SCHOOL of SUSTAINABILITY

ARIZONA STATE UNIVERSITY

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy
Andrew Berardy

Will defend his prospectus

Finding the Future of Food

Abstract

Two visions compete for the future of food. The first embraces technology, novel feedstocks and efficient nutrient delivery systems, fueling a new Green Revolution to feed the world. Demonstrating a weak sustainability perspective, these technological optimists seek substitutes to inefficient animal-based food production such as soy-based and cultured meat. The second vision presents industrial agriculture and food as the problem rather than the solution, because these caused externalities and moved humanity past Earth's carrying capacity without ending hunger. Taking a strong sustainability view, the environmental purists focus on preserving nature and traditional choices. However, both sides argue that the opposing vision is unsustainable. Technological optimists introduce unknown risks, trade diversity for efficiency, and shift environmental burdens from ecological to industrial, while environmentalist purists reject modern agriculture, decreasing production efficiency, reducing capability to feed the world, and changing food from a necessity to an elitist status symbol. Frustrated by deciding which vision to follow and suspicious of hidden agendas, people may either stop caring or become zealots. Simplistic rules they adopt like local food only or no genetic modification can be inconsistent with broader visions of sustainability. One such rule is maintaining a plant-based diet to keep low on the trophic scale, but this ignores that it often means going higher on the industrial scale. Life cycle assessment (LCA) can identify tradeoffs between food options, revealing perverse outcomes and identifying efficient alternatives. Soy protein isolate (SPI) is a key ingredient in many soy-based meat alternatives, so an LCA of this ingredient would enable evaluation of the effects of additional processing and comparison to the animal products it helps to replace. Preliminary results indicate that processing for SPI may increase environmental impacts, but not beyond those of similar animal products. Although LCA is useful in providing a quantitative assessment of efficiency, it is limited to this framework and is resource and time intensive, so consumers cannot rely on LCA alone to determine what is sustainable. Therefore

consumers require expertise to understand the tradeoffs made when producing different foods. They must be able to make intuitive judgments about probable consequences of different products. Information alone does not create expertise, so it is necessary to examine tacit knowledge. Whereas there are powerful analytic tools like LCA for studying industrial and ecological systems' impacts, there are few methods for evaluating tacit knowledge. This dissertation introduces a new experimental method, TURINEX (Test of Ubiquitous through Real or Interactional Expertise), which can assess tacit knowledge in any area of expertise at multiple levels. Growth in tacit knowledge occurs along a continuum from novice to expert. Three stages are evident in transitions from omnivore to vegetarian and then vegan, making vegan expertise ideal for study. Also, consumers who are considering a plant-based diet exhibit behaviors conducive to sustainable consumption including reflexive consumption and systems thinking, even if they don't end up becoming vegetarian or vegan. TURINEX analysis of consumers with varied dietary preferences should therefore provide insight into what tacit knowledge and shared experiences are needed to encourage sustainable consumption. TURINEX testing shows that gaining knowledge and having shared experiences forms the basis of tacit knowledge. These findings should be used to inform efforts that encourage sustainable consumption through information dissemination and educational materials.

Friday, March 14, 2014
9:00am
WGHL, Room 102

Faculty, students, and the general public are invited.

Supervisory Committee:
Dr. Thomas Seager, chair
Dr. Christine Costello, member
Dr. Mark Hannah, member
Dr. Christopher Wharton, member
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