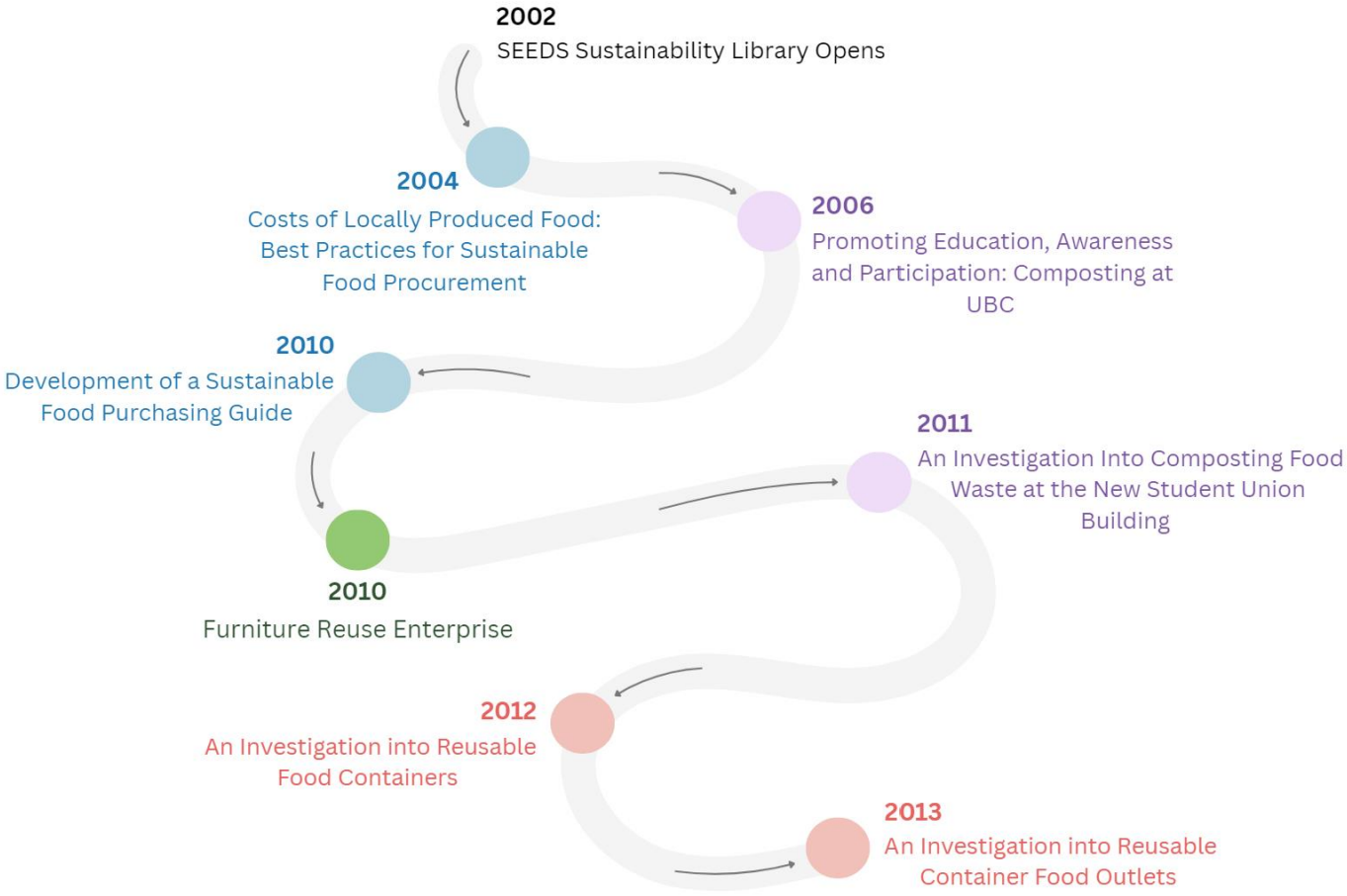
Backgrounder: Circularity Prior to 2014

Overview

There were 7 "seminal" reports on circular economy topics in the SEEDS Sustainability Library.

These reports span several key circular economy sub-topics, including reusable materials (furniture, food containers), composting and waste sorting, and sustainable food procurement.



Method

The SEEDS Sustainability Library doesn't include number of citations or references from other reports, so selecting seminal papers based on some metric of influence or reach is not possible. Instead, the approach involved using search terms to identify candidate papers, scrolling back to the earliest posted papers, and examining titles and abstracts of one paper at a time. Papers were included based on a few considerations: 1) whether they were the first report on a particular research topic (e.g., reusable food containers), 2) whether they seemingly kickstarted a research trend, where a number of other reports on the same topic followed in the next 1-2 years, and 3) whether they were especially comprehensive and seemingly laid the groundwork for future research in this area.

Topic areas searched were reuse, composting and waste sorting, and sustainable food procurement.

Search terms were reuse, share, container, reusable, laboratory equipment, furniture, sorting, compost, waste sorting, procurement.

Key Findings

Summary

- In 2010, the furniture reuse operation run by the Plant Operations department was **limited by lack of awareness, lack of a formal mechanism to inform customers, and lack of storage space** (Chaudhary et al., 2010)
- In 2010, students and UBC departments reported **interest in a formal furniture reuse service** (Chaudhary et al., 2010)
- In 2011, **Ziploc plastic containers were identified as the ideal reusable container** to use in the vending machines of the new Student Union Building (Al-Khalili et al., 2011)
- In 2013, student surveys on reusable containers revealed 1) **low awareness of reuse initiatives**, 2) **interest in food outlets offering a reusable container program**, 3) a **desire for a decrease in food prices** in the range of 0-10% for bringing reusable containers (Merry et al., 2013)
- In 2006, barriers to compost participation included **poorly positioned bins, a lack of awareness, a lack of effective educational content, and inconsistent signage** (Chan et al., 2006)
- In 2010, best practices for food procurement included **purchasing seasonal vegetables local to BC, local milk produced by BC farmers, and local, free-range and organic chicken and pork** (Bell et al., 2010)

Furniture reuse

A 2009-2010 report (Chaudhary et al., 2010) investigated the state of furniture reuse on campus and proposed an initiative to improve on its weaknesses.

Context

The authors noted that total waste generated at UBC in 2007-2008 contained 114MT of wood and 146MT of metal, materials which are common in office furniture. The economic cost of dumping this material was $17,000 and the environmental cost of 114MT of wood waste was up to 210 MT of CO2 released into the atmosphere. They also noted that a well-functioning reuse system on the university campus could divert a majority of wood waste, preventing economic and environmental consequences.

At the time, the campus reuse operation was managed by volunteers of the Moving Crew (MC) in the Plant Operations department, with support from senior management. Departments in need of furniture removal would call the MC, who would then store furniture in the waste management warehouse. At the time, the MC

collected an average of 50 cubic yards of furniture per month from various departments. There were two major problems with this system: 1) **no proper mechanism to inform potential buyers of this available furniture**, only word-of-mouth, and 2) **a lack of storage space** (only 30 cubic yards of room when 50 cubic yards were being collected per month) resulting in dumping of furniture into the landfill. They identified a need for better promotion/marketing and additional storage space.

Buyer perspectives

The market for reused furniture includes students and UBC departments.

Examining the student market, the authors note that around 6082 students relocate to UBC per year, and about 51% of these students buy used furniture (based on a survey of 125 students). They found **substantial interest for the types of items held in the furniture warehouse**, with 78% of students wanting to purchase chairs, tables, file cabinets or desks.

In terms of the department market, there were 49 departments in 2010 with variable interest in buying used furniture. Expert interviews with 3 department facility managers revealed that **many of these departments had had already engaged in informal furniture exchanges through word-of-mouth with other departments**. Departments discarded an average of 3 cubic yards of furniture per month and discarded in bulk during refurbishment. Some departments had yearly budget allocations to buy new furniture, but some departments had low furniture budgets and were looking to buy discounted used furniture. Further, most departments had accepted sustainability as their core value and were therefore likely to utilize a formal reuse service. The 3 departments interviewed supported a formal furniture reuse enterprise, where they could drop off and buy used furniture, and recommended setting up a website to facilitate communication.

Strategies used by other institutions

The report reviewed reuse practices in 11 other institutions (including 3 in Canada, 3 in the USA) and highlighted "surplus stores" as a potential service model. Surplus stores are generally open on all working days and sell different kinds of surplus items, not just furniture (e.g., electric appliances, antique books, and office stationery). 9 out of 11 institutions had surplus stores, some universities conducted weekly sales to dispose of surplus furniture, 3 out of 11 universities contracted with eBay to sell items online, 1 university used Facebook and Twitter to publish updates on new arrivals and sales, and 7 of 10 universities offer paid pick-up and drop-off services on campus. The Michigan State University Surplus Store sells a wide variety of items (e.g., office and residence hall furniture, lab equipment and supplies, vehicles, computers, farm equipment, books), provides recycling services like e-waste, toner and ink cartridge, book and scrap recycling, they leverage social media for promotion, and they sell items through eBay.

Reusable food containers

Ideal containers

A 2011 report (Al-Khalili et al., 2011) found that Ziploc Plastic containers were preferable to Snapware glass containers and LunchBot steel containers as reusable containers to place in vending machines in the new Student Union Building at the time. The reasons for this were that all three brands were comparable in terms of environmental damages and social aspects, but Ziploc Plastic containers were cheaper. Their survey of 100 students indicated that students were more likely to by Ziploc plastic containers (88% stated that they would buy a container for the price of a Ziploc plastic container – 1$) than Snapware glass containers (23% stated that they would buy a container for the price of a Snapware glass container – 10$). Further, Ziploc plastic containers were half as costly to recycle as Snapware glass containers, potentially saving the school hundreds of dollars annually (Al-Khalili et al., 2011; Merry et al., 2013).

Student perspectives on reusable food containers

A survey of 125 students in 2012-2013 explored student perspectives on a reusable food container food outlet (Merry et al., 2013). Of students who purchased food at the AMS outlets in the Student Union Building, the vast majority (72%) did so 2-5 times a week (44% purchased food 2-3 times a week, 28% 4-5 times, 16% once a week, and 12% >5 times a week). There was **moderate-low awareness** (28% of students were aware) **of the Eco-2-Go program**, where students can sign up for a $5 membership card to be exchanged for a reusable container, which can be dropped off after use.

There was **interest in food outlets offering a reusable container program**, with 68% of surveyed students preferring the reusable container outlet concept over a regular food outlet. Students also thought that exclusive use of reusable containers and utensils in the new Student Union Building was a good idea (88% support), and that exclusive use of reusable containers and utensils in all AMS outlets was a good idea (88% support). More students (36%) agreed that the outlet would have a net positive impact on the student experience than a negative impact (20%), with the majority (44%) believing the outlet would have a neutral impact. Further, the vast majority of students (96%) thought that a reusable container food outlet would have at least a small impact on social awareness of sustainability (small impact, 36%; moderate impact, 48%; large impact, 12%). However, some students (32%) stated that they would only buy food at a reusable container outlet **if the outlet provided utensils,** and 16% stated they would simply not buy food at all from the reusable container outlet, regardless of whether utensils were provided.

The **most important factors** contributing to reusable container participation were **price** (36%), **cuisine** of the outlet involved (24%), and **convenience** (20%). A majority of students (88%) wanted to see **decreased food**

prices if a reusable container food outlet was introduced. This decrease **should be in the range of 0-25%** according to 77% of surveyed students (45% preferred a 10-25% reduction, 32% preferred a 0-10% reduction, 23% preferred a 25-50% reduction). The authors conclude that a **10% decrease in food prices** at the reusable food container outlet would yield the best customer turnout at the lowest cost to the business (Merry et al., 2013). The most preferred food outlets in terms of cuisine were the Pit Burger Bar (32%), The Moon (24%), and Honour Roll (24%), implying that this **reusable food container concept should be implemented in the Pit Burger Bar.**

In terms of prices for the containers themselves, most students (64%) preferred to spend in the **$1-6 range** for a reusable container (8% preferred $0, 40% preferred $1-3, 24% preferred $4-6, %16 preferred $7-9, and 12% preferred $10-12).

Composting and waste sorting

Context

A 2005-2006 report (Chan et al., 2006) noted that the Organics Collection Program at UBC, which acquired an in-vessel composter in 2004, had expanded over 2 years to collect compost from 30 sites, including Totem and Vanier cafeterias, and the Forestry Science Center. However, several key problems were noted, including 1) a lack of consumer awareness about the existence of a composting facility on campus, and a lack of awareness about the importance of composting, 2) persistent contamination of compost with non-compostable items, 3) lack of consistent and regular maintenance of the compost bins, and 4) lack of educational materials for the compost program. The authors note the need for more awareness and participation in the composting program.

Current barriers

The report explores a number of barriers to compost participation. First, **compost bins were sometimes not well-positioned to maximize their use**. Compost bins were not always visible, not always in a well-trafficked area, not always located next to garbage cans, and not always clearly marked. Second, the brochure at the time, "A Guide to Organics Collection" (UBCWM), **was targeted towards those who already made the decision to compost**. It did not inform readers of the benefits of composting and offered no incentives or motivation to compost through information on the environmental impacts of waste. Third, **signage explaining where items belonged was inconsistent or lacking**. Fourth, a **lack of awareness and interest**, beliefs that **composting is too time-consuming, inconvenient, or smelly**. The report (Chan et al., 2006) concluded that there needed to be a greater focus on improving the program from the users' perspective, with better placement of bins and better education. They identified several tools to improve environmental behaviour, including encouraging

commitment, prompts to remind people to compost, norms guiding people how to behave, effective communication, incentives to compost, and convenience.

Sustainable food procurement

Other schools

A 2009-2010 report (Bell et al., 2010) explored sustainable food procurement at UBC and other schools. At the University of Northern BC, phase 1 of the Green Strategy for 2009 to 2011 included the primary goal of maximizing local and organic food and increasing "ethical" options such as vegetarian and vegan foods. In meeting this goal, they explored the possibility of building an on-campus greenhouse and expanding their student garden and composting activity. Another main goal of the University of Northern British Columbia was to minimize food waste, packaging and throw-away service items by researching ways of minimizing processing and disposal of food. The possibility of a consumption tax on unsustainable food and food service items was being explored.

At Harvard, the "Green Office" provides different checklists that students use as guides for events, kitchen supplies and energy use. The "Green Catering Checklist" is used to specify items that are 'greener' options, such as organic, shade grown, fair trade coffee, or local New England wines. The "Leaf Certification" checklist uses a 4-petal ranking, with more petals shaded indicating higher sustainability of a product, to raise awareness.

UBC's current situation

In 2010, recent changes to UBC's food sustainability practices included offering sustainable seafood options, 100% cage-free eggs at all outlets, organic shade grown fair trade coffee, a selection of organic locally grown apples at residences, healthier food choices, composting bins at every food outlet, biodegradable cutlery, cups and containers, and discounts for customers bringing their own mug (Bell et al., 2010). Both UBCFS and AMS Food and Beverage Department also offered an increased variety of seasonal and local menu items using UBC Farm ingredients. A number of changes stemmed from prior Land and Food Systems 450 projects, including **eco-friendly labels** (local, organic, vegan) to identify menu items with a lighter ecological footprints, **purchasing rice from California** at the Honour Roll, and the **AMS Lighter Footprint Strategy,** which aimed to reduce the campus's Ecological Footprint to sustainable levels and to foster environmental justice in operations and through relationships within the University and the broader community.

Best practices for food procurement

The report identified best procurement practices for each food group.

For vegetables, the best option was to buy local (within BC) and in season items. They recommended the 'Get Local - Metro Vancouver' chart for identifying in-season items. During the winter months, local options include frozen and canned food, and storage crops. At the time, BC also had an Environmental Farms Plan, and an Integrated Pest Management program; the report recommended purchasing from farmers engaged in these programs, to ensure that sustainable practices were being supported. If purchasing local was not an option, items could be purchased from nearby provinces or states (e.g., Oregan and California for fresh produce during the winter), provided that items were labelled as organic or fair-trade. **Purchasing from far away countries should be avoided due to shipping costs, pollution, and unsafe labour practices**, especially if local options were available. In terms of food procurement, Canada, USA, and Mexico were identified as preferable to South American, African or Asian countries.

For dairy, the best option was to buy local (within BC). Local options at the time included Avalon and Olympic Dairy. Other companies considered acceptable were Dairyland and Lucerne (both Canda-wide). **Importing dairy products from the USA should be avoided**, given that they use rBST growth hormone.

For meat, the best option was to buy local, free-range and organic chicken. Local, free-range and organic pork and beef were also considered acceptable, but chicken is ideal because it requires fewer resources. If organic options were too expensive, it was considered acceptable to purchase local and free-range options, because the environmental impact was minimal, and local producers could be supported. **Meat products that are not certified organic or free range should be avoided**, as well as **meat products from outside of BC**.

Recommendations

Recommendation not met Partially met Well met

Furniture reuse

- Create a formal **"Furniture Reuse Enterprise"** (Chaudhary et al., 2010). This initiative would resell chairs, desks / tables, file cabinets, couches and other rarity items like foosball and ping pong tables, taken from individual departments in UBC or from the resident students/faculties in the UBC residences like Acadia Park and Thunderbird. This initiative would include expanded storage space (ideally 50 cubic yards), an inspection process, slab pricing (i.e., 3 levels of pricing within each item category, with an average price of $12 for chairs, $25 for desks and $20 for cabinets), slash pricing (i.e., if no sale over 2 weeks, slash price by 25%), weekly garage sale for students, direct delivery to departments, and a website (under the UBC domain) with posted items, and promotion. Promotional activities should include advertising via pamphlets, and listings/updates on Facebook,

my.ubc.ca, admission acceptance letter packages, the Student Guide given out on the first day of classes, and the SUB and VILLAGE notice boards [Status: a furniture reuse service has been established through Facilities Planning, with limited storage space and a standardized procedure for identifying and transferring furniture. Challenges include a lack of awareness, staff, and storage space]

Reusable food containers

- UBC should sell **Ziploc plastic containers in the Green Vending Machine at the Student Union Building** (Al-Khalili et al., 2012; Merry et al., 2013). Snapware glass containers should also be included as an alternative (Merry et al., 2013) [Status: there are no "green vending machines" in the Student Union Building other than the vending machine for cakes from Just Cakes sealed in reusable glass jars]
- AMS should implement a Bring Your Own Food Container Outlet, in which food can only be purchased if you bring your own reusable container. Food prices should be decreased by 10%, and Bring Your Own Utensils should be optional not mandatory (Merry et al., 2013). [Status: there are no outlets in the Student Union Building where food can only be purchased with reusable containers; however, most outlets provide an option for reusable containers]

Composting and waste sorting

- Change the Organics Collection Program's brochure to target people who aren't already composting (Chan et al., 2006). Proposed sections include: 1) why compost? (benefits of composting), 2) the in-vessel composter (building awareness of the resource), 3) how can I get involved? (ways to act), 4) tips for success (including tips for bin placement), 5) compost pledge (to build commitment), and 6) what goes in the bin? (to build skills). [Status: difficult to assess if the brochure was changed at any point]
- The brochure should be distributed to student groups, administration and staff, and food venues (Chan et al., 2006). [Status: difficult to assess]
- Develop questions to be incorporated into the "Waste Management Survey" of the compost coordinators for 2007; focus on questions addressing education (Chan et al., 2006). [Status: difficult to assess]
- Obtain feedback to incorporate into an improved version of the brochure (Chan et al., 2006). As part of this, hold a focus group to test the effectiveness of the newly developed compost brochure, communicate with UBC Waste Management to incorporate their input into the new

brochure, and use the results of the 2006 survey of the compost coordinators to improve the brochure if applicable. [Status: difficult to assess]

- Most organic waste generated at the new Student Union Building should be handled by UBC Waste Management at the in-vessel composting facility (Hua et al., 2011). [Status: the in-vessel compost facility has now closed down. Difficult to assess if this was the case prior]
- Some composting should be carried out at the Student Union Building on a smaller scale (Hua et al., 2011). Ideally, a traditional composting operation in the using an adaptation of the Indian Indore Method can be set up on the rooftop of the Student Union Building. This technique is economically more feasible than vermicomposting [Status: there is a closed-loop composting system at the Student Union Building]

Sustainable food procurement

- Conduct a more thorough CCA (commodity chain analysis) for an entire day's menu at Totem Residence (Group 8, 2004). [Status: difficult to assess]
- Results of the CCA should be discussed with the food service providers, with recommendations on how they can go about reducing the indirect costs associated with the food that they provide. These should include tangible practices that they can follow. For example, **finding alternative products or food providers with less associated transportation distances** or that **may be taking steps to lessen their environmental impact** and **ways to introduce healthier food preparation** practices including those that monitor food safety (Group 8, 2004). [Status: difficult to assess]
- The AMS and UBC Food Services should implement a "monthly feature commodity" (i.e., displaying information on production techniques and approximate food mile counts for different menu items). Monitor and evaluate the outcome (Group 8, 2004). [Status: difficult to assess]

For UBC Food Services and AMS Food and Beverage Department Procurement Staff

- **Utilize the proposed purchasing guidelines**, found in the 'Food Procurement Guide' section of the paper (Bell et al., 2010)**.** These guidelines provide "best", "good", and "avoid" categories of items for all food groups including vegetables, meats, condiments and meat alternatives. The guide has been included in the appendix of this document [Status: difficult to assess]
- **Provide comments on feasibility/affordability of the guide** (Bell et al., 2010). [Status: difficult to assess]

For future Land and Food Systems students

- Connect local farmers with the UBC food system (Bell et al., 2010). [Status: difficult to assess]

- Increase awareness of food procurement policies to students (Bell et al., 2010). [Status: difficult to assess]
- Collect Feedback Regarding our 'Food Procurement Guide' from AMSFBD and UBCFS (Bell et al., 2010). [Status: difficult to assess]
- Further investigate the sustainable procurement of seafood, oils, sugar, flour and other baking goods (Bell et al., 2010). [Status: student research has since looked at other food categories including seafood and frozen foods]

For Land and Food Systems teaching team

- More appropriate matching of TA with the scenario under investigation (Bell et al., 2010). [Status: difficult to assess]
- More consistency in teaching team's desired outcomes for the project (Bell et al., 2010). [Status: difficult to assess]

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