.

Social Marketing Strategies:

- Incorporated proposals for a monthly one day event – "Eco-friendly Day", where all AMS Food and Beverage Department (AMSFBD) outlets are promoting various sustainability initiatives.
- Implemented groups proposed "eco-label" which is a sign designed to inform customers whether a menu item is local, organic and/or vegan (LOV), and a corresponding informative poster based upon a version developed by the groups which provides information and the importance about lighter footprint food choices. Currently all AMSFBD outlets have incorporated this sign on corresponding menu offerings.
- Implemented proposals for a sustainability discount program, based upon group's template for an "*Eating Ecologically*" stampcard, where after a customer has purchased ten lighter footprint menu items they are entitled to a discount at AMSFBD outlets.
- Implemented group's marketing strategy to promote AMSFBD sustainability initiatives, including promoting green discounts, reusable containers, lighter footprint menu options, etc.
- Implemented groups proposed marketing strategy for a cheese-less pizza now offered at *Pie R Squared* which serves as part of the AMS Lighter Footprint Strategy.

- Implemented proposals to harmonize waste management signage between UBC Food Services and AMS Food and Beverage Department, where all composting, recycling and waste signs share the same template in the between these two core food providers.
- Implemented proposals for the development of “Composting Road Signs” which direct people to the nearest composting bin with the intention to increase composting behavior among faculty, staff and students around food outlets in the SUB.
- Implemented proposals to create a bulletin board, posters and labels to increase awareness of the origin and nutrition of AgUS BBQ menus.

Food Procurement:

- Implemented proposals to procure cage free eggs at AMSFBD outlets.
- Implemented proposals to create buyer seller relationships between the AgUS, Agora Café and the LFS Orchard Garden.
- Incorporated proposals to sell a selection of UBC Farm produce to Place Vanier, Sage Bistro and Pie R Squared (PRS).
- Helped inform initial consultations to create a sustainable food purchasing policy to guide procurement of meat, poultry and fruits and vegetables in AMSFBD.

Menu and Recipe Development:

- Incorporated recipes for a new line of lighter footprint menu options, including vegan “Ginger Spice Cookies” at *Blue Chip Cookies*, and “Beet and Apple Salad” at *The Pendulum*. Groups also developed nutritional analyses, which have been incorporated into outlets.
- Implemented elements of group’s proposed seasonal cookbooks into weekly AgUS BBQ’s for the September to April term.
- Incorporated components of group proposals to inform the development of the new Beaty Café in the Beaty Biodiversity Building which is hoped to serve as a true model of a sustainable food service operation.

Waste Management:

- Implemented proposals to source reusable collapsible containers and sell them in the AMSFBD outlets, as a strategy to encourage further customer waste reduction behaviors.
- Incorporated recommendations to increase the number of composting bins in the Student Union Building, which have recently been increased for AMSFBD from one to eleven composting bins.

Urban Agriculture:

- Received a portion of the 2008 Grad Council Class Gift which was awarded based upon a joint funding application submitted by representatives from Scenario 5 groups and UBC Farm representatives. As a result, a student in the Faculty of Land and Food Systems was hired to serve as the Land and Food Systems Orchard Garden Coordinator.
- Planted a variety of crops such as potatoes, sunflowers, kale, herbs and squash.
- Harvested crops which were donated to the UBC Farm, and sold to the AgUS and Agora Cafe where new market relationships were established.
- Established an LFS Orchard Garden management committee to provide mentorship to the garden coordinator, volunteers and future students, and to help oversee ongoing garden activities and future development.

Policy:

- Helped inform the further development of the AMS Lighter Footprint Strategy, which sets forth a number of targets and actions to enhance the sustainability of AMS operations.
- Participated in a climate food roundtable discussion, and formed a climate food working group which is helping UBC Sustainability Office’s Climate Action Partnership (CAP) develop a Climate Action Framework (CAF). This CAF is intended to help UBC move *beyond* climate neutral, as part of the project mandate, the presidents Climate Change Statement of Action which commits UBC to reduce role GHG emissions of greenhouse gases, as well as BC’s provincial legislation that requires all public sector organizations be carbon neutral by 2010.

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