

UBC Social, Ecological Economic Development Studies (SEEDS) Student Reports

A Sustainability Assessment of UBC Food Services' Beef Food Products

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Beef Food Products**

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Abstract

With increasing affluence, the world becomes increasingly reliant on protein as a source of calories (Acevedo et al., 2006). Beef consumption in particular is increasing at an alarming rate due to the misleading cheapness of beef products, which can be partly attributed to the improved science, technology, and farming techniques that allow for higher productivity of beef (Avery & Avery 2008). However, beef production is likely the most wasteful source of protein, in terms of energy used and environmental degradation (Shah, 2010). After a failed attempt at finding a complete Life Cycle Analysis (LCA) on beef in academic databases, our group compiled academic information that allow a comparison between two very different management styles in beef production.

UBC Food services (UBCFS) have already made immense strides toward sustainable practices. Through this assessment, we hope to encourage these efforts which display initiative and responsibility which are needed now more than ever at a time when our environment faces more problems than solutions. Like the majority of food providers in North America, only feed-lot beef products are used at UBCFS due to its social and economical feasibility from both consumers' and providers' stand point (Shah, 2010). A qualitative study with 10 participants is conducted. Participants are presented information regarding the benefits of organic beef over feed-lot beef, and a brief interview is conducted thereafter. Results show that when given a choice of organic beef products which are 150% the price of existing products, participants are not willing to pay more regardless of health or environmental benefits.

Introduction

Beef production is one of the largest food sectors in North America (Shah, 2010). Regardless of fluctuations of consumption, probably due to an ever quickly changing diet in North America, beef production has increased steadily in both the US and Canada. According to the British Columbia Cattlemen's Association, each person consumes 47.2lbs of beef annually, making beef the most consumed animal protein source. Canadians have not increased beef consumption in the last few decades, but beef production has increased dramatically due to an increase in beef export to US and Mexico. Worldwatch Institute reported that in 1998, US beef consumption was as high as 97lbs per person per year, leading the world in meat consumption and is only second to Argentina in beef consumption per capita.

The revolution of fast food also revolutionized the beef industry since fast food restaurants became the largest purchasers of beef (Shah, 2010). The most important concept of fast food is that the food must be cheap, tasty, and uniform. Thus, feed-lot systems introduced a way to provide great tasting cheap beef that is consistent in quality, and highly efficient in terms of productivity.

Regardless of the management system, beef production is extremely expensive in terms of environmental costs (Shah 2010). The emission of the greenhouse gas methane is generated as a by-product of the digestive processes of the cow, and is a major contributor to climate change (Suback, 1998). According to EPA, livestock herds contribute to 25% of anthropogenic emissions of methane.

Compared to other sources of animal protein, beef production uses twice as much grain as pork, and four times as much as poultry (Shah, 2010). That is to say, the conversion of plant proteins to animal proteins for human consumption is enormously inefficient. In fact, more than

one third of the world's grain is fed to livestock. The use of land to grow crops to feed cattle, and also the land that is used for grazing, must also be considered when assessing the environmental impact of beef production. Further analysis of these implications will be discussed in our LCA section in methodology.

Grain fed beef is the beef most of us consume usually. Unless the beef specifically says "organic", "grass fed", "grass finished", "free range" or "natural", it is probably grain fed. What that means is the cattle are fed corn, especially before it is slaughtered. Even though corn is not part of a cow's natural diet, it is fed because it is cheap (as corn is being overproduced and subsidized in the US) and also because it fattens cows quickly. Both in the US and Canada, natural and synthetic hormones are allowed. Antibiotics are also allowed. Cattle are not required to forage, and have very limited space to move around, which has raised ethical concerns. Crowded feedlots have been criticized for being inhumane, unsanitary, and are sometimes breeding ground for disease such as E. coli 0157L:H7 (Shah, 2010). Among the most controversial of cattle raising systems are Concentrated Animal Feeding Operations (CAFO). CAFOs have been criticized for their ethics, their direct impact on animal and human health, and of course their environmental impact.

On the other end of the spectrum are organic beef. Specifically we are looking at the grass fed beef, which has been continuously fed certified organic grass right up to the time of slaughtering (Fernandez & Woodward, 1999). Interestingly enough, grass fed beef is not very popular. They tend to be very lean, and as a result the beef is less marbled and has an inferior taste to grain finished organic beef.

According to the USDA, certified organic beef must come from cattle that have not been given antibiotics or growth-promoting hormones. Depending on whether it is grain-finished or

completely grass fed, all feeds must also be certified organic. Cattle must have unrestricted outdoor access, except when they must be protected or restrained for obvious reasons.

Antibiotics can be used if they are ill but they can no longer be sold as organic meat. All cattle have a full history that must be verifiable.

Background

Reflections on Vision Statement

As a homogenous group of nutrition students, we agreed most with the third goal of the vision statement, that food is ethnically diverse, affordable, safe, and healthy. In regards to food safety, this project made us uneasy about the beef we consume every day. Although not included in this report, many of the websites and journals we have read raised health concerns regarding the safety and sanitation methods in beef production. One article discussed the health problems associated with factory farming cattle, suggesting that many diseases are being spread to humans through cattle in confined conditions. In addition the proximity, a nationwide ground beef microbiological survey published in 1996 by the USDA found that there is sufficient coliform levels, aerobic plate counts, sorbital, MacConkey agar, etc., to imply that the cow's fecal matter is contaminating beef.

Furthermore, the US Food and Drug Administration (FDA) had allowed feedlots to feed cattle food sources derived from other dead animals until 1997, when bovine spongiform encephalopathy (BSE), more commonly known as mad cow disease, was discovered to be a result.

Two of our members strongly disagreed with the first statement "Food is locally grown, produced and processed". We believe that globalization should not be ignored or condemned, but

celebrated. The acculturation that has taken place over the last century has also led to an increase in ethnical diversity, which has increased the variety of foods we can enjoy. Knowing that a gallon of gasoline is used for every pound of grain-fed beef, we would rather be practical, reduce our meat consumption or switch to organic or natural beef instead of aiming to build a closed food community.

Finally, part of our project's goal is to promote education and awareness for consumers regarding the production, nutrition, ethics, and environmental impact of a very popular food. We believe that consumers ultimately decide the direction of sustainability in the UBC food system. As we will discuss in our recommendation and conclusion, UBC consumers must create a demand for organic and natural beef in order for a change to be socially and economically feasible.

Forming Research Questions

Our purpose initially was to quantify the environmental benefits of organic, natural, or grass-finished beef over grain fed beef. We then conduct research, using this data, to see whether or not consumers will switch to organic beef if available to them when given this information. Finally, based on this research we will formulate recommendations to the UBC food service. However as a three member group we had to be very specific about how we wanted to spend our time and resources. Beef production is a very complex agricultural system that is very hard to assess. For a perfect LCA of beef products one would have to consider everything from the diesel used for farming the corn that is fed to the livestock, to the environmental impact of chemicals used a beef processing plants, to the materials used for packaging of the beef product. Also, attempting to assess a net social cost of beef production is almost impossible since the cost

of beef is being depressed by huge subsidies to both land and corn, driving down all protein prices.

We finally decided that the best way to optimize our efforts was to focus on the most practical aspect of the assessment. We wanted to make a realistic recommendation based on useful research data. We decided to only compare grain-fed beef to certified organic beef. In order to analyze the approximate total environmental impacts of consuming beef, we have conducted the Life Cycle Assessment (LCA) to compare the full range of environmental and social damages assignable to whole process of beef assessment, including raw beef production, manufacture, distribution, consumption, waste disposal and the necessary transportation steps that are required for the production of beef. Then we will take the findings and present them to subjects in our research, and ask them if they would choose organic beef over grain-fed beef. We will also assess the reasons behind their choices. Those findings will lead us to our recommendations.

Part I — LCA Analysis

Introduction

As population grows, the need for meat consumption has increased dramatically. In order to meet the need of meat consumption for the huge population globally, people developed a rapid method of producing meat—the conventional way. At the same time, there were many environmental consequences created from the rapid meat production method and its consumption. In order to analyze the approximate total environmental impacts of consuming beef, we conducted the Life Cycle Assessment (LCA) to compare the full range of environmental and social damages assignable to whole process of beef assessment, including raw

beef production, manufacture, distribution, consumption, waste disposal and the necessary transportation steps that were required by the existence of beef. By analyzing the life cycle assessment of beef, we would determine which product was more appropriate to be used to further enhance the sustainability of UBCFS food system.

Method

Life Cycle Assessment (LCA) was a standardized tool, in which the energy and raw material consumption, different types of emissions and other important factors related to a specific manufactured product were measured, analyzed and summed over the products' entire life cycle from an environmental point of view (Nakamura et al., 2009). Life Cycle Analysis attempted to measure the "cradle to grave" impact on the ecosystem, and was considered to be the most comprehensive approach to assessing environmental impact (Nakamura et al., 2009). There were numerous variants of LCA analysis that had been developed and investigated. A consensus was made that there was only one basic method with a large number of variants (Georgia Institute of Technology). There were generally four main components of LCA, which included goal definition, inventory analysis, impact assessment and improvement assessment/interpretation (Georgia Institute of Technology). The goal definition defined the scope and basis of the evaluation, which set its specific boundary. The system boundary determined which unit processes were included in the LCA and it should reflect the goal of the study. The second component of LCA was inventory analysis, which identified and quantified energy, water, material and land usage, and the environmental release (e.g. air emissions, solid waste, wastewater discharge) during each life cycle stage. In the analysis, all emissions and consumptions were accounted for the mass and energy balances. The third component was impact assessment, which measured the emissions and consumptions that were being converted

to environmental effects. The last component integrated and explained the findings of the three preceding steps to develop policy, plans and actions to reduce environmental impacts and areas of improvement were identified (Georgia Institute of Technology). In our specific study, the system boundary was defined as the basis of the evaluation, which intended to increase the sustainability of UBCFS food system practices. Components of LCA included inputs and outputs throughout the beef production process. The inputs included raw materials, energy, and water and land uses. The outputs included wastes such as waterborne, airborne and solid wastes; they could also include other environmental damage such as global warming, ozone depletion, damage to land, loss of biodiversity, and visual pollution. LCA could be used as an indicator of how sustainable a process or a system can be. Sustainability was defined by the author Paul Hawken of the book *The Beginning as Stabilizing the Currently Disruptive Relationship Between Earth's Two Most Complex Systems-Human Cultures and the Living World* (Hawken, 2007). The making of every product damaged the environment to some extent, such as the process of the extraction and growth of raw materials, and the manufacture, packaging and distribution of products created damages to land and living things. A product created waste during all these stages and after use it was eventually thrown away. All of these steps created a heavy environmental burden; therefore, we had to seek better ways to improve what we were doing. In this specific case, we were trying to look for a better way of producing beef by comparing their LCA results. We analyzed the data that was obtained from various sources to compare the LCA of conventional beef and organic beef. Criteria that we could use to compare the differences of the two types included: green house gases (GHGs) emissions, acidification, resource depletion, eutrophication, and human toxicity. But due to the limited data we could get from information on Canadian beef industry, we only compared their difference on GHGs emissions. We also found

research papers from Australia and some European countries on LCA comparison between conventional and organic beef as a reference to prove our assumptions.

Findings

We compared the LCA analysis of organic beef and conventional beef, and we found that they shared some common processes such as packaging and waste disposal. The materials that were used to package or wrap the beef were polymer resins and plastic wrap, which was made from Polyvinyl chloride. Both types of beef were packaged the same way; therefore, the ways of package disposal were the same. The plastic materials and polymer resins were thrown away as garbage as they were not able to be recycled. Cardboard boxes that were used during transportation were flattened and recycled as paper waste. However, the differences in LCA of organic beef and conventional beef caused different impacts on environment. To be considered as organic, there were certain strict criteria that must be met. Criteria included: cows were born and raised on certified organic pasture; they never received growth-promoting hormones and antibiotics; they were fed only on certified organic grains and grasses; they received humane treatment and had unrestricted outdoor access. Based on the information we gathered, we found that organic farming offered better results from an environmental point of view (Cederberg and Mattsson, 2000). There were less green house gases (GHGs) released with comparison to industrial farming, which produced conventional beef. It was well known that GHGs were one of the main contributors to global warming which had many serious consequences- rising sea levels, loss of some species, movement of tropical disease into temperate zone, and more powerful hurricane (Hawken, 2007). Canada has already experienced some of the effects of global warming (Bentley and Barker, 2005), which meant the effects of GHGs were slowly taking place. From the report of David Suzuki Foundation- the “climate change”, smog that

resulted from GHGs emissions and associated health problems affected our human. There were an estimated 16,000 Canadian died prematurely annually, at the same time, farmers in southern Ontario experienced \$70 million in crop damage each year due to smog (Bentley and Barker, 2005). Based on all these reasons, it was very important to develop organic farming gradually to replace conventional farming.

Discussion

From all the research we have done on comparing the LCA of conventional beef and organic beef, we concluded that organic beef was a better protein product than conventional beef for its naturally more environmental sustainable property. Hence, it helped to increase the development of UBCFS food system sustainability practices. We recommended UBCFS to start using organic beef once a week as a weekly special dish to introduce to students who might be interested in buying it. We could not recommend to replacing conventional beef completely by organic beef since its price was relatively high. Since the price was the main concern for students to make decisions, we recommended UBCFS to use local beef as the conventional beef source. Local beef cost relatively cheaper than imported beef or beef from other provinces in Canada for its reduced transportation distances and fees, which also contributed to reducing carbon footprint. It was obvious that the carbon dioxide, which was one of the GHGs emissions resulting from imports, were higher than those associated with locally produced items (Bentley and Barker, 2005). By offering local beef in UBCFS, students could easily make a more sustainable decision when choosing the food they desired on the dish.

Nowadays, people's life was enriched with food and materials. Food was readily available everywhere, and also, its need by people was increased significantly. As students of UBC from faculty of Land and Food System, we have been trying to find a more sustainable

ways to live. In this specific scenario, we actually got a chance to do research on our meat choice when considering the sustainability factor. Agricultural production was the hotspot in the life cycle of food products and LCA could assist to identify more sustainable options. From our various researches, we found that chicken production was reported to be the most environmentally efficient followed by pork, with beef being the least efficient if protein was considered as the functional unit. The reason why beef was being the least environmentally efficient was that the greater feed conversion ratio, which could be calculated by mass of the feed consumed divided by the gain of body mass resulted in higher emission from feed production (Roy et al., 2008). The results of these studies indicated that the enteric methane from livestock and nitric oxide emission from feed production were the major contributors to global warming for meat products. Although consuming meat generally was not environmentally sustainable, the demand of it by people was still increasing; we should try to find a solution that balanced the two conflicting factors. From our researches, we concluded that organic beef was a better option than conventional beef for its lighter environmental impacts. But due to its high price, many students would not want to purchase it. We recommended UBCFS to use local beef as their conventional beef source. Local beef was less expensive than organic beef, but more importantly, it reduced the transportation costs significantly. From the article Fighting global warming at the farmer's market By Bentley and Barker, they mentioned that transportation accounted for one quarter of Canada's energy consumption and produced one quarter of our greenhouse gas emissions, more than any other sector of the economy (Bentley and Barker, 2005). Some facts we found showed that the more polluting airfreight and trucking ways to transport food was on the rise, on the other hand, transportation by boat and rail was decreasing (Bentley and Barker, 2005). All of these facts told us that the shorter the food transportation

distance (food miles), the more environmental friendly, and hence, a more sustainable option. Therefore, when choosing foods other than meat, such as fruits, we should also apply the buy local theory to help reduce food miles to make it a more sustainable option.

Part II — Qualitative Research

Introduction

In order to develop recommendations to UBCFS in terms of the associated economic and social impacts, we need to better understand the perspectives involved in students' choice of non-organic and organic beef. Through reviewing an organic food outlet off campus, the market prices of non-organic and organic beef have been compared. Since no research has specifically investigated UBC students' perspectives and attitudes towards organic foods, we decided to interview students living or having lived in Totem and Place Vanier Residences. Interviews have elucidated the complexity of food, particularly in beef, decision-making process. Choices about which kind of beef to consume are influenced by personal health concerns together with economic and environmental factors.

Methodology

This exploratory qualitative study was conducted with a convenience sample of students recruited in the residence cafeterias and selected from investigator's contacts. Each participant signed an information/consent form before each interview.

Participants: All participants were UBC students living or having lived in either Totem or Place Vanier Residence. Potential participants were approached by the interviewer when having meals at the residence cafeterias or through scheduled appointments. Each was asked if they would take part in a five- to ten-minute interview for a project examining students'

perspectives and attitudes of organic beef as a beef alternative. Reasons for non-participation included non-beef eaters, vegetarians or vegans and lack of time or interest.

Recruitment continued until saturation was reached, determined by ongoing assessment of the usefulness of new findings in relation to the purpose of the study, the diversity of the participants and available time and resources. The final sample of 10 participants was diverse in majors/faculties and races.

Interviews: We collected data using semi-structured interviews, a method used in past food choice research that provides access to consumers' perception in the food decision-making context without much bias. Interviews were based on an interview guide. All interviews were briefly hand transcribed.

Data analysis: Data were analyzed by organizing, classifying and summarizing qualitative data. Each transcript was reviewed and key words used to explain their choices were summarized and categorized. Several strategies were used to enhance trustworthiness. During interviews, the interviewer summarized the main points participants made, providing information with an opportunity to clarify responses. Finally, adequacy of analysis was peer evaluated with other researchers in the group.

Findings

Interviewees consistently discussed taste, texture, health concerns, and costs as explanations for their food selection as well as other issues, such as personal beliefs and environment concerns. Final decisions were based on the relative weighting of each factor.

Health considerations: Health concerns related to hormone and antibiotic use during cattle feeding process, and nutrient differences between organic and conventional beef. All participants acknowledged organic beef would be "better", but many of them asked if there were

nutrient differences between those two types of beef, and confirmed if there was no big difference between non-organic beef and organic one, they would not willing to switch to the organic. One engineering student explained his choice of conventional beef:

“[...] If it's guaranteed to be 150% tasty and 150% nutritious, I will switch to organic beef [...] so far I don't know much about organic beef [...] to me unless it is completely overrides the traditional beef, I wouldn't think about it [...] I mean, why paying more for not getting how much you have spent on [...]”

Participants with basic knowledge on organic foods all mentioned that unwanted chemicals used during the feeding process negatively impacted on their meat selection but did not significantly changed their choice of conventional beef. One science student said:

“[...] Organic beef has no pesticide or fertilizer contamination and no artificial substances like antibiotic [...] But no, I wouldn't go for organic beef since I only eat a little anyway [...]”

Cost considerations: For those who consume beef frequently, increasing the price of beef by 50% is a big issue and significantly affected their choice of beef. In most instances, because the food spending budget fixed meant they would try to find a combination that meets their nutritional needs and satisfies their appetite. After knowing the price of organic beef, one student commented:

“A healthier diet that is 150% of original price is just too expensive especially in a campus residence dining room [...]”

Environment concerns: With the exception of one student from the faculty of Land and Food System, nobody mentioned that organic food had less negative impact on environment. With a probe question: “Could you think of any environment benefit of organic foods?”, one

more science student commented the stool absent of antibiotic or hormone could be recycled as soil fertilizer. Therefore, it reduced the input of cattle farming. Since the context of our LCA analysis was about climate change, the information we provided to the participants was about the comparison of organic with non-organic beef on greenhouse gas emissions. By looking through the data, most students commented that the difference was not significant that even organic beef still produced a large amount of GHGs (Greenhouse Gases). The aforementioned science student continued:

“[...] Instead of switching from non-organic to organic, I would like to reduce my beef consumption, which I think is a better and smarter choice to make [...]”

Many participants offered to reduce their meat consumption, which they said would be more sustainable without increasing their food expenditure.

Discussion

Our research focus is to investigate the reasons, attitudes and perspectives related to the choice between non-organic and organic beef among students living/having lived in Totem and Place Vanier Residences. We chose to do a qualitative over a quantitative research because a qualitative research discerns people's perceptions of a phenomenon in their life. Especially in the case of a nutrition and food-related phenomenon, an application of qualitative research is essential (Harris et al., 2009). The phenomenon we are focusing on is the presence of organic beef as a beef alternative in the residence cafeterias of UBC. Besides, qualitative research is inductive; namely, it studies a phenomenon that is poorly known. UBC students' perceptions and attitudes towards organic beef are little known and have not been studied. We intend to generate a general description from the outcomes of a qualitative approach. Furthermore, due to

constrained time and limited number of researchers (3 persons), a qualitative research is more efficient and appropriate.

Main considerations on meat choices have analyzed. Depending on times of key words mentioned during the interviews, high priority is given to health and cost considerations over environment concerns. Our findings have indicated that students think about beef as a meat choice because of its taste/texture, nutrition values and affordable costs. Most college undergrad students living on campus were not affluent. Based on the meal plans, daily food spending ranged from \$18-24. (Appendix 3) Balance of the meal-plan account was quite flexible, such as dollars can be added anytime, or redeemed as meal dollars at the end of the term. However, students would not be willing to spend extra on food for something similar. They always wanted to maximize the quantities and varieties of their meal.

Environment concerns did not emerge as an important value in our study. Students who consider organic beef better only had more concerns on the use of antibiotic and hormone. We assume that the environmental benefits of organic foods were rarely mentioned spontaneously because of the lack of comprehension on organic foods. It is unlikely that our participants did not care about the environment. Rather, the real definition of organic foods and their implied benefits were not well advocated. Except for personal interests, students only obtained accurate knowledge in related courses. Therefore, students not studying in related fields would show less knowledge on organic foods. The results of our study reflected on that point. Students majoring in commerce, arts and engineering had limited knowledge on organic foods so that they did not include environment considerations in their decision making process.

Showing participants the results of our LCA research, we intended to let participants “trade off” values during their food choices. Organic foods are expensive as they are

environmental friendly. In most cases, participants found that although organic beef was more sustainable than non-organic one, it still had negative impacts on climate change. The displayed environmental benefits were not strong enough for students to make a change. Some participants therefore offered to consume less beef. Thus, instead of having to "trade off" values, they were able to choose a way to reduce their ecological footprint.

Limitations of the research are related to not professionally trained researchers on study constructing and data analyzing. Besides, due to time and resources constrains, the sample size is too small to represent the target population, which may lead to systematic bias of our findings. Further research is needed to see more extensive and professional findings in terms of both larger sample sizes and longer period studies.

Recommendations

We recommend to UBC food services to be proactive in creating a change in campus food providers through the students and faculty. There is obviously a lack of information which consumers need to create a demand for organic and natural beef. Before any steps can be taken to address the underlying problem, the economical and social feasibility of the concept of organic beef must be evaluated.

Our group proposes that UBC food services host an "Organic Week" during the school year. During this week, organic meat providers will be able to set up a direct connection with existing food services on campus to offer to consumers the option of trying organic beef with their food. Organic foods can simply replace their conventional counterparts if they are ingredients, or they may be a new commodity.

The concept of “Organic Week” will be to raise awareness to the public regarding organic food. We expect that organic food providers will include farmers markets, organic farmers, and even larger chain stores. UBC should also promote informational media which students can easily access to learn more about the organic food offered to them.

At the same time, UBC food services can use this opportunity to assess the economical feasibility of organic foods so that they can adopt foods into their menus permanently.

We recommend to future LFS students who choose this scenario to also promote the idea of an organic week. Future groups can even focus on identifying local suppliers who are willing to cooperate with UBCFS to make such an event happen in the near future. They can also help create information media to promote ecologically conscious consumers. Working with the UBCFS to increase interdisciplinary education on food, health, and the environment is the key to creating this change. For example, one of the ongoing projects named “UBC Food Services Sustainability Initiatives” is to increase awareness through marketing and educational programs. In fact, many food choices and healthy alternatives have been available at residence dining rooms; however, students' incentives choosing a more sustainable diet are not strong enough. Through educating the campus community, students with more comprehensive knowledge on food and health will be more confident on making diet choices.

Assuming that future groups will have more group members, we would definitely recommend a quantitative research to assess the current demand for organic foods. After our presentation, Sophia recommended that future groups can place dollar values on hypothetical organic foods during the study instead of saying “150%” more expensive. Participants will answer differently to the same question that is phrased differently.

Also to future group, we recommend to search for more complete LCAs on beef. The lack of a complete LCA on any one kind of beef, not to mention two kinds of beef to compare, hindered our investigation on the extent of environmental impact of feed-lot beef. We hope that in the future, there will be sufficient information on the LCAs of both organic and conventional beef so that the difference in prices can be better justified to study participants.

Conclusion

There is no doubt that choosing natural and organic beef over the conventional beef is environmentally beneficial. LCAs may or may not be a good proof of this, as different journals will include or exclude different aspects of the beef production system.

We performed a qualitative study with 10 participants, and it is unlikely that the results will convince any food provider to start serving organic beef. However there is a current, ongoing, massive quantitative study that is being conducted. This study could potentially put organic and natural beef on the menu everywhere, not just UBC food services. Every time consumers buy conventional yogurt for a dollar cheaper than the organic yogurt, they are part of the study. Every time consumers decide to buy fruit from a farmer's market instead of a supermarket, they are part of this study. The fact is, most of us are part of this study three times a day, and the food industry is much like a real time indicator at the outcome of the study. As the world becomes more health conscious, we expect a movement towards healthier, organic foods. Many large corporations have already begun preparing for this demand, and we believe that UBC food services should lead the way in this transition toward health and environment consciousness. We strongly believe that in order for this change to occur here at UBC, UBCFS

must first convince the consumers on campus to begin investing in health, the environment, and change.

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Appendix I

Semi-structured Interview Guide

1. What do you know about organic beef?
2. If there organic beef is now available in the residence cafeteria, would you be willing to substitute beef with organic ones if the price is 150% more?
3. Do you ever consider what you eat can impact on environment? PROBE: providing some environment benefits of organic beef compared with non-organic ones. Tell me about that.
4. (If previously, participant does not want to choose organic beef) After knowing that organic beef is better to the environment, would you still insist on your choice?

Appendix II

Beef Market Prices

Capers (an organic and local food grocery market)

\$63.19/kg= \$0.06319/g --- rib **organic**

\$18.72/kg= \$0.01872/g --- lean ground beef **organic**

\$5/125g= \$0.04/g --- smoke/roast beef from Quebec **organic**

\$6.17/100g= \$0.0617/g --- beef rib eye steak **local**

\$6.17/100g= \$0.0617/g --- strip loin NY steak **local**

\$2.09/100g= \$0.0209/g --- beef stew meat **local**

From some other grocery stores

Average price for strip loin NY steak is about \$3.86/100g= \$0.0386/g

Average price for lean ground beef is about \$12.928/kg= \$0.012928/g

Average price for rib is about \$42.13/kg= \$0.04213/g

Average price for beef stew meat is about \$1.32/100g= \$0.0132/g

Appendix II I

The Residence Meal Plan costs

	Minimum Plan	Light Plan	Regular Plan	Varsity Plan
CIF*	\$50.00	\$50.00	\$50.00	\$50.00
Overhead Cost	\$945.29	\$1,021.90	\$1,131.34	\$1,215.47
Flex Dollars	\$330.37	\$509.12	\$764.48	\$960.79
Meal Dollars	\$1,875.30	\$1,875.30	\$1,875.30	\$1,875.30
Total Plan Costs	\$3,200.96	\$3,456.32	\$3,821.12	\$4,101.56

*Capital Improvement Fund

- **Minimum Plan** is designed for students who are not on campus on weekends and who have a smaller appetite.
- **Light Plan** is designed for students with small to light appetites that are occasionally on campus on weekends.
- **Regular Plan** is for students with an average appetite, who are on campus on alternate weekends.
- **Varsity Plan** is designed for those students with a hearty appetite or those who would be spending most weekends on campus.

(Obtained from: <http://www.food.ubc.ca/diningplans/residence/index.html>)