UBC Social Ecological Economic Development Studies (SEEDS) Student Report

Identifying Sustainability: The UBC Model Food System Example

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Identifying Sustainability:

The UBC Model Food System Example

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Abstract

Universities have the responsibility to be the leaders of social change through initiatives that respond to current social, economic, environmental and moral values. The University of British Columbia has an opportunity to lead the research of sustainable food systems through the development and study of a Model Food System. This system will incorporate the local UBC farm, a Community Kitchen and a strong community component of students, faculty and concerned Food Citizens. Our research proposal outlines the measures necessary to create and study this Model Food System (MFS). It is our belief that through this study the University will benefit from decreased operating costs, higher nutritional and social value of food menus, and a strong community linkage.

Introduction

Problem Statement

The University of British Columbia has established a food system in an attempt to meet the nutritional needs of its community of students, faculty, staff and visitors. However, the goals used to create this system are aligned with those of the university, namely *profit maximising* and *efficiency* Although these ideals are legitimate in a business sense, they are misplaced in a university. It must be observed that these ideals represent a myopic view of the issues surrounding a food system. [redacted]

Undoubtedly, value and nutrition of daily meals are at the forefront of consumers' conscience [redacted] In addition, socially and ethnically relevant food choices, variety, as well as the ecological impacts of production and processing methods should be paramount when creating a food system, especially at a university that regards itself as "world class" . Placing greater importance on these values in business ideology ensures more than profit. It ensures the customers' satisfaction and health as well as the

health of the environment. Adopting such values inherently increases the success of a business because they represent a trend towards sustainability. A sustainable system operates using methods that encourage "perpetual" growth [redacted] within an ecological mandate. Therefore, a food system should place emphasis on the access to ecologically produced food, fair-wage or community volunteered labour, environmentally conscience transportation of goods and locally produced and processed items. The lack of these values in the UBC Food System requires attention.

The study of a systems sustainability, or ability to maintain long-term success, can involve complex and sometimes abstract concepts that are difficult to identify let alone measure. A system itself can contain a multitude of components each with separate functions that utilize specific inputs to generate the desired outputs. Therefore, the more components contained within a system, the more difficult it can be to evaluate the sustainability of a given situation [redacted].

How do we know what qualifies as a sustainable system? The use of a simple model provides a hint as to how to approach this question. For example, imagine a system represented as a bathtub. The inputs are hot water from the tap and soap from a bar, the output being soapy water through the drain. In a perfect system, the material and energy found in the inputs should be fully accounted for in the outputs. This situation rarely exists in reality [redacted], wherein the efficiency of the system is compromised by leaks in the tub.

The UBC Food system appears to leak through thermal energy losses, emissions of carbon compounds/transportation costs, non-recycled organic wastes, and inefficient spending. However, the magnitudes of these leaks are not easily detected if the flow of materials and energy from their entry to and exit from the system are neither investigated nor accounted. The lack of awareness that the tub is leaking creates a false overestimation of the costs that run the food system. Therefore, extra resources or inputs must be added to maintain the desired level of output. This "topping-up" of the system, as well as the leaks represents major

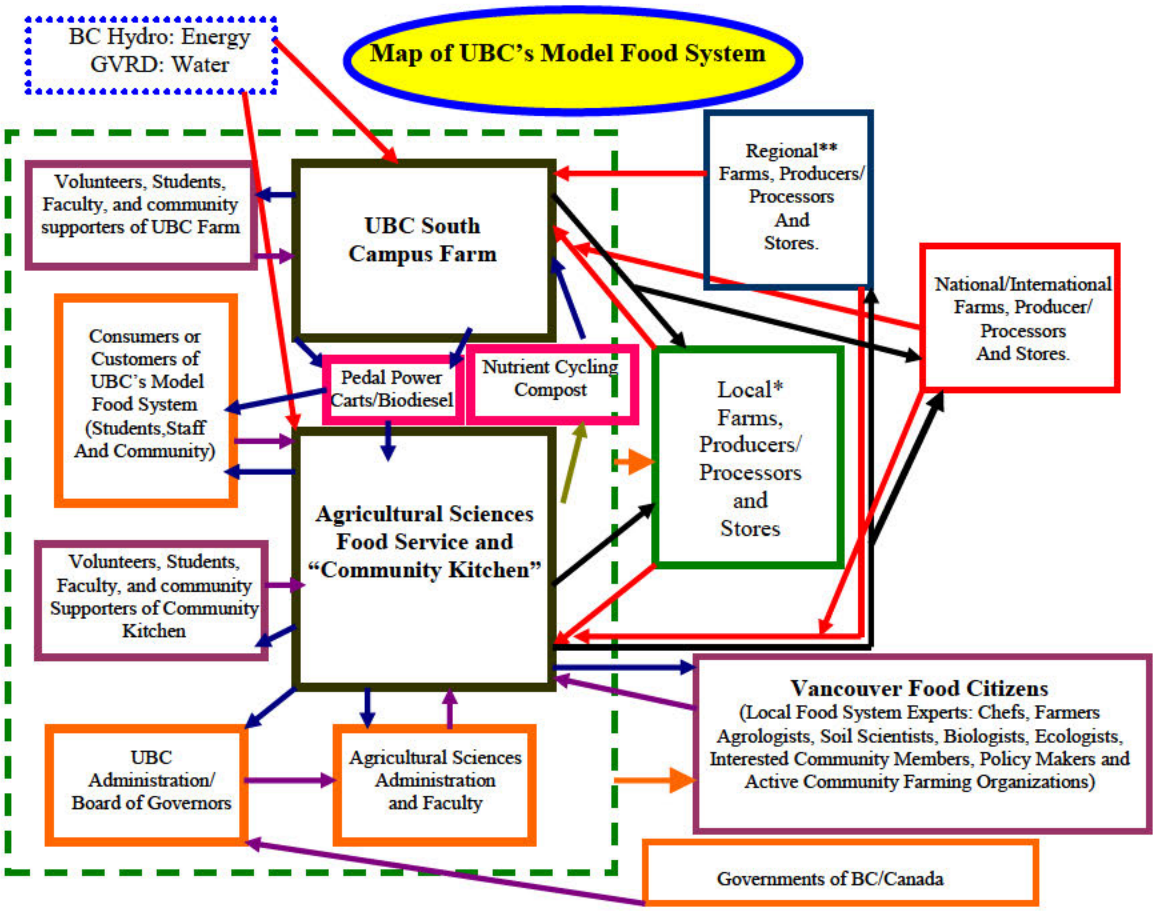
inefficiencies and compromises the sustainability of the system [redacted]

[redacted]

[redacted]

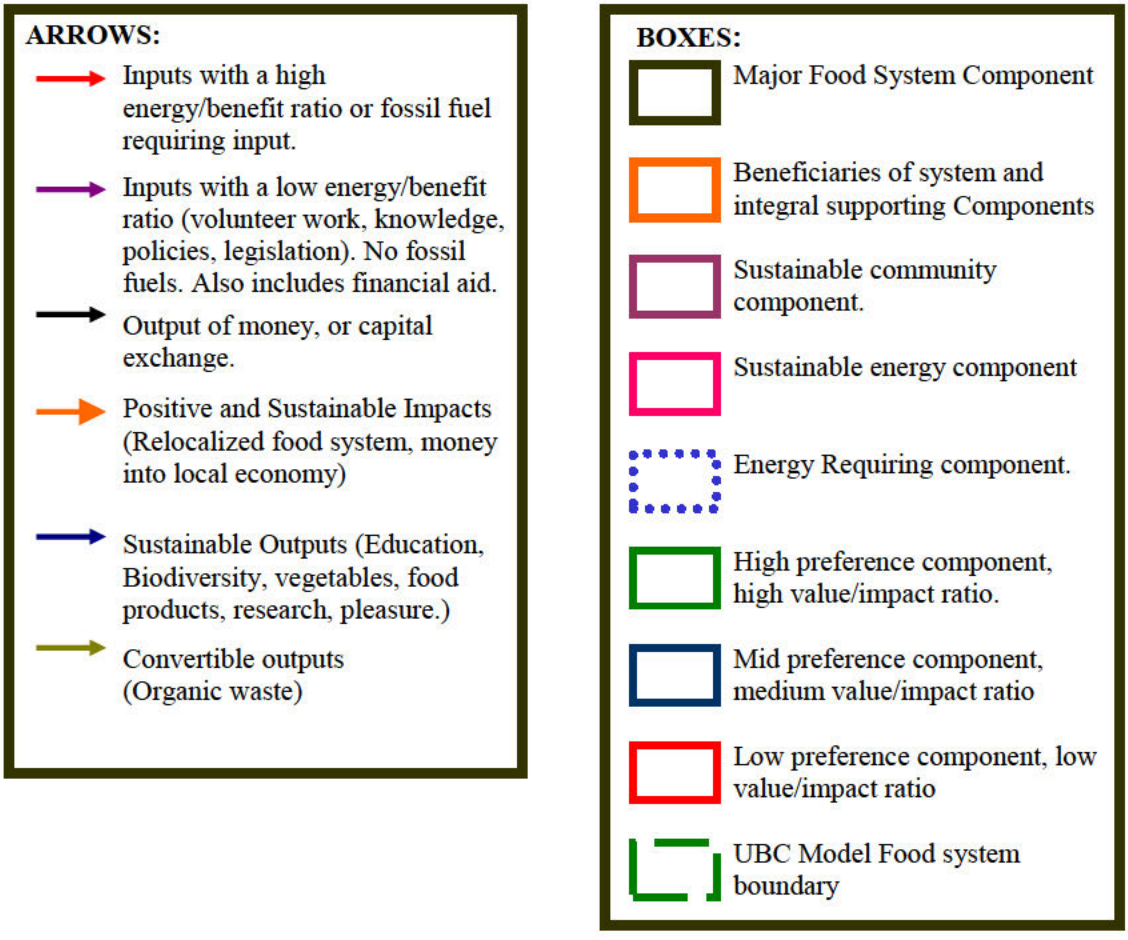
Models of the current UBC food system and the proposed Model Food System

Figure 1:



* Local Producers/Processors are defined as being both located and owned by residents of the area within the Greater Vancouver Regional District and the Lower Fraser Valley.
** Regional Producer/Processors are defined as being both located and owned by residents of British Columbia excluding the area within the Greater Vancouver Regional District and the Lower Fraser Valley.

Legends Of UBC Model Food System Map.



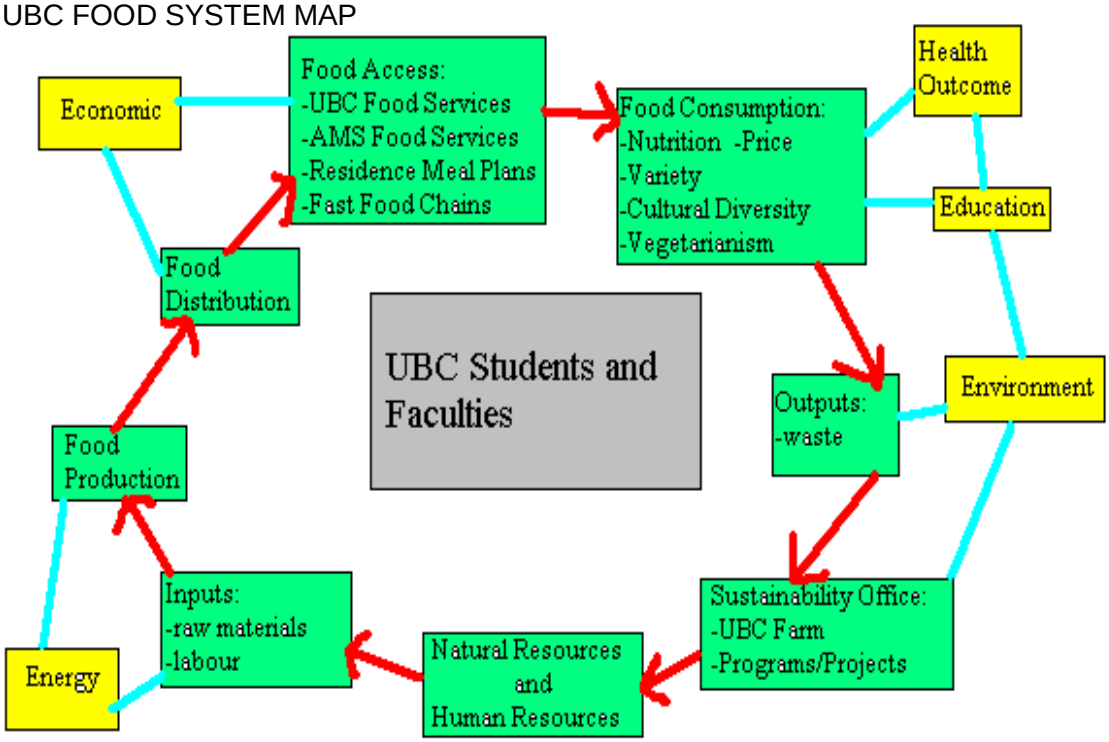
Map

Model Food System Map Disclaimer

The proposed Model Food system has a great deal of interactions within the University itself and the larger community. Figure 2, the Model Food System Map, attempts to illustrate the complex interactions and qualify each of these. The legend indicates the nature of each interaction, ranging from High-energy requirements versus benefits, to low energy requirements versus benefits. In addition, each component of the system is qualified as to the preference we will give to including this component in our system. For instance, the Local and Regional producers are given separate preference levels as we feel choosing more ingredients from local producers enhances the local economy and decreases transportation of goods via fossil fuel powered vehicles. Furthermore, this connection to local farmers will strengthen the community linkages that are vital in a food system.

Figure 2: [redacted]

UBC FOOD SYSTEM MAP



Data Collection

Table 1 (Appendix A) represents the abundant supply of methods in which our Model Food System and subsequently the UBC food system could be studied. The components of the systems can be shown to have a range of sustainability indicators that are measurable either through qualitative or quantitative studies. Table 1 is an extensive list and it is not our intention for the reader to assume all of these components must be identified([redacted]). Subsequently, we have compiled a summary of the major data collection methods. We believe that these suggested approaches are the priority study areas to be undertaken during the initial study of the proposed Model Food System. After careful consideration, these areas were proposed for the initial study because they contributed greatest in the overall task of placing the UBC Food System on the sustainable end on the continuum ranging from unsustainable to sustainable. ([redacted]) Conducting these priority measurements and collecting data on these

aspects of the system would achieve a greater understanding of the sustainability success of the UBC Food System. The ten condensed data collection methods are listed in Table 2.0 (Appendix B).

Indicators

SOCIAL INDICATORS

Nutritional Value

Currently, there are nearly thirty UBC food services outlets and about ten Alma Matter Society (AMS) food services outlets on campus. Due to the fact students and staff are busy with their class schedules and other activities, they often ignore the nutritional value of the foods they gulp down during meals. As students ourselves, we recognize the importance of nutrition for our stressful life. In a sustainable food system, the consumption and production of food should enhance the health of the consumers (Kloppenburg, et al., 2000). Our emphasis is to study the food production and preparation, and nutritional value of foods of the outlets in UBC.

The Food Info Service run by the food science students in the Faculty of Agricultural Sciences is an excellent starter for studying the food production. We propose the students of Agricultural Sciences participate in and raise questions in regard to the sustainability, and allow the food science students to explore into the food production field and provide knowledge campus-wide.

The students from the Faculty of Agricultural Sciences are fortunate to have the knowledge regarding food, nutrition, and health. Therefore, we feel the primary focus should be within this faculty and be incorporated into the Model Food system kitchen we propose. For example, Dietetics and Nutrition students can be involved in assessing the nutritional value of the foods on campus-wide. Through dietary analysis of foods at each foodservice outlet, we can see at what percentage these foods stand and see which ones are considered nutritious. In addition, Dietetics and Nutrition students could use the Canadian Food Guide to measure how well meals at each food service outlet provide the recommended servings of each food group. Considering that people normally eat two to three meals a day plus snacks than a meal served, the school should provide 35% of the minimum recommended serving of each food group to make sure everyone is getting the

proper amount of nutrients from their meals. After looking at the results, [redacted] outlets found within the lower percentage range and that don't follow the Canadian Food guide will need to have their meals carefully planned, preferably by dietetic and nutritional sciences students. The goal is to reach the highest percentage as possible of recommended nutrients and the 35% of servings from each food group in order to achieve sustainable nutritional value in UBC food service meals.

Food System Variety

In the paper "Tasting Food, Tasting Sustainability: Defining the Attributes of an Alternative Food System with Competent, Ordinary People" by Kloppenburg, et al., two of the attributes of a sustainable food system included are diversity and cultural nourishment. Canada's Food Guide to Healthy Eating emphasizes a variety of foods from each of the food groups. Because students and staff come from different ethnic backgrounds, providing diverse food products is not only healthier but also more culturally important.

The meals provided by UBC Food System should include a wide range of food selections including ethnic foods, vegetarian foods, organic foods, and inexpensive foods. Questionnaires can be provided to the students on their preferred type of food choices. The Community kitchen can use such information and allow students to prepare a variety of foods using the available resources. As Kloppenburg et al's paper states "A diverse food system invites increased opportunities for people from many cultures and socio-economic backgrounds, and increase participation of consumers."(2000). Such transition will lead to a more sustainable food system as people become involved and responsible in their consumption, preparation, and production of foods. ([redacted]

Advertising

We hope the implementation of the Model Food System can provide a basic sample model of the whole UBC food system and bring the people closer at UBC. Advertising is an important indicator of sustainability; successful advertisement will bring more people participate in the project and facilitate the progression towards a sustainable UBC food system. The initial student participants may create posters, banners, and brochures

regarding ways to achieve sustainability. Such action will create a community within UBC that is knowledgeable to its food system.

[redacted]

ECONOMIC INDICATORS

Energy Cost

Economic sustainability of the UBC food system cannot be measured without analyzing the vast amounts of energy consumed on campus. Eliminating, or at least reducing, energy expenditures could in fact improve the overall health of the food system as a whole. For example, we suggest reorganizing current long distance food shipments by infusing closer proximity food sources, such as the UBC Farm. The serious concerns surrounding locality issues may be minimized through the development of a "Community Kitchen" on campus ([redacted] The Community Kitchen would have a "fresh from the garden" motto aimed at providing customers with healthy, home cooked meals made from quality produce grown on the UBC Farm. This shift in food source locality could help redirect useful funding toward more efficient and ecologically sustainable sectors of the UBC food system. Such as advanced kitchen equipment with improved technology that decreases energy spent. We also propose to develop a condensed time schedule for the Community Kitchen in order to minimize energy consumption. These precise hours of operation will result in less time spent maintaining food at serving temperatures, hence reducing wasted energy. Overall, the reorganization of the UBC food supply along with technological improvements will create a more energy efficient food system for the University of British Columbia.

Social Welfare

We vision that the Model Food System will be a marketplace to meet consumer and local business needs. By closing information gaps, we can reach an optimal social level. To illustrate, product availability can

be enhanced by the contingent survey method, which is a measure of consumer preferences. In order to compete against existing restaurant and food places, sustainable businesses will have access to this information on preferred prices and desired products that will attract more customers. Along with linkages to local businesses, developing the MFS will also allow for local farmers to establish a market niche for organic raised crops. We would provide them with a secure source of income through pre-payment at the start of year to help them produce crops and then pay the balance upon receipt. These efforts would bring revenues to businesses while meeting consumer desires, and so maximize social welfare. Currently, the Sustainability Office indicates "a median willingness to pay of $10 per [person] per year for the campus to be pesticide free", but there are no food projects being developed (Potvin, B., 2002) [redacted] . There is more room for improvements, namely to integrate our MFS with the Social, Ecological, and Economic Development Studies (SEEDS) program at UBC [redacted]. The challenge is to disengage as quickly as possible from initial funding financed by the government and university. As the business stabilizes, we can gradually detach our dependencies from such financial subsidies and become economically sustainable in the long run.

EDUCATION INDICATORS

Education is another category that we felt should be studied when focusing on the UBC food system sustainability indicators. After all, Aldo Leopold once asked that if education of a certain kind does not help us to better manage our resources and work towards sustainable solutions then "what is education for?" (Orr, 1991).

Student Participation

One education indicator within the realm of our Model Food System is student participation. We believe that student participation in our model food system initiative would foster additional support for the project and advance sustainability knowledge in the community. Thus when these students graduate, they will make choices that progress towards sustainability within the food system. We hope that in the long run our efforts towards better informing the student population will spread to the Greater Vancouver community. Therefore,

we would recommend establishing student participation on a small scale within our model food system and then tracking student opinions over time through a mailed out survey [redacted] We recommend beginning the initial study with student participation representing the wide diversity and variety of people within the Agricultural Sciences Faculty through a directed studies option or newly implemented curriculum [redacted] Eventually the initiative could be transplanted throughout the UBC campus in coordination with the UBC Sustainability Office. Students may participate and even earn community service volunteer hours that could be accepted as a three-credit course if the hours and work are within the student's respective study areas.

Community Education

Another indicator of the success of our sustainable model food system is community education. Education within our community is an important indicator because it is a reflection of the public's knowledge and awareness of sustainability issues. We recommend that the UBC Sustainability Office start by working with UBC students to produce food sustainability education, which would advertise for the consumers of the MFS initiative. Randomized distribution of questionnaires that within the UBC community, which relate to sustainability education could then be used to grade the success of the advertising and provide indications of the sustainability knowledge of the community. In addition to providing information for the public, the model food system participants could work with the UBC Sustainability Office to offer student led field trips and tours of the farm. This approach would bring people closer to their food and allows them to appreciate the influence of their choices. Furthermore, we recommend that food security and sustainability topics be made available to younger students of elementary school age. The MFS could have representatives who plan food sustainability activities for youth where the education is targeted specifically to youngsters. Elementary schools could establish a "Food Week" where young students are able to discuss the benefits and consequences of their food choices.

[redacted]

ECOLOGICAL INDICATORS

Nutrient Recycling and Waste Management

Nutrient Recycling can be improved by using the manure produced from the farm animals, including chickens, dairy cows, and possibly sheep. In addition, organic material recovered from food outlets and composted will make excellent organic growing material. These efforts will reduce the dependency on external farm inputs to the UBC System. Costs will be decreased, as less money is spent on fertilizer, and is instead focussed on paying students, or having them volunteer, to bike the manure from the animals are to the crops. Also, chickens can be integrated directly onto the crop. Chickens will eat weeds and insects in the area. However, crops must be selected properly, so the chickens do not eat the desired plants.

Waste management can be achieved through manual labour. Providing buggies, or bikes with carts attached to the back, for volunteer students to wheel the food wastes to the farm will reduce the reliance on fossil fuels for transportation. If the food is brought to the chickens as an alternate food source, they will require less pelleted feed. This should be done every 2-3 days, so food does not go bad. This will lessen costs and lead to better overall sustainability of the UBC food system [redacted]

Biodiversity

Biodiversity is crucial to sustainability. Currently, the UBC farm embraces a diverse and integrative approach to farming, as opposed to a monoculture method. This inherently allows naturally occurring species to flourish, and benefits from the natural balances between pests and natural predators in pest control. With funding from the University, or assistance from the community, the farm can increase both its diversity of animals and plants and enlarge the area in which the crops are grown. Student help, paid or volunteer, will be required to succeed with this project. Also, a greater selection of foods from the farm will provide more interesting meals from the Community Kitchen. This will help promote the idea of eating healthier foods within the student community. The more people to have the opportunity to eat this food, the more the word will spread, and hopefully bring out more volunteers for this type of feast.

Value Assumptions

Our group values a broader range of qualities than that of the UBC Food system directors, which include ecological, social, nutritional, economical and local community support. We value recycling organic wastes, either for animal feed or compost, as well as decreasing fertilizer and pesticide use. The low impact of human powered transport is worthy of investigation under our principles. In addition, we feel it is necessary to create a community of Food citizens, both at the UBC campus and in the Greater Vancouver district who will feel responsible to care for the land from which their food is harvested. Our group feels that these holistic values and views of a food system are necessary to combat the leakages that result in a system focused primarily on profit and "efficiency."

We have proposed a research method that requires the creation of a Model Food System through which a standard can be established for this university to compare to its own Food System. This model system would operate under the contexts of the previously mentioned sustainability indicators while striving to meet a high level of efficiency through nutrient cycling, volunteer and student labour as well as minimal dependence on fossil fuel powered equipment. It is our hope that this model system will provide a broad range of data and information that illustrates what a sustainable food system looks like. With this information in hand, we feel the University of British Columbia can take its next steps toward developing a sustainable food system of their own.

Conclusion

Coming from a diverse group of disciplines, we came up with Social, Economic, Ecological, and Education as important indicators for a sustainable food system. The map and the methodology chart provide us with the blue print of amending the

leakages of our present bathtub analogy. Social indicators are based on nutritional information, food system diversity, and advertising. The Model Food System we propose can help reach nutritional goals to maintain a healthy diet, provide a balanced diet from a diverse selection on food, and connect people together by allowing them to see the relationship between foods and themselves. Another indicator is Economic, which includes maximizing social welfare by harnessing the energy inputs in an efficient manner and meeting consumer and producer demands with enough information and awareness in a Model Food System marketplace. Too often-neglected resources are Student Participation and Community Education, which we called education indicators. Here we utilize students as a mobile force to make advance choices, which will result in progress towards sustainability within the food system. We recommend collaboration with the Sustainability office and local elementary schools to better inform the student population; education is primary in reflecting the public's knowledge and awareness of sustainability issues. As with ecological indicators, nutrient recycling and waste management efforts will reduce the dependency on external farm inputs to the UBC System by relieving input costs and in turn lead to better overall sustainability of the UBC food system. Another component is biodiversity**,** where the UBC farm serves as an example for other resources to model from. The UBC farm embraces a diverse and integrative approach to farming, as opposed to a monoculture method, which allows diverse species to flourish in balance with one another.

Recommendations

1.0 Social

1.1 Create menus which provide students with choice of preparation method and nutritional values

1.2 Have food service outlets establish a nutrition emphasis so students and staff can have access to healthy foods that are available within short walking distance

1.3 Develop plans for a future culinary school (profit recoverable "Continued Education" operation that educates trainee-chefs on local/sustainable farming techniques and crops while providing world class culinary training)

1.4 Create an open forum page for comments and feedback on the website

1.5 Encourage the sustainability office to work with our proposed model food system and be closely involved with the data collection

1.6 Recommend that UBC Food System outlets provide a variety of nutritious and high quality foods.

1.7 The students of Agricultural Sciences participate through newly developed curriculum linking sustainability education and food system development

1.8 Increase sustainability awareness through effective advertising initiatives

1.9 Lobby federal and provincial governments for University awareness and support for taking on such an important holistic analysis of food system inefficiencies

2.0 Economic

2.1 Decrease transportation costs by supporting local companies

2.2 Invest in local business networking initiatives

2.3 Investigate and implement ways of decreasing operating costs

3.0 Ecological

3.1 Incorporate community/satellite gardens

3.2 Investigate alternative and unconventional transportation means i.e. bio-diesel, human power... etc.

3.3 Put meters in place at UBC farm to gauge water usage

3.4 Reduce overall energy waste by supporting environmentally friendly initiatives

3.5 Study importance of biodiversity

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Appendix A

Table 1.0. Components to be measured within the Model Food System, as well as suggested methods of measurement.

Component	What is measurable?	How can it be measured?
1) BC Hydro/GVRD water source	a) Energy consumption (i.e. lighting)	a) Read box/bill (timers) *
	b) Water usage (i.e. irrigation, dishwashing)	b) Flow meters/ timers *
		c) Incentive programs- input from BC Hydro for efficient usage
2) Volunteers, Students, Faculty, and community Supporters of UBC Farm	a) Number of participants and students involved	a) Course attendance and class list
	b) Hours worked/volunteer hours	b) Time sheets
	c) Satisfaction	c) Courses evaluation and case evaluation
	d) Community support and interest	d) Donations, membership, visits to farm and the system, market garden, calls of interest

3) Consumers or Customers of UBC's Model Food System (Students, Staff and Community)	a) Amount of products sold	a) Receipts
	b) Customer Satisfaction	b) Surveys
	c) Interest in program	c) Surveys/participation record
4) UBC Administration/ Board of Governors	a) Money from UBC Administration and Board of Governors	a) Grant records
	b) Publicity	b) Number of speeches Martha Piper/administration deliver that focus on the model food system
	c) Public interest	c) Visits to farm, records, meetings, support
	d) Zoning policies	d) Investigate 'Official Community Plan' zoning changes (UBC Farm interest)
	e) Model System's Dependence on financial support	e) Money needed over time (becoming more sustainable means requiring less financial support over time)
5) Agricultural Sciences Administration and Faculty	a) Curriculum development	a) Amount of introduced applicable and relevant coursework
	b) Money	b) Money budgeted for the model food system
	c) Resources/Infrastructure	c) Amount of training and allocated space
6) Agricultural Sciences Food Service and "Community Kitchen"	<u>Connection to #12</u>	
	a) Employment	a) Number of jobs
	b) Active participation	b) Diversity and number of participants
	c) Exposure	c) Media coverage
	d) Pleasure	d) Satisfaction Survey
	e) Experience for students	e) Types of Knowledge and skills provided by community participants
	<u>Connection to #4 and #5</u>	
	g) Research	g) Records
	h) Public relation	h) Public opinion questionnaire
	i) Money	i) Money budgeted for the model food system
	<u>Connection to #3</u>	
	j) Food products	j) Menu range
	k) Food variety	k) Menu range
	l) Nutritional quality	l) Nutritional analysis and study
	<u>Connection to #7</u>	
	m) More efficient transport (energy)	m) Calorie and energy balance study
	n) Exercise	n) Measured activity of the participants
	<u>Connection to #11</u>	
	o) Connection to industry	o) Number of local suppliers
	p) Place of sale	p) Number of local versus international
	q) Money Exchanged for goods	q) Accounting records
	r) Energy used for transport	r) Transportation method and energy requirement calculations
	s) Equipment purchased	s) Accounting records

	Connection to #1	
	t) Energy cost/efficiency	t) Equipment energy efficiency (power/hours)
7) Pedal Power Carts/Biodiesel	a) Human calorie expenditure	a) Energy expenditure calculation
	b) Labour involved	b) Amount of participants and work hours
	c) Distance travelled	c) Proximity calculations
	d) Costs of b ke, cart and maintenance	d) Records and comparison with conventional transportation
	e) Biodiesel cost/benefit analysis	e) Amount of oil recovered from fryers, cost from conversion
	f) Emissions estimation	f) Calculate from Air Care results
8) UBC Farm	a) Variety of Produce	a) Number of items including types of food group and species
	b) Soil Quality (Biology)	b) Soil Tests & Assessments
	c) Biodiversity	c) Ratio with respects to the Population Studies, Beneficial Species vs. Pests
	d) Water Usage	d) Water Meter *
	e) Seasonal Length	e) Length of Season (months)
	f) Seed Saving	f) Number of seeds replanted vs. bought
	g) Manure usage	g) Weight of manure/infrastructure (check to see if there is a balanced distribution to prevent runoffs)
	h) Energy Usage	h) Energy meter and analysis of equipment for efficiency
	i) Equipment Purchased	i) From receipts find total value and depreciation values
	j) Visits to Farm	j) Tally sheet/log book
	k) Money Spent	k) Accounting records
	l) Feed inputs	l) Purchased amounts vs. Recycled material
	m) Fertiliser	m) Cost-benefit-analysis on conventional fertilisers compared to compost quality
	n) Labour Costs	n) Payroll sheet vs. Volunteer hours
	o) Fossil Fuel inputs	o) Litres of gas and diesel used and estimated emissions
	p) Program Development	p) Number of projects (i.e. Initiatives per month)
	q) Market Garden Success	q) Profits/Cost analysis and increasing participation
	r) Connection to Businesses	r) Number of suppliers and how much from each and nature of relationship
	s) Advertising & Promotion	s) Announcements, media appearances, and money allocated
	t) Community Connection	t) Calls from citizens, donations, school interests, % of land tendered by locals
9)Nutrient Cycle	a) Amount Recovered from model food system	a) Weight of material recovered vs. material available for the recovery
	b) Amount used	b) Weight of nutrient inputs
	c) Number of sources	c) Suppliers
	d) Cost Savings	d) Balance Sheet
	e) Pollution impact	e) Calculate Concentration of toxins and quantity of pollutants

Producers/ Processors	a) Method of Transport and fossil fuel requirements	a) Record the method and calculate emissions
10) Regional Farms	b) Distance Transported	b) Proximity calculations
11) Local	c) Quality of input (organic)	c) Certification and type of farming practices
14) National/ International	d) Variety	d) Number of choices and availability, preferences
	e) Cost	e) Receipts: cost versus value
	f) Frequency	f) Number of deliveries
	g) Tax/import costs	g) Accounting records
12) Vancouver Food Citizens	a) Type of Contribution	a) List of Participation
	b) Benefit to them	b) Method of retribution
	c) Satisfaction levels	c) Awareness surveys, website forums, endorsement
	d) Number of Connections	d) Guest book*
	e) Size of community	e) Map/ proximity
	f) Professions	f) Ratios of expertise; i.e. chefs to soil scientists
	g) Market Garden Success	g) Participation rates
	h) Public figure support	h) Gordon Campbell, Moura Quayle, Martha Piper
	i) Donations	i) Record of those involved and amount donated
13) Government of BC	a) Policies Development	a) Legislation enacted
	b) Investments	b) Grants, subsidies loans, etc.
	c) Financial dependency on government	c) Money needed over time (becoming more sustainable means requiring less financial support over time)

* = These components must be installed if not currently in place.

Appendix B

Table 2.0 Suggested data collection priorities for initial study of the Model Food System.

1) Electrical energy and water consumption
2) Proximity of input contributors
3) Nutrient recycling amount
4) Nutritional value of menus
5) Profit analysis of the Model Food System
6) Ecological impact and wastes
7) Community partnerships
8) Customer satisfaction and perceived value
9) Biodiversity: Environmental health of Model Food System

10) Education contribution to university community