

BEETING DOWN THE ECOLOGICAL FOOTPRINT

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ABSTRACT

This paper reports on a student enterprise carried out under the ambit of the University of British Columbia Food System Project. The Project seeks to initiate a transition towards sustainability in the campus food system and incorporates a process of community-based action research. The authors were requested to assist the Alma Mater Society in carrying out an action plan designed to aid one of its several food outlets to carry a lighter ecological footprint. A literature review and communication with stakeholders provided direction for the project. The objective of this study was to introduce a seasonal, local, vegetarian item into The Pendulum's menu, the chosen food outlet. Ingredients for the menu item were selected based on their relative abundance and local availability from September to April, the busiest period for The Pendulum. Another consideration was the potential to source food materials from the UBC Farm in the future. A beet and apple salad with goat cheese was prepared, evaluated by a sensory panel, costed, nutritionally analyzed, and then test marketed at The Pendulum. Display case signage was used to market the salad as local, seasonal, nutritional, and that it helps to reduce the ecological footprint of the Alma Mater Society. The salad was popular, selling out within a day, and will be incorporated into The Pendulum menu.

INTRODUCTION

The University of British Columbia Food System Project (UBCFSP) is an ongoing collaborative community based action research project designed to initiate a transition toward a sustainable and secure food system at UBC (Rojas, Richer, & Wagner, 2007). The UBCFSP began in 2002 and has created an opportunity for students of Agriculture Science (AGSC) 450, Land, Food and Community III, to apply their learning to a project that the Faculty of Land and Food Systems is currently undertaking. The focus of this research is to explore ways to help

the Alma Mater Society Food and Beverage (AMSFBD) reduce their ecological footprint (EF). The Alma Mater Society (AMS) seeks to “significantly reduce the average per-serving ecological footprint of food and beverages sold by October 31, 2011” (Doherty, 2007, p.4). The AMS is the student society at the University of British Columbia, representing over 40,000 students on the Vancouver campus (Stein, 2008). Reducing the ecological footprint of AMS food and beverage outlets is a measure of internal target success and is aligned with the food system component of the AMS Lighter Footprint Strategy drafted December 2007 for discussion purposes (Doherty, 2007). To realize this goal, the group conducted a review of research papers prepared by earlier AGSC 450 colleagues’, researched foods carrying both low and high EF, and communicated with UBCFSP partners to help determine the direction of this project. The development of this project includes several marketing initiatives including product development, consumer feedback, costing, pricing, and test marketing.

PROBLEM DEFINITION

Growing population and corresponding consumption trends have endangered the Earth’s carrying capacity. In 2006, the Global Footprint Network defined the ecological footprint as a measure of how much productive land and marine area a group of people require to produce the resources consumed and absorb the waste generated. The global EF is now over twenty-three percent higher than what is defined as sustainable. This means it takes more than a year for the earth to regenerate itself with what humans have used, and discarded, in a year. Not only are non-renewable resources being depleted, renewable resources such as fisheries, forests, and ground water are also at great risk (Global Footprint Network, 2006).

Acknowledging its responsibility to respond to the crisis existing in planetary sustainability, in January 2007 the AMS formally approved an Environmental Sustainability

Policy (ESP) to support ecologically sound practices in their operations and in their relationship with the university and the community (Doherty, 2007). In preparing the draft AMS Ecological Footprint Strategy, and using the EF concept, the AMS seeks to guide its work to areas that will have the greatest impact and identify actions that are most effective in reducing its operational footprint given the scarce resources it is currently able to allocate to the effort (Doherty, 2007). Furthermore, any plan of action will unfortunately be limited to those that benefit the AMS through mainly, cost savings (Doherty, 2007, p. 16).

AMS representatives requested the authors to assist in forming its Lighter Ecological Footprint Strategy and directed our interest to help implement a lighter ecological footprint (LEF) menu item into the offering at one of its campus food outlets. This group was requested to include in its considerations items that do not contain beef or dairy products. It is well recognized that production of animal protein at current levels and employing current production strategies causes significant environmental degradation and contributes significantly to greenhouse gas emissions (Knight, 2007).

The AMS recognizes its role in fulfilling UBC's commitment as a signatory to the Halifax Declaration "to help societies shape their present and future development policies and actions into the sustainable and equitable forms necessary for an environmentally secure and civilized world." (Doherty, 2007, p. 5). Signators acknowledge "an ethical obligation to address the 'intolerable human disparity which lies at the root of environmental unsustainability'" (Doherty, 2007, p. 5). Current methods and levels of producing animal protein contribute to an inequitable use of natural resources measured on both an ecological and geographical scale.

Another popular concept used to examine and solve problems of sustainability is based upon three basic components – social, economic and ecological (AASHE). These investigations often seek to balance the health of each “component” in order to reverse human activity that tends to threaten and diminish the health and productivity of the biosphere to ones that preserve and enhance its capacity and health. While people may be aware of some of the issues of food security, ecosystem health and human health, it is the tension that exists between ecological health and economic pressures that often predominates their concerns, choices and decisions to take action.

Collective actions need to be taken to help manage our ecological assets more carefully. Group members believe that accepting this assignment and carrying it to fruition will contribute in a small yet significant way to a growing shift toward sustainability. It is hoped that the group’s efforts will connect to and impact upon the larger goals of reducing greenhouse emissions through a reduction of fossil fuel consumption during transportation and by strengthening the local food system.

VISION STATEMENT AND IDENTIFICATION OF VALUE ASSUMPTIONS

The collaborators in the UBCFSP adopted a vision statement expressed in guiding principles. In examining the principles, this group identified shared values that informed the analysis of the vision statement. As students in the Faculty of Land and Food Systems our values have been informed by the readings and curriculum shared in many courses and we recognize a bias for an ecologically sustainable food system over the currently predominate industrial food system. Predominantly, group members study in the Food Nutrition and Health faculty, although one member has studied resource sustainability and policy in the Department of Geography, as well as political science, sociology and anthropology. All members of the

group place a high value on food security through safe, nutritious, ecologically sustainable, available, appropriate and affordable food, and consider these issues in achieving a sustainable food system. It was recognized that in order to ensure sustainability, the social, economic and ecological aspects of the food system would have to be examined. Most group members grew up in the Greater Vancouver region, and it was believed this life experience imbued members with an appreciation and bias toward a healthy, active lifestyle and a high degree of environmental consciousness.

All members agreed the UBCFSP vision statement provides an excellent foundation upon which to build a sustainable food system at the UBC campus. While members appreciate this document has evolved through a lengthy, integrated process of collaboration over many years, it is noted that while the second guiding principle recognizes the importance of local inputs, it does not reference an organic criteria. There was a strong recognition that while locally produced items reduce travel miles and fossil fuel consumption with attendant green house gas emissions, local and sustainable organic food achieves reductions in many other categories of biosphere damage. It was acknowledged that organic producers face many challenges and that organically grown food is not available in great quantities locally. Some members of the group felt the benefits, opportunities and challenges in shifting the food system to locally grown, organic production should be set as a study goal that is added to the vision statement. A second area of discussion centered around the importance of the availability of food that was culturally, ethnically, and nutritionally appropriate and brought into focus a tension between the reality of being able to meet all of these needs within a local food system while maintaining traditional and cultural food practices. Although the group discussion did not bring forward suggestions on how to address this issue, it was felt that it was important that

the concern be noted. The sixth guiding principle highlights that crucial to the successful shift toward a sustainable food system is awareness and understanding of ones personal responsibility in contributing to the change. Enhancing a heightened focus upon and understanding of the crisis of biosphere health, coupled with forums for developing community-based action plans, should be emphasized. To achieve this objective, a social marketing strategy based upon social marketing principles should be developed and implemented.

METHODOLOGY

History of the UBC Food Security Project

A literature review of past UBCFSP groups work revealed that the acquisition of local and seasonal foods is feasible in B.C. throughout the year (Alkema, Chong, Huang, Law, Mak, Sakai, & Vilaysane, 2004). In 2006, five groups (Group 3, 6, 8, 13, 23) explored ways to incorporate seasonal and local food items on to the menus of UBC campus food outlets and many of the groups recommended incorporating food grown at the UBC Farm. Group 13 proposed ways the UBC Farm could supply squash and rosemary for a seasonal pizza, and this idea has now been successfully implemented in Pie R Squared (Chan, Fetterly, Ip, Marr, Rekken, Smith, & Oosten, 2006). In 2007, Group 17 proposed a butternut squash bagel now offered on the Bernoulli's Bagels menu (Kabool, Duong, Lo, Wei, Chen, Spec, & Boks, 2007). The past successful integration of menu items into AMS food service outlets provided the direction for this project.

Who's Buying Local Around Vancouver

There are several Vancouver restaurants that have adopted the farm-to-fork concept. Many have taken it beyond "local and organic", and are serving local, *sustainable* organic food

to “create a healthy food system for British Columbia” (FF/CFS, 2008). Most restaurants in Vancouver using local foods are higher end, fine dining establishments (FF/CFS). Notable is The Raincity Grill specializing in West Coast fare since 1992, and one of the first restaurants in Vancouver to “firmly embrace local ingredients” (RG, 2006). They offer a 100 Mile Tasting Menu featuring foods purchased from their primary suppliers, four artisan farmers in southern British Columbia and on Vancouver Island.

There are fewer moderately priced restaurants that offer local foods, likely a result of pricing challenges. The few restaurants that have overcome this barrier include East is East, Curry 2 Go, Edible Planet, Cactus Club, and the Rocky Mountain Flatbread Company. The Rocky Mountain Flatbread Company, like The Raincity Grill, is committed to ecological, social and economical sustainability. They purchase most of their food from local, organic farmers to ensure the foods they serve are free of chemicals, medications, synthetic fertilizers, pesticides and herbicides, and promote human and ecosystem health. The food served is natural, and the production methods do not degrade the soil or produce chemical run off to pollute ground water and river systems. It is also important to this organization that animals are treated humanely. To ensure the seafood they purchase is harvested sustainably, they participate in the Ocean Wise program. They are members of Green Table, an organization that evaluates a producer’s operational impact on the environment, and then finds solutions to help reduce their ecological footprint. With Green Table’s guidance, Rocky Mountain Flatbread Company composts all food waste and packaging, and use biodegradable packaging, low flush toilets, wood waste for firewood in their clay oven, and reclaimed wood in their décor. In implementing these and other measures, they have become carbon neutral (RMF).

A University Model

Across the country, another local food movement is occurring. In September 2006, the University of Toronto, the largest university on the continent, became the first university in Canada to commit to serving local and sustainable foods. Partnering with Local Food Plus (LFP), a non-profit organization that certifies farmers and food processors who meet their standards, they were able to negotiate a contract with Aramark, a food service management company, to commit to purchasing a percentage of their food from LFP certified producers. While the percentages are undisclosed, it is said to increase annually.

The Ecological Footprint of Food

The ecological footprint of the Pendulum Restaurant was previously assessed for the purpose of measuring and quantifying environmental impacts. The approach used for this study was a component-based calculation that separated consumption into food, consumer goods, service, transportation, housing facility, and material waste (Baynham & Dalton, 2005). For the purpose of this report, we will focus on the food component.

The footprint calculation for food production takes into account processing, transportation, agriculture, and energy usage. The footprint assessment tool for each food category is presented in a series of specific “footprint multipliers” (Baynham & Dalton, 2005). Footprint multipliers express the amount of each land type (in m²) used for a particular mass of food, with the values from Table 11.2 in Sharing Nature’s Interest (Chambers, Simmons, & Wackernagel, 2000). To calculate the total footprint the footprint multiplier is multiplied with the total mass of the food (Figure 1). It is important to note that the calculation is only an estimate. Uncertainties include an unconfirmed assumption that the natural resources are

managed in a sustainable manner and incomplete information on the location of production, transportation method and distance traveled (Baynham & Dalton, 2005).

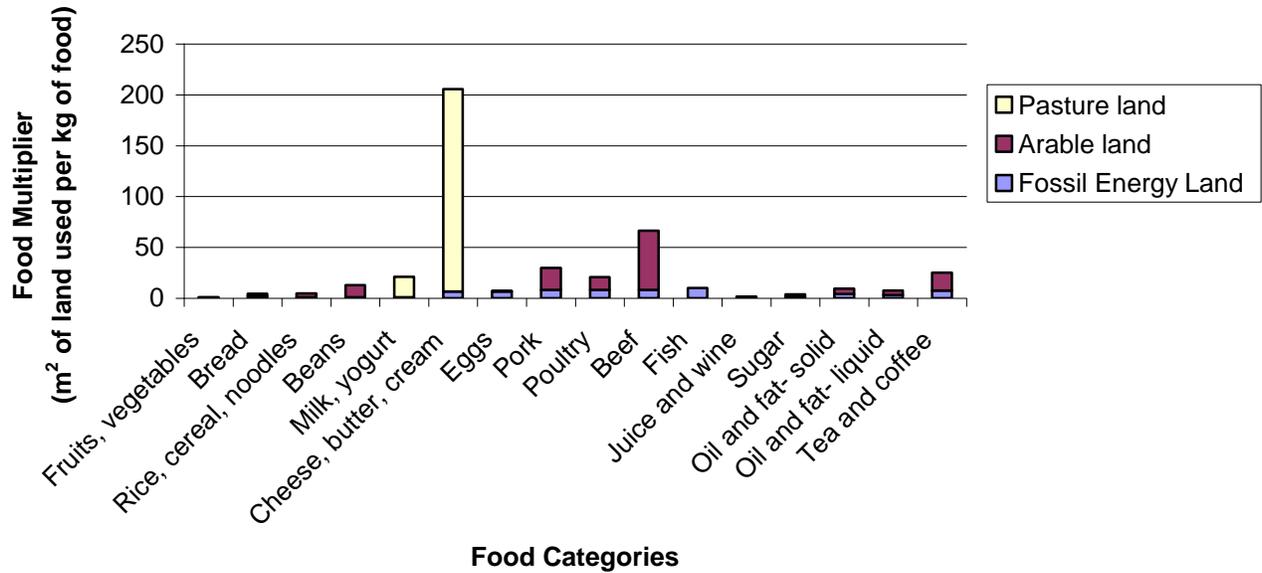


Figure 1. The footprint multiplier (m^2 of land used per kg of food) for each Food Category and Land Type. *Pasture land* is used to raise cattle and graze animals; *Arable land* is a productive land for crops; *Fossil energy land* is the area to act as sink for the fossil fuel combustion product to keep ecological balance (Baynham & Dalton, 2005).

Dairy is the single largest contributor to The Pendulum’s footprint, which is directly linked to the large amount of cheese used by the restaurant (Figure 1). Cheese has a large footprint value because it requires ten litres of milk to produce one litre of cheese. The second largest contributor is beef which requires a large amount of arable land used for feed. Fruit and vegetables have the lowest footprint multiplier, and contribute the least to The Pendulum’s EF (Figure 1).

Stakeholders

An interview with Nancy Toogood, Manager of the AMSFBD, provided valuable insight into the vision of her department. It was apparent that a major goal is to transform their

organization into a sustainable system. Over the past several years, they have found many ways to reduce their ecological footprint, including the use of biodegradable packaging and cleaning supplies, recycling and composting, increased sourcing of local foods, and the exclusive use of organically grown, fair trade coffee. Currently, the AMS' position on organics is that they are too expensive for their target clientele - the budget-conscious student. Toogood strongly supports the use of locally grown food, and increasing the offering of vegetarian and vegan options as a way to reduce their footprint. She noted that although the AMSFBD is committed to environmental sustainability, economic sustainability should be considered of utmost importance (N. Toogood, personal communication, January 31, 2008).

During an interview with Rick Kellough, Manager of The Pendulum, he vocalized his preference for new menu items as a way to reduce the ecological footprint, rather than modifying existing menu items or gradually reducing the amount of meat and dairy ingredients throughout the menu because they contribute significantly to gross revenue. Kellough mentioned several foods he felt were unsuitable in his restaurant such as nuts, tofu and eggplants because of cost, packaging, and/or visual appeal. He also mentioned several items that make great menu additions including legumes, hominy, green onions, tomatoes, zucchini, and basil. Kellough commented that while marketing has not been a focus at The Pendulum, he is open to developing marketing strategies to promote eco-friendly menu items. Kellough uses as much local foods as possible. However, he was hesitant to use the UBC Farm as a supplier because it is unable to consistently meet demand. Kellough was very receptive to test marketing a recipe proposed by this group to evaluate consumer response (R. Kellough, personal communication, February 28, 2008).

Menu Development

The choice of The Pendulum over other AMS food outlets was made predominately on the basis of menu variety. The focus on ingredients for new menu items that were local, seasonal and vegetarian was based on past research and interviews with stakeholders. Organic and/or grass fed meat products were discussed and deemed unfeasible because of the economic cost. Internet research was conducted to find B.C. fresh fruits and vegetables that are available during the fall and winter months when student food sales are greatest. A careful review of The Pendulum's menu helped predict food preferences of their clientele. A seasonal and local vegetarian pasta menu item became the focus, and a recipe search using recipe books, magazines and the internet was conducted. Four entrées were prepared and tested with an initial sensory panel. The tasting of these vegetarian pasta dishes resulted in one preferred recipe, which was chosen based on taste, ease of preparation, appeal to the customer base, and the potential to source the main ingredients from the UBC Farm. The recipe was then revised and retested with another sensory panel consisting of seven participants. Open ended questions were asked verbally and responses were recorded on audio tape and transcribed. The main areas of questioning included appearance and presentation, flavour and texture, cost, and marketability. The final recipe, a beet and apple salad, was adjusted for yield to provide a standardized menu for preparation by the Pendulum's kitchen staff. The raw food cost of the menu item was determined using current supply costs from the Pendulum's suppliers, and a nutritional analysis using data from Canada's nutrient file database was performed on the final recipe.

Test Marketing

Contact was then made with Kellough at The Pendulum to test market the menu item in his restaurant. A 4 litre (16 servings) batch of the beet and apple salad was prepared and transported to The Pendulum by a group member with Food Safe 1. A follow up interview with Kellough was scheduled to determine the menu item's sales and marketability.

A point of purchase sign was used to promote the new menu item in the showcase enumerating its ecological, social, and health benefits. It also functioned as an educational tool to help customers make the connection between eating local, seasonal foods, reducing food miles, and thereby contributing to reduction of the ecological footprint. Nutritional value of the vegetarian salad was also highlighted.

RESULTS

Menu Item

The popularity of pasta entrées and the daily pasta feature on The Pendulum's menu guided our first focus (AMS). All the pasta dishes prepared by group members were good, but only one stood out as exceptional, and met the goals of the UBCFSP, the AMSFBD, and The Pendulum. A beet and apple pasta salad was originally chosen. The recipe was then adjusted, eliminating the pasta because the beets stained the pasta pink and was thought to be more visually appealing without it. Kale was incorporated into the menu item because it was local, seasonal and had high nutritional value, and goat cheese was also added for flavour and visual appeal. The second sensory panel suggested to eliminate the kale, retain the goat cheese and also preferred the appearance and texture of grated beets and sliced apples (Appendix 1). Ingredients of the final salad recipe include beets, apples, goat cheese, apple cider vinegar,

olive oil and honey (Appendix 2). The honey, beets and apples are all produced locally in the Lower Mainland and surrounding areas from September to April and the UBC Farm produces these ingredients from July to October (Table 1). A raw food cost was calculated at \$0.57 per serving using current prices from The Pendulum’s suppliers. The selling price of \$1.58 per serving was determined using the factor method to produce a 36% food cost (Appendix 3). A nutritional analysis determined that the salad contained 155 calories per serving, and is high in potassium, folate and fiber (Appendix 4).

Table 1. The seasonal availability of ingredients for the Beet-a-licious Salad

	Honey	Beet	Apple
September	◆ ◆	◆ ◆	◆ ◆
October	◆	◆ ◆	◆ ◆
November	◆	◆	◆
December	◆	◆	◆
January	◆	◆	◆
February	◆	◆	◆
March	◆	◆	◆
April	◆	◆	◆
May	◆		
June	◆		
July	◆	◆ ◆	◆
August	◆ ◆	◆ ◆	◆ ◆

◆ Locally produced in Vancouver area (FF/CFS, 2008)

◆ Availability at the UBC Farm Market (A. Frye, personal email March 14, 2008)

Test Marketing

The beet and apple salad was actually sold for \$3.50 per serving to coincide with the other salads in The Pendulums display case, resulting in an actual food cost of 16%. The 4 litre batch sold out in one day, and two customers gave positive feedback directly to Kellough, who also noticed that no leftovers remained in the bowls on any of the tables he cleared (R.

Kellough, personal communication, April 2, 2008). Kellough appreciated the salad's three day shelf life and plans to make the salad in the coming weeks, although he will try it without the goat cheese to reduce the raw food cost. He is also considering substituting maple syrup for the honey so it would be appropriate for vegan customers. Kellough was concerned about labour costs incurred in the peeling and grating of beets, and after some alternative suggestions made by group members, he agreed to prepare it a number of different ways to see if it sells as well (R. Kellough, personal communication, April 2, 2008).

The point of purchase sign for the Beet-a-licious Salad listed the ingredients and emphasized the local, seasonal and health benefits of the salad in reducing the AMS ecological footprint (Appendix 5). Kellough advised his staff not to promote the salad as a new menu item, to help control factors which might affect the sales success. Kellough thought the small, laminated sign did a good job in drawing attention to the salad in the display case because it was different than the other salad labels. Although Kellough thought the sign was needed to stress the importance of local and seasonal produce, he voiced concern about being able to make and laminate signs for all the salads that are local and seasonal. He also mentioned that the signs do not last long and are often thrown away after a day or two (R. Kellough, personal communication, April 2, 2008).

DISCUSSION

The proposed menu item for The Pendulum food outlet is a Beet and Apple Salad served with goat cheese. This menu item has a low EF because it uses local and seasonal ingredients which support local producers, reduces energy costs and the use of fossil fuels for transportation. Additionally, it meets the criteria of an acceptable menu item as described by

Toogood, in which the ingredients used are readily available, low in cost, and ecologically friendly (personal communication, January 31, 2008).

The main ingredients in this recipe, apples and beets, are ecologically friendly because they have the lowest footprint multiplier (Figure 1). The recipe also excludes beef products, which has a high footprint multiplier. Although the recipe contains goat cheese, a dairy product which contributes to a high EF, the group and sensory panel felt it was an important ingredient for flavour, and would justify an increased selling price. The goat cheese, adding contrast to the red beets, makes the salad more aesthetically pleasing which may entice consumers to buy (Appendix 1).

Beets and apples, which make up more than 80% of the salad by mass, are available locally from July to April (Table 1). Fresh local honey is available year round. The other ingredients (apple cider vinegar, olive oil, and goat cheese) are processed foods, not listed in the Get Local website, but are readily available according to the 2008 AMS inventory list.

According to Amy Fryer, Marketing Coordinator of the UBC Farm, at this time the UBC Farm is unable to supply the main ingredients for this salad to The Pendulum (A.Frye, personal email, March 14, 2008). In 2006, apples were not produced by UBC Farm but were bought locally to be re-sold at the Farmer's Market. The Farm intends to start cultivating apples for harvesting in the fall of 2009 (A. Frye, personal email, March 14, 2008). Honey was produced in 2006 during the period of August and September, but was not produced at all in 2007. Insufficient quantity and inconsistency of UBC Farm products are major limitations to the Farm becoming a supplier for this menu item to The Pendulum. This concern was also voice by The Pendulum Manager, and he prefers not to depend on UBC Farm (R. Kellough, personal communication, February 28, 2008). The UBC Farm is, however, making changes to

increase their business-to-business sales, and with this focus, they may be able to negotiate supply to The Pendulum as they have done with the butternut squash and Pie R Squared.

Based on Pendulum's 36% food cost, the minimum selling price would be \$1.58 per serving (Appendix 3). The factor method used in determining selling price is the most commonly used method as it uses a simple calculation; however, it is less accurate compared with the prime cost method. The prime cost method is more accurate because it requires time studies to be done on labor for each menu item. This method of calculating the selling price would have been too onerous and thus unrealistic for this study, and the reason the factor method was used to determine the selling price. The second sensory panel indicated they would be willing to pay \$3.00 - \$5.95 per serving (Appendix 1). The current prices of The Pendulum's salads range from \$ 3.50 - \$4.25. Priced in this range, this menu item should be profitable given its low food cost, and consumers showed they find this price acceptable. Kellough was concerned about the cost of labor in the preparation of the recipe. We generously estimated 40 minutes to prepare 60 servings of the salad given the beets are not shredded by hand but rather by using a food processor. Kellough was surprised by the disclosed ease of preparing the salad and will prepare the salad himself a couple of times before he is satisfied the salad will be profitable.

This salad menu is low in its EF and very nutritious, an added benefit in attracting health-conscious consumers. Eating this salad contributes toward a healthy lifestyle and diminishes the chance of dietary related diseases. The food is low in calories, a good source of fiber (Appendix 4) and the nutrient-dense ingredients help pave the way to a healthy heart. It has the additional benefits of antioxidants, contains only natural sugars, is low in saturated fat,

contains no cholesterol, and has monounsaturated fatty acids, all of which can help protect against coronary heart disease (The world's healthiest foods, 2008).

The sale of the salad at The Pendulum was successful. This contributed to an evaluation of our testing and marketing methods. With the benefit of feedback from our sensory panels, the beet and apple salad was revised and appealed to the customers. A critical result was Kellough's willingness to add the salad to his repertoire of menu items in his restaurant (R. Kellough, personal communication, April 2, 2008). Some of the reasons the group feels the salad was successful are that it was simple to make and it only involves a few ingredients. The recipe is flexible - the salad can be made with or without the goat cheese, maple syrup could be substituted for the honey allowing it to be suitable for a strict vegan, and the texture and appearance can be altered for easier preparation, appearance or marketability. The salad has a long shelf life because the ingredients remain crisp, and the apples do not appear to brown as they are already stained by the beets. Shelf life is important to Kellough because it allows him to make large quantities in advance and store the salad for a couple of days, saving time and labor cost.

The marketing signage may have helped increase consumer awareness of the health benefits of eating a local, seasonal, and healthy menu item. Because Kellough didn't think it was practical to make this type of signage for every salad that fit the local, seasonal and healthy criteria it may be more practical to have a more generic label. We would suggest laminating small versions of the sign omitting the name, ingredients or health benefits as these could be filled in with wipe-away markers later and used for any menu items that fit the local, seasonal and healthy criteria.

RECOMMENDATIONS

1. The UBCFSP recruit collaborative partners from other faculties, such as the Sauder School of Business, to assist with the marketing and business planning aspects of this project.
2. UBC Farm increase production in support of menu items at the UBCFBD.
3. AMSFBD, with assistance from UBCFSP collaborators, explore the economic effects of transforming AMS food outlet offerings to organic products with the goal of developing strategies for implementation.
4. The UBCFSP adopt a goal to study the benefits, opportunities and challenges in shifting the food system toward locally grown, sustainable, organic production, with a medium range view of adding it to the vision statement.
5. AGSC 450 future colleagues examine ways to reduce animal protein consumption by introducing alternative proteins into the menu such as legumes, lentils and tofu.
6. AGSC 450 future colleagues examine ways to reduce the ecological footprint of consuming animal protein by examining alternative ways of production such as organic intensive grass farming.
7. AGSC 450 future colleagues to investigate cost effective biodegradable and reusable packaging material that can be used exclusively by the AMSFBD.
8. AGSC 450 future colleagues to investigate the products available from the UBC Farm throughout the school year (Sept-Apr) and develop menu items based on the findings.

CONCLUSION

In conclusion, the salad meets the criteria of local production and introduces a menu item based largely on fresh fruit and vegetables. Using foods purchased locally helps mitigate the impact of food transportation, supports local farmers and processors, helps strengthen local economies, helps build a local food system, and also enhances food security. The implementation of this local and seasonal menu item at The Pendulum Café is a successful part of a strategy to further lighten the EF of the AMS as well as create a more sustainable food system on the UBC campus. In the view of the authors, the strength and development of a sustainable food system, which achieves the goal of reducing the AMS's EF, is attainable by transitioning the menu through the introduction of more local and seasonal fruits and vegetables.

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APPENDIX 1. Sensory Panel 2

What do you think about the presentation?

- The presentation is about a 9.7/10.
- I'm going to give it a 6/10 - before I started eating it, it was a 9.5/10.
- We can't keep our hands off it, we keep eating it.
- It looks fabulous.
- I might take the kale out. I love the presentation of the kale but people don't like kale.

Do you like beets cooked or raw?

- Cook them first, always.

How much would you be willing to pay for a 250ml serving, if it was a grab and go salad?

- You have to eat a lot of other things with it, it is not enough, \$3.00. Because you have to have something else with it, I would pay \$3.00.
- \$5.95; I'd want to pay \$3.00 but I know it would be \$6.00. Ya [sic], \$5.95 for a little cup of the good stuff.
 - Eating the beets probably fills you up a lot and goat cheese is expensive.

Is the goat cheese necessary?

- Oh ya [sic], absolutely necessary; it is a must.

What do you think about the grating of the beets?

- I like it like this.

Would you like the apples grated too?

- No.
- Well, I'd try it with the apples grated.
- Then it would be more coleslaw, and it would look too mushy that way and may turn into a big soupy mess.
- The grated beets give it the right texture I guess and the apples kind of give it the chunks, and then the goat cheese gives it the flavour.

What do you think about the beets bleeding on the apples?

- I thought it looked really nice.
- The grated beets with the cheese on top gave it good contrast.

What about instead of laying the salad on a leaf of kale, we have kale sprinkled on top for garnish?

- No, I didn't really like that part, it didn't really need it even.
- I would sprinkle some local nuts on top.

Do you all like beets?

- Yes. (3 people)
- This is my first beet dish that I like. The only reason I like this is because the beets are shredded. I don't like beets that are whole. This is how I like beets.
- Nobody is going to buy this that doesn't like beets

General Comments:

- The goat cheese really compliments the fresh apples.
- The apples are really sweet and delicious.
- The goat cheese is smooth.
- It is really good, but I love cheese though.
- I'd almost add some pinenuts or sunflower seeds on it.

APPENDIX 2. Beet and Apple Salad Recipe

BEEF AND APPLE SALAD

Preparation Time: 40 min | Cooking time: 30 min | Yield: 60 servings | Portion Size: 250 mL



Ingredients	Amount
Honey	300 ml
Apple Cider Vinegar	300 ml
Olive Oil	300 ml
Beets, greens removed	40 ea (4.5 kg)
Apples	20 ea (4.5 kg)
Goat Cheese, crumbled	1250 ml (1.0 kg)

Preparation

1. Whisk together honey, apple cider vinegar, olive oil and set aside.
2. In an oven, roast beets at 425°F for 30 minutes. Grate beets using food processor and add to a bowl.
3. Wash, core and cut apples into slices and add to beets. Toss with dressing, coating well.
4. Sprinkle approx 20 ml goat cheese on top of each beet and apple salad portion and serve.

APPENDIX 3. Recipe Cost and Selling Price

The estimated volume and cost for preparing 60 servings of Beet and Apple Salad

Ingredient	Metric Amount	Vol ↔ Wt Conv	Wholesale Price	Cost
Beets	40	4.5 kg	\$ 14.00/25 kg	\$ 2.52
Apples	20	4.5 kg	\$ 0.21 ea	\$ 4.20
Goat Cheese	1250 ml	1.0 kg	\$22.15 / kg	\$ 22.15
Honey	300 ml	0.5 kg	\$ 60.90 / 15 kg	\$ 2.03
Apple Cider Vinegar	300 ml		1.89 / 375 ml	\$ 1.51
Olive Oil	300 ml		\$ 19.35 / 3L	\$ 1.94
			Total	\$ 34.35
			Raw food cost (RFC) per serving	\$ 0.57

Sample calculation to determine the selling price of beet and apple salad entrée (based on Factor Method):

- Given that the Pendulum food cost is 36%, the pricing factor is 100/36 equivalent to 2.777
- Selling price via Factor Method = (RFC of each recipe per serving) X 2.777
= \$0.57 x 2.777
= \$ 1.58 per serving

APPENDIX 4. Nutritional Analysis

Nutrient	Honey (30mL)	Apple Cider Vinegar (30mL)	Olive Oil (30mL)	Beets (4 each) ~ 5cm	Apples (2 each)	Goat Cheese (125mL)	Total	Total per Serving
Protein (g)	0.12	0.00	0.00	5.28	0.72	15.96	22.08g	3.68g
Total Fat (g)	0.00	0.00	27.36	0.56	0.48	22.07	50.47g	8.41g
Carbohydrate (g)	35.40	1.78	0.00	31.36	38.2	1.88	108.62g	18.10g
Energy (kcal)	130	4	242	140	144	269	929kcal	154.83kcal
Fibre, total dietary (g)	0.00	0.00	0.00	6.4	5.2	0.00	11.6g	1.93g
Sugars, total (g)	35.28	0.12	0.00	22.16	28.74	1.88	88.18g	14.70g
Calcium (mg)	2	2	0.00	52	16	220.5	292.5mg	48.75mg
Iron (mg)	0.18	0.18	0.18	2.64	0.34	1.2	4.72mg	0.79mg
Potassium (mg)	22	30	0.00	1064	296	117	1529mg	254.83mg
Sodium (mg)	2	0.00	0.00	256	2	381	641mg	106.83mg
Vitamin C (mg)	0.2	0.00	0.00	16.0	12.8	0.00	29mg	4.83mg
Fatty acids, Saturated (g)	0.00	0.00	3.682	0.088	0.078	15.26	19.1g	3.18g
Fatty acids, MUFA (g)	0.00	0.00	20.22	0.108	0.02	5.04	25.4g	4.24g
Fatty acids, PUFA (g)	0.00	0.00	2.738	0.20	0.142	0.52	4.32g	0.72g
Cholesterol (mg)	0.00	0.00	0.00	0.00	0.00	58.5	58.5mg	9.75mg
Beta-carotene (µg)	0.00	0.00	0.00	64	74	57	195µg	32.5µg



Beet - a - Licious Salad



INGREDIENTS: BEETS, APPLES, GOAT CHEESE, HONEY, APPLE CIDER VINEGAR, OLIVE OIL



LOCAL means your food has travelled less miles to your plate and released less pollutants through transportation. It also means supporting your local community farmers.



SEASONAL means quality ingredients harvested and enjoyed at its peak of freshness. Less reliance on imports from other countries meaning less cost and more environmentally-friendly.



HEALTHY means good for you and your planet! A nutritious and fulfilling vegetarian dish rich in potassium, folate, fiber and antioxidants with a touch of natural sweetness.



HELP TO reduce AMS's ecological footprint.