

UBC Social Ecological Economic Development Studies (SEEDS) Student Report

**The Sustainability Of The Ubc Food System: Collaborative Project II**

**Chad Forbes, Kerry Smith, Tony Wong, Lara Jones, Vincent Quan, Leslie Lu, Meghann**

**Cant**

**University of British Columbia**

**AGSC 450**

**April 2, 2003**

*Disclaimer: "UBC SEEDS provides students with the opportunity to share the findings of their studies, as well as their opinions, conclusions and recommendations with the UBC community. The reader should bear in mind that this is a student project/report and is not an official document of UBC. Furthermore readers should bear in mind that these reports may not reflect the current status of activities at UBC. We urge you to contact the research persons mentioned in a report or the SEEDS Coordinator about the current status of the subject matter of a project/report".*

# **THE SUSTAINABILITY OF THE UBC FOOD SYSTEM: COLLABORATIVE PROJECT II**

Agricultural Sciences 450

April 2, 2003

Group 14: Chad Forbes

Kerry Smith

Tony Wong

Lara Jones

Vincent Quan

Leslie Lu

Meghann Cant

## **ABSTRACT**

With regards to sustainability, the UBC Food System is suspected by some as being in a state of [REDACTED] crisis. In response, the Faculty of Agricultural Sciences, UBC Campus Sustainability Office, UBC SEEDS program, AMS Food and Beverage Department, and UBC Food Services are collaborating to bring about change. However, before any changes can be suggested and implemented, some indication must be given of the severity of this crisis.

To this end, we have been assigned the task of developing a model to assess the sustainability of the System. We begin by providing a definition of the problem and outlining how our value assumptions influence this definition. We also define sustainability. Then we conceptualize what is meant by a sustainable and an unsustainable System and describe the continuum between the two. We provide a map of the System that identifies its boundaries, components, interactions, goals, and linkages to local, regional, national, and global food systems. We then propose three significant indicators to measure the sustainability of the System and describe them in detail. For an ecological indicator, we recommend the food mileage of produce at UBC. We suggest

awareness of nutritious foods among students, staff, faculty, and residents at UBC as a social indicator. The cost of nutritious food on campus is presented as an economic indicator. Finally, using all of this information, we create and explain a “Sustainability Master Metre” on which the sustainability of the UBC Food System can be measured and the severity of the crisis evaluated. [REDACTED]

## **INTRODUCTION**

Each day, the UBC Food System feeds thousands of students, staff, faculty, and residents. Like a machine, the System grinds on and on, producing food and generating waste, in a continual effort to feed the people that keep it running.

In the midst of this complex and impressive machinery, a growing number of people are becoming concerned with the current state of the System. Among them are members of the Faculty of Agricultural Sciences, staff of the UBC Campus Sustainability Office and UBC SEEDS program, and employees of the AMS Food and Beverage Department and UBC Food Services. With trends towards an increasing population, a greater demand for food, and escalating amounts of waste, the sustainability of the System is being called into question.

Our project is born of this concern. We have been asked to develop a model to assess the sustainability of the UBC Food System. Specifically, we have to:

- define the problem of evaluating the sustainability of the System
- describe our value assumptions as they pertain to our understanding of and methods of handling this problem
- provide a conceptual definition of a sustainable and an unsustainable System and describe the continuum between the two
- construct a map of the System that identifies its boundaries, components, interactions, goals, and linkages to local, regional, national, and global food systems
- propose at least three sustainability indicators (ecological, social, and economic) that could be used to evaluate the sustainability of the System
- describe the research involved in using these indicators

It is hoped that our work will lay the foundation for future studies of the sustainability of the UBC Food System. [REDACTED]

## **PROBLEM DEFINITION**

In previous years, students have examined the sustainability of certain components of the UBC Food System, such as Place Vanier, the UBC Farm, Subway, Agora, Bread Garden, and The Barn. However, to our knowledge, no one has undertaken the task of assessing the entire System. There is a need to explore not only the individual components, but the myriad of interactions that take place between them. Thus, the problem lies in developing a model that will enable future generations of students to study the sustainability of the UBC Food System as a whole. [REDACTED]

## **VALUE ASSUMPTIONS**

Our underlying values determine the way we interpret sustainability and provide the “lenses” through which we view the current UBC Food System. The collective values of our team members provide the basis for defining the pathways to sustainability and creating the tools with which to measure our progress. As a group, we value the natural world, but it is more of an “instrumental” acknowledgement than an “intrinsic” appreciation. According to Murdy (1), evolution dictates that species “exist as ends in themselves” and must behave in ways that enhance their own survival or risk extinction. Accordingly, we view the livelihood of our species as ultimately the most important. This is reflected in the components of our model that assess the social and economic wellbeing of the community members; however, we also recognize the interrelatedness of all things and believe that natural resources, not technological advance, hold the key to our survival. The health of the community is determined not only by the health of its human population, but also by the health of the surrounding environment.

As the surrounding ecosystem is a vital determinant of our existence, ecological sustainability should also comprise a meaningful component of our evaluation. According to Murdy (1), nature is our “life support system” and we cannot be truly human-centred until man “accepts his dependency on nature and puts himself in place as part of it”. This view is consistent with the values of our group; therefore, we approach

the task of measuring the sustainability of the UBC Food System guided by the principles of weak anthropocentrism.

With respect to our views on community and individualism, we feel that our existence will be strengthened by a coordinated effort that benefits the community as a whole, rather than segregated efforts that promote individual interests. However, we cannot entirely avoid the influence of a society that emphasizes the individual. We recognize the benefits of relying on local production and community ownership, yet some of our wants are contradictory to these principles. As the distribution of our values wavers along the continuum of anthropocentric, biocentric, community, and individual values, we realize that what we have defined as the true extremes of ecological, social, and economic sustainability might not be entirely achievable. However, these definitions provide direction and an ideal destination in our journey towards a sustainable UBC Food System. [REDACTED]

## **DEFINITION OF SUSTAINABILITY**

To us, sustainability refers to the long term viability of a system, be it natural ecosystem, agroecosystem, or food system. It may be thought of as having three unique aspects: an ecological aspect, a social aspect, and an economic aspect. Each aspect may be looked at separately, but ultimately the three must be viewed together. They do not operate in isolation. They are interdependent and interconnected. Each contributes significantly to sustainability as a whole. [REDACTED]

## **OUR VISION OF A SUSTAINABLE UBC FOOD SYSTEM**

We felt that it would be a valuable experience to carry out a process of visioning, similar to the one described by Lieblein *et al.* (2). We sat down together and took turns discussing what we believe constitutes a sustainable UBC Food System, making sure to address the ecological, social, and economic aspects. We put forth and questioned our ideas until we were able to come to a consensus. The results of our visioning process represent a blending of our thoughts and are summarized below.

We think that a sustainable UBC Food System would:

- rely on fewer external inputs and a greater number of internal inputs (such as food from the UBC Farm)
- produce little waste and place an emphasis on renewable resources and recycling (examples include reusable mugs and cutlery)
- work to conserve and enhance natural resources such as soil (encourage composting, for example)
- minimize practices that degrade the environment (for instance, reduce pesticide use)
- respect wildlife and strive to protect and promote biodiversity
- recognize the need for permeable surfaces and create more green spaces (green spaces could possibly be used for urban agriculture projects such as community gardens)
- offer a variety of nutritious foods in order to promote human health (including students, staff, faculty, and residents)
- make use of locally grown and seasonally available food
- offer relatively inexpensive food
- provide a sufficient quantity of food to meet the needs of a growing UBC population
- ensure that all people have equal access to food and have appropriate support systems in place to this end
- encourage people to be aware of their connection to the System (namely, where and how their food is produced)
- fuel a desire in people to participate in the production of their food (such as volunteering at the Farm)
- foster in people an appreciation for the effort required to grow, harvest, process, and market their food
- emphasize meals that are centred on families and communities and that time should be taken to prepare and share them

This shared vision is, as stated by Lieblein *et al.* (2), a collection of “powerful mental images of what we want to create in the future”; it reflects “what we care about the most” and is “harmonious with our values and sense of purpose”. ██████████

## **OUR VISION OF AN UNSUSTAINABLE UBC FOOD SYSTEM**

After we had finished envisioning a sustainable System, we went on to imagine an unsustainable one, again being careful to include the ecological, social, and economic aspects. Using the same visioning process as before, we generated the results summarized below.

In our opinion, an unsustainable UBC Food System would:

- be heavily dependent on external, nonrenewable inputs, while disregarding and belittling internal inputs
- produce large amounts of waste and generate no widespread support for recycling
- permit and support practices that degrade natural resources and the environment
- give little consideration to preserving biodiversity
- value impermeable surfaces and deemphasize green spaces (allowing land that could be used for agriculture, recreational gardening, or as habitat for wildlife, for instance, to be sacrificed for the sake of parking lots and buildings)
- not value human health
- make use of food that is not locally grown, but travels long distances to enter the System
- offer a great variety of foods, regardless of seasonal availability
- offer nutritious food that is more expensive than unhealthy food
- be unable to provide enough food to meet the needs of a growing UBC population
- overlook those people that do not have adequate access to food and have no appropriate support systems in place to prevent this
- give little thought to whether or not people have knowledge of their connection to the System
- not encourage people to take part in the production of their food
- not engender in people a feeling of celebration in the ability to grow, harvest, process, and market their food
- support meals that are fast and easy to prepare and eaten alone and “on the run”

## **THE SUSTAINABILITY CONTINUUM**

We recognize that our conceptual definitions of a sustainable and an unsustainable UBC Food System represent two extremes on a continuum of sustainability. At any

given time, the University may lie at a certain point along this continuum, being neither wholly sustainable nor unsustainable. In addition, UBC may be closer to achieving sustainability in one aspect and further in another. Excellent. [REDACTED]

## **MAP OF THE UBC FOOD SYSTEM**

The UBC Food System is made up of multiple components that continually interact with one another in a variety of ways. These interactions can be synergistic (components acting together) or antagonistic (components acting in opposition to one another). In doing so, each component exerts an influence on others. The result is a complex network of relationships, of actions and reactions. Furthermore, at each level of organization (from an individual component to the entire system), properties emerge that were not present at the level below. These properties are termed emergent and are characteristic of that particular level of organization. They arise from the countless interactions that take place between components within the context of the entire system (3). They are difficult to predict when merely looking at individual components. So, in short, the UBC Food System is far greater than the sum of its components. [REDACTED]

With this in mind, we developed a map of the System, which is diagrammed in the Appendix and explained below.

### **Boundaries**

We feel that the boundaries of the UBC Food System are both visual and perceptual. The visual boundary is defined as “extending to the University Gates and incorporating all food production, retail outlets, and disposal within those parameters”. The perceptual boundaries are more complex and therefore more difficult to define. Examples include legal, economic, and environmental boundaries. A legal boundary arises from the contract between UBC and Coca Cola that prevents the University from bringing in and selling any other types of soft drinks on campus. An economic boundary is created if locally grown or organic food is too expensive for students, staff, faculty, or residents at UBC to purchase. Soil and climatic limitations form an environmental boundary that prevents certain types of food from being grown on campus at the UBC Farm and in gardens.

## **Components**

The components of the System are highlighted in yellow on the map. Where appropriate, they are recognized as being “local, regional, national, and global” (in red). In particular, the “waste and pollution” and “waste food and waste packaging” that are generated by the System are shown to have “local, regional, national, and global” implications for the environment (in blue).

## **Interactions**

On the map, the interactions between the components of the System are represented as black arrows and, in the case of the UBC Farm, as green arrows. The interactions of the components with their products are highlighted in blue.

## **Goals**

We believe that the goals of the System are twofold. On one hand, it strives to provide “good food, friendly service, and value”, while on the other hand, it endeavors to maintain “financial integrity through dedicated and skilled employees” (4).

## **SUSTAINABILITY INDICATORS**

We feel that sustainability indicators should be easy to understand, apply, and interpret, as well as relevant and communicable. They should be useable year after year in order to provide a long term view of sustainability. They should also highlight linkages and be used in concert with one another. They should make use of data that are accessible and reliable. They should measure progress, explain sustainability, educate communities, motivate people, and focus action (5). We did our best to choose indicators according to these criteria and provide a thorough rationale for doing so. [REDACTED]

### **Ecological Indicator**

For an ecological indicator, we have chosen the food mileage of produce at UBC. In order to adequately assess the ecological state of the UBC Food System, production, processing, and transportation of food from source to consumer requires examination. It is within these areas that the ecological load that we impose on the environment becomes apparent, since the average distance traveled by a food product in North America before it is consumed is 1300 miles (6).

The rise of globalization and the increased availability of foods outside of their normal growing seasons have enabled consumers to rely upon produce that is derived from non-local sources. In doing so, foods are produced by farmers in places far removed from the destination of consumption. Furthermore, intermediate sources are required for processing, packaging, and transportation to a retail outlet at the end of the product's journey.

The advantage of maintaining food in its local agricultural community is that food does not travel through the same vast network of hands. Instead, local food is processed or packaged (or both) within a confined distance, maximizing local labour, and sold either directly from the producer or through a local retail outlet. In doing so, funds may change hands between three and four times from source to consumer. This is called "the multiplier effect" and is greatly increased for every food mile that the raw product travels from its source (7). Retaining products within a smaller geographic radius of production enhances the economic viability of communities and reduces the ecological load placed by food production and consumption on natural resources.

As mentioned before, this concept of food miles in tracking the movement of fresh produce onto the UBC campus is our chosen indicator for ecological sustainability. We believe that the fewer miles a product has traveled, the less harm is done to the environment through the use of fossil fuels for transportation. This also promotes greater use of local products and greater awareness of product origins by the consumer. A portion of our vision for a sustainable UBC Food System includes the consumption of produce from local sources or at least of goods that have traveled the least amount of miles from their origins. An unsustainable System would be measured by a greater amount of food miles. Three key food providers on campus, namely the AMS Food and Beverage Department, UBC Food Services, and UBC Village, would be used to assess sustainability progress by totaling miles traveled for each provider on an annual basis, with the goal of decreased miles per annum per provider. [REDACTED]

We believe that to support both food security and sustainability within the boundaries of the UBC campus, we should follow Kloppenburg's "foodshed" model. According to his model, self-sustaining farms take advantage of their local environment and resources, but replenish them through recycling, composting, and use of animal

nutrients. Ecological sustainability is characterized by a philosophical relationship with the land that is regenerative and not exploitative (8). **The UBC Farm is an example of a community-based approach to enhance the ecological, social, and economic sustainability of the UBC Food System through the use of local labour to produce local food and by removing less waste from its place of origin to increase nutrient cycling.** [REDACTED]

### **Social Indicator**

Our chosen social indicator is the awareness of nutritious foods among students, staff, faculty, and residents at UBC. Social capital must also be considered when assessing community sustainability (5). According to Hart (5), the education and health of community members are essential determinants of social vitality. Lieblein *et al.* (2) discuss the importance of understanding the workings of the food system and “one’s own place within it”. As the awareness of nutrition can enhance the community on “both a personal and a societal level”, we incorporated this theme as a vital component of our UBC Food System analysis (2).

According to Early (9), the marketplace is filled with many options, some of which “accord well with concepts of good nutrition” and some of which are “questionable in terms of their value to the health of consumers”. Increasing the awareness of food nutrition is an essential task because community members need a knowledge base from which to “make wise food choices from the plethora of products” (9). Although Early (9) discusses the obligation of food businesses to contribute to the health of the community, he believes that consumers should also take responsibility for their own health. In order to make appropriate decisions, individuals must be equipped with the necessary tools.

Lieblein *et al.* (2) suggest that transparency and “mental closeness” are key concepts in increasing awareness in the community. Ensuring that appropriate information reaches all members of the community, and is not just confined to specific segments of the population, is an important step towards sustainability; however, this alone “may not be sufficient to establish transparency, understanding, and closeness of mind” (2). Awareness must be enhanced through personal experience (2). The UBC Farm can provide this experience and reestablish the linkages between production and

consumption. As members become familiar with the origin of their food, better decisions can be made which consider the nutritional value and environmental impact of food choices. As Lieblein *et al.* (2) suggest, “when there is a mental closeness in the food system, there are no hidden areas”. If education about the nutritional benefits of fresh, local produce transcends throughout the community, more people might be persuaded to purchase UBC products. Not only will the health of the community benefit from improved nutrient retention and decreased chemical exposure, but decreased food mileage and less external reliance could contribute to ecological and economic sustainability as well. In addition, the increased involvement at different levels of the UBC Food System can strengthen community interactions. A community that works together will be more likely to achieve the goal of a more sustainable future.

As education is one of the primary steps in the progression toward sustainability, we felt compelled to include it as part of our model. Our social indicator is designed not only to measure the ability of community members to make informed decisions about nutritious food, but also to assess the level of community understanding and involvement with respect to the origins of food and the UBC Farm. By measuring food mileage, it is hoped that “spatial distance” from our food sources might eventually be reduced and now, by assessing the awareness of nutritious food, it is hoped that the “psychological distance” from our food sources might also decrease (2). [REDACTED]

### **Economic Indicator**

We have chosen the cost of nutritious food on campus as an economic indicator. Financial capital is an important aspect of community health and must be considered as an equal part to natural and social capital in the attempt to define a sustainable UBC Food System. An economically viable community is one in which money is available to circulate within the community and invest in its improvement (5). It is also one where individuals enjoy financial wellbeing and the financial capital is preserved as a whole (5). Healthy community economics are important to obtain “material goods and services that we use in our lives – from the basic necessities to special extras that make life more enjoyable” (5). As healthy food is one of these fundamental needs, we chose to emphasize the affordability of nutritious food as an important component of our

sustainability model. Our economic indicator is a measure of how much of individual income within the UBC community must be devoted to obtain adequate nutrition or, in other words, how much of an economic burden the cost of quality food imparts.

High food costs undermine the economic health of the community. Hart (5) suggests that “material goods such food, water, energy, and clothing are all necessary for survival”; yet, if individuals are forced to purchase expensive food, other basic needs may suffer. Community economics are determined by “how we manage our households, both our individual households and our collective community households” (5). How can people effectively manage their households if the financial burden prevents the satisfaction of even minimal needs? People need to be free from financial stress to enjoy and enhance their community. Financial capital must be “nurtured so community capital continues to improve” (5).

According to Early (9), adequate healthy food is a moral right. High food costs, however, can serve as a barrier to obtaining this due. If members cannot afford adequate nutrition, food security is compromised and there may be widespread consequences for the community. People may turn to lower quality items as a result or make do with insufficient quantities. Improper nutrition can be detrimental to health, leading to lower productivity because of decreased energy levels or increased sickness. As the health of the community members deteriorates, so does the health of the community as a whole. Both physical and cognitive performance may suffer and health care costs could increase as a result. In addition, the wellbeing and synergy among community members could be adversely affected. As social viability weakens with high food costs, the interactions between social and economic factors become clear.

Early (9) discusses the concept of “food ethics”, which questions the social responsibility of food businesses. Although some feel that businesses do not have a moral obligation to promote the health of their consumers, Hart (5) suggests that businesses “need to respect and enhance the community in which they exist”. High food costs reflect a lack of cooperation within the community, while low food costs indicate a respect for consumers and a coordinated effort among businesses and community members towards making the community a better place to be. According to Hart (5), this type of community growth is an essential part of sustainable development.

Adequate nutrition is a basic right. A sustainable UBC Food System would ensure the provision of adequate nutrition to all its members while preserving or promoting the economic health of the community. The effects of this objective are far reaching, with many interactions, which is why we feel that the affordability of food is a vital component of the sustainability model for the UBC Food System. [REDACTED]

[REDACTED]

[REDACTED]

## **RESEARCH DESIGN**

Sustainability indicators are only useful so far as people know how and are able to use them. Therefore, we must do more than simply present what indicators we have decided to include and why we have chosen them; we must outline a research design that states how to measure them, when to apply them, and with whom and for whom to study them.

### **Ecological Indicator**

Food mileage is a quantitative indicator. We propose to measure it by first determining the source of various food items and then calculating how far, in kilometers, that source is from UBC. The origins of items can be ascertained by surveying food outlets and asking managers for clarification when the source is not provided on signs or labels. If managers are unsure as to where a particular item comes from, then their suppliers could possibly be contacted for the information. The source of each item at each outlet can be recorded, as can the distance of that source from UBC. Using this information, total food mileage can be calculated for each item category (all apples, for example) and each outlet.

We feel that it would be easier to track produce than other food items that have been heavily processed. Bread, for instance, is made up of many ingredients that likely come from many different places. It would be very difficult, not to mention time consuming, to determine where each of those ingredients originated. We suggest studying the food outlets controlled by the AMS Food and Beverage Department and UBC Food Services, as well as those located at the UBC Village. These three represent the key food providers on campus.

Once food mileage has been calculated, these values can then be presented to the above food providers, as well as the UBC Campus Sustainability Office. These values can be **used to persuade the AMS Food and Beverage Department, UBC Food Services, and UBC Village of the importance of buying local produce** [REDACTED]

They can also be used by the UBC Campus Sustainability Office to support its mission. The food mileage of individual items or item categories can highlight specific areas for improvement; the total food mileage for each outlet can provide an indication of ecological sustainability. The focus for these food providers should be to lower their food mileage.

We feel that the task of measuring the food mileage of produce at UBC should be given to future students of Agricultural Sciences 450 that are involved in this ongoing Collaborative Project. The survey method described above could be conducted once a year, making sure that the students contact the same food outlets each time. At the end of the Project, results from past years can be combined to provide an overall view of the food mileage trend of produce at UBC and thus of the ecological sustainability of the UBC Food System. [REDACTED]

### **Social Indicator**

For our social indicator, we propose to perform a qualitative analysis of the level of awareness and availability of nutritious foods on campus. Qualitative research such as this requires a series of surveys to be presented to a random sample of the UBC community. We propose that these surveys should be conducted twice yearly, with the Agricultural Sciences 250 class surveying people in December and the 450 class doing the same in April. Those surveyed in December should be different from the people surveyed in April. Advertisements for interested participants could serve as a moderately randomized sample for the study, since the sample would need to include all disciplines.

[REDACTED] After the data is collected and analyzed, some recommendations could be presented to food outlets or for development of community nutrition programs.

Empowering people with the knowledge to make informed food choices leads to improved nutritional status of the community and increased productivity and wellbeing, also lessening the risk of the onset of chronic diseases. An indication of a sustainable society would be seen in a rising trend in the awareness of nutritious foods.

Modifications could be made after each year of study. Potential examples may include programs implemented to increase the awareness of nutritious foods. Season-specific classes could also be held at various times of the year. At the end of the Collaborative Project, an overall trend should be established and evaluated. If there is a significant increase in the awareness of nutritious foods, then a move towards sustainability has been achieved. An unchanged level of awareness would reflect a move away from sustainability, prompting perhaps another study or series of questionnaires and surveys to determine the reason for nutritionally-poor food choices. A significant increase in the awareness and better food choices would indicate a move toward a more sustainable community. [REDACTED]

### **Economic Indicator**

Since the affordability of food dictates overall food availability and wellness of a population, especially for a typically low-income student population, it is important to measure the economic availability of food through price comparison.

In order to compare the cost of food between groups and to ascertain the availability of nutritious food over less nutrient-dense choices, a baseline data collection involving price comparison would be required. An indicator of sustainability would be an additional survey that measured the percentage of UBC residents' income spent on deemed nutritious food and on the total amount of food over a defined period of time, such as a semester or term.

A quantitative analysis of our economic indicator will be performed. A descriptive study will be performed by selecting a group of individuals at random that we believe to be representative of the UBC population. To minimize error in this descriptive study, a large population should be surveyed, including a fair and randomized representation of students, staff, faculty, and residents. Selection bias would be minimized by distributing the surveys in different parts of campus.

The data could then be compared on an annual basis and sustainability could then be indicated by a decrease or maintained nutritious food percentage, whilst the total percentage of income spent on food would decrease. This would indicate a greater awareness among consumers, producers, and retailers about the importance of nutrient-dense food choice availability and affordability – perhaps leading people to seek out suppliers who produce agricultural products locally, with decreased transportation overhead, and with a greater community conscience, since the benefits of a well-fed population are seen through increased productivity and vitality.

## **DESCRIPTION OF OUR MODEL**

Using all of this information – our problem definition, value assumptions, sustainability definition, vision of a sustainable and an unsustainable UBC Food System, map, sustainability indicators, and research design – we have developed a “Sustainability Master Metre”. It is shown in the Appendix. Our gauge-style metre was designed with the objective of reading ease and the clear distinction between ecological, social, and economic sustainability progress. However, beyond individual indicator measures, reality dictates that the various facets that we have chosen to measure are closely interrelated and this is demonstrated by the superimposed sum of each, for a total measure of sustainability which may be referenced against prior assessments.

It is important that a model is clear, easy to read, and concise, which is why we constructed a metre that resembles a gauge. It is similar to those which measure familiar quantities such as gas consumption and power outflow that we observe and receive information from on a daily basis.

The measures of the indicators of sustainability are also reflected in the metre’s gradual colour change from “unsustainable” through various stages to “sustainable”. Red suggests the need for change, whilst the transition through orange, yellow, and green to blue mirrors the gradual steps toward the goal of sustainability.

As independent sustainability measures may change according to the results of each assessment in either increasing or decreasing quantities, the meter represents these shifts. Individual ecological, social, or economic sustainability progress will be reflected

on each level of the gauge, whilst the total average measure is overlaid on the gauge, reflecting the interdependency of the various realms of the entire picture of sustainability.

## **CONCLUSION**

Designing a model to assess the sustainability of the UBC Food System was no easy task. We are proud of our effort and feel that it represents a first step, however small, towards a better understanding of the System and its structure and function. Our model is a much needed starting point that will enable the Faculty of Agricultural Sciences, UBC Campus Sustainability Office, UBC SEEDS program, AMS Food and Beverage Department, and UBC Food Services to work together to realize their own shared vision of a sustainable UBC Food System.

We consider our model very much a “work in progress”. As a dynamic collection of thoughts, ideas, and beliefs, it is flexible and can be adapted and refined as needed. It can be used over and over again, either on its own or in conjunction with the models developed by our peers in this the third and final course of the Land, Food, and Community series. Our model is our mark that we leave behind for future generations of students, staff, faculty, and residents who share in our concern for the sustainability of the UBC Food System. ██████████

## **REFERENCES**

- 1 - Murdy, W.H. 1993. Anthropocentrism: A Modern View. Pages 302-310 in S. Armstrong and R. Botzler, *Environmental Ethics: Divergence and Convergence*, McGraw Hill, Toronto.
- 2 - Lieblein, G., Francis, C.A., and Torjusen, H. 2001. Future Interconnections Among Ecological Farmers, Processors, Marketers, and Consumers in Hedmark County, Norway: Creating Shared Vision. *Human Ecology Review* 8(1): 60-71.
- 3 - Gliessman, S.R. 1998. *Agroecology: Ecological Processes in Sustainable Agriculture*. Ann Arbor Press, Chelsea.
- 4 - UBC Food Services. 1997. Mission Statement. Available at: <http://www.foodserv.ubc.ca>. Last accessed: March 18, 2003.
- 5 - Hart, M. 2000. Indicators of Sustainability Training Course. Available at:

- <http://www.sustainablemeasures.com/Training/Indicators/index.html>. Last accessed: March 2, 2003.
- 6 - Kloppenburg, J., Hendrickson, J., and Stevenson, G.W. 1996. Coming into the Foodshed. *Agriculture and Human Values* 13(3): 33-42.
- 7 - Heffernan, W. 1999. Consolidation in the Food and Agriculture System. Available at: <http://www.farmcrisis.net/studies/heffernan.htm>. Last accessed: March 25, 2001.
- 8 - Kloppenburg, J., Lezberg, S., De Master, K., Stevenson, G.W., and Hendrickson, J. 2000. Tasting Food, Tasting Sustainability: Defining the Attributes of an Alternative Food System with Competent, Ordinary People. *Human Organization* 59(2): 177-186.
- 9 - Early, R. 2002. Food Ethics: A Decision Making Tool for the Food Industry. *International Journal of Food Science and Technology* 37: 339-349.