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CROP SWAP MISSOULA: FOOD WASTE AND THE SHARING SOLUTION

By

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Undergraduate Professional Paper
presented in partial fulfillment of the requirements
for the University Scholar distinction

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Missoula, MT

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Approved by:

Joshua Slotnick, Faculty Mentor
Environmental Studies

ABSTRACT

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Environmental Studies

Crop Swap Missoula: Food waste and the sharing solution

Faculty Mentor: Joshua Slotnick

Rachel Botsman coined the term “collaborative consumption” to describe an economic model based on sharing, swapping, trading, or renting products and services, and enabling access rather than ownership¹. Also referred to as the sharing economy, the mesh economy, or the peer-to-peer economy, collaborative consumption models offer a more efficient use of unused, or underutilized resources. Whereas previously peer-to-peer exchanges were only practical within small networks of friends, family, and neighbors, the Internet and mobile technology have allowed us to share almost anything at any time. While there are countless examples of community exchange platforms, and more springing up every day, there is not an efficient widespread platform for the sharing of food.

In his book, *American Wasteland*, author Jonathan Bloom estimates that nearly one-half of all food produced in the United States is discarded, wasting valuable natural resources and costing billions². This report will analyze existing models of peer-to-peer exchange in order to guide the creation of Crop Swap Missoula, a small-scale online food exchange based in Missoula, Montana. The exchange will allow for the sale, donation, or trade of surplus food items among users. I will consider the potential financial, environmental and social benefits of the project and attempt to anticipate problems that may arise. According to a team of researchers at collaborativeconsumption.com, platforms often fail due to insufficient supply and/or demand, a lack of product focus, an unclear value scheme, not enough funding, or regulatory issues. I will discuss these issues as they apply to Crop Swap, and explore potential solutions.

1

Botsman, Rachel. "The Sharing Economy Lacks A Shared Definition." Collaborative Consumption. November 22, 2013. Accessed April 30, 2015.

2

Bloom, Jonathan. *American Wasteland: How America Throws Away Nearly Half of Its Food (and What We Can Do about It)*. Cambridge, MA: Da Capo Press, 2010.

Introduction

The collaborative consumption movement began slowly in the mid-nineties, with websites such as Craigslist and eBay allowing for the exchange of goods between users. Now, relatively new technologies allow us to easily share nearly everything online, from our tools to our cars, our couches to our bedrooms, our personal lives to our knowledge and skills. Advances in technology have made this economy possible, but technology is not the only driving force behind the phenomenon. The 2008 recession combined with a growing awareness that we must conserve the planet's diminishing resources, set the stage for the “sharing economy”, and it began to grow at record pace. The sharing economy shows no signs of slowing down, and now moves billions of dollars’ worth of goods and services. In her 2010 book, *What's Mine is Yours: The Rise of Collaborative Consumption*, Botsman estimated that the sharing economy was worth \$26 billion, and by 2025 it is estimated that the sharing economy sector could be worth \$335 billion³. With the intention of conserving resources and building community, I plan to enter into this economy by creating the small-scale food exchange, Crop Swap Missoula.

Using existing models of peer-to-peer exchange, this report will guide the creation of Crop Swap Missoula, an efficient online exchange network that will facilitate connections between local farms, food businesses, and gardeners that have food surpluses with nonprofits, hunger relief organizations, and community members that will put this food to use. I will discuss the impacts of food waste, and the potential financial, environmental and social benefits of a food exchange. I will also analyze similar models of exchange, and the possible obstacles such a service might face. Companies entering into the sharing economy often fail due to lack of sufficient supply and/or demand, lack of product focus, unclear value schemes, not enough funding, or regulatory issues, all of which I will discuss later. Though there are significant obstacles to overcome, similar models of exchange can help determine the feasibility and guide the creation of a small-scale food exchange in Missoula.

Food Waste

3

"The Sharing Economy – Sizing the Revenue Opportunity." PwC. Accessed May 1, 2015.

The world produces more than enough food to feed the entire population, but according to the World Food Programme, one out of eight people still suffer from chronic hunger⁴. There are a multitude of factors that contribute to food insecurity worldwide, but food scarcity is rarely the cause. Accurate data on the amount of food wasted globally does not exist, but a study conducted by the Food and Agriculture Organization of the United Nations (FAO) in 2011 suggests that roughly one third of all food produced for human consumption (which does not include crops grown for animal feed or fuel) is wasted, amounting to 1.3 billion tons annually⁵.

Food waste is defined by the Food and Agriculture Organization of the United Nations as “wholesome edible material intended for human consumption, arising at any point in the food supply-chain that is instead discarded, lost, degraded or consumed by pests”⁶. In the United States it was estimated that in 2010 alone, 31% of all food at the retail and consumer level (not including losses on the farm or between the farm and the retailer), worth \$161.6 billion was sent to the landfill⁷. In 2012, an EPA report on the municipal solid waste stream found that after composting and recycling were taken into account, food waste amounted to more than 21% of solid waste discarded in landfills⁸, and this does not consider the significant amount that goes down garbage disposals. It costs roughly \$1 billion dollars a year to dispose of this waste in landfills where it decomposes anaerobically and creates methane, a greenhouse gas 21 times more dangerous than carbon dioxide⁹. According to the FAO, if global food waste was a country it would be the third largest emitter of greenhouse gases behind the U.S. and China¹⁰. While some facilities now have the capacity to capture some of this methane, which can then be

⁴ "Hunger Statistics." United Nations World Food Programme. Accessed May 1, 2015.

⁵ Gustavsson, Jenny, Christel Cederberg, and Ulf Sonesson. *Global Food Losses and Food Waste: Extent, Causes and Prevention*. Rome: FAO, 2011.

⁶ *Food Loss Prevention in Perishable Crops: Based on an Expert Consultation Jointly Organized by the Food and Agriculture Organization of the United Nations and the United Nations Environment Programme*. Rome: FAO, 1981.

⁷ Buzby, Jean C., and Hodan Farah Wells. *The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States*. United States Department of Agriculture, 2014.

⁸ "Municipal Solid Waste." EPA. February 28, 2014. Accessed May 1, 2015.

⁹ "Overview of Greenhouse Gases." EPA. April 14, 2015. Accessed May 1, 2015.

¹⁰ *Food Wastage Footprint: Impacts on Natural Resources*. FAO, 2013.

converted into energy, most still let these gases leach into the atmosphere. When discussing climate change, we must also now talk about food waste.

Wasted food means wasted seeds, wasted water, wasted land and labor; it means wasted fossil fuels, wasted packaging, wasted nutrition, and wasted money. A 2010 article published in the journal *Environmental Science and Technology* suggests that the production of food including cultivation, transportation, processing, sale, storage and preparation accounts for 16% of all energy consumption in the United States, with food waste amounting to 2% of energy consumed¹¹. Even with all this excess, in 2005, only 3% of food waste was recovered; the remaining 97% was sent to landfills¹². Food recovery and redistribution above and beyond what already exist is crucial.

Food waste occurs at every level of the supply chain including production, processing, distribution, purchase, preparation, and consumption. At the production level, namely on farms, food losses can occur for many reasons, including extreme weather, diseases, pests, poor storage, inefficient harvesting, or strict aesthetic guidelines and quality standards set by governments the supermarket industry that are in place because, among other reasons, we have come to expect perfect produce¹³. Community food exchanges would create markets for produce that has not been harvested or has been rejected by distributors for any of the above reasons. At a reduced price, consumers may be willing to purchase food that would normally be taken out of the supply chain. This would allow for the recovery of some revenue for farms that have put so much energy and resources into growing the food.

During processing, waste often occurs because of substandard yet edible materials such as vegetable peelings that could be used for soup stock, animal organs and entrails that are perceived as waste in some cultures but are delicacies in others, leftover bread that can be turned into croutons, and so on. An online community food exchange could find alternative markets for

¹¹ Cuéllar, Amanda D., and Michael E. Webber. "Wasted Food, Wasted Energy: The Embedded Energy in Food Waste in the United States." *Environmental Science & Technology* 44, no. 16 (2010): 6464-469. doi:10.1021/es100310d

¹² Buzby, Jean C., and Hodan Farah Wells. *The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States*. United States Department of Agriculture, 2014.

¹³ Gaiani, Silvia. *Transforming Food Waste into a Resource*. Cambridge, UK: Royal Society of Chemistry, Publishing, 2012.

these usable, but largely unmarketable foods. An additional option for food that is no longer fit for human consumption or that is culturally viewed as waste could be fed to animals rather than discarded, offering a financial benefit to those involved in animal husbandry. Crop Swap Missoula plans to incorporate this element into the exchange in an effort to make use of inedible food scraps.

Distribution of food in the United States occurs mainly at supermarkets and restaurants where waste occurs when more food is offered than consumers can or will buy. Grocery stores greatly overstock items so that every item is available at all times. Hot bars, bakeries, delis and buffets do business in the same manner. The consequence of this illusion of endless abundance is that mass quantities of edible food are discarded daily. While working in a grocery store bakery several years ago, I was often responsible for throwing out an entire pallet of fresh, edible food each day. Very little was donated, if any, but nearly all was perfectly fit for human consumption.

Working in the catering industry, I also witnessed similar practices. It was not an option to run out of any item, so we prepared more than was needed for any given event. At the end of the event, employees would take home some if there were containers available, but often trash bins were filled with gourmet leftovers. I have witnessed the same fate for food from restaurants, whether prep waste, food ordered but sent back, food that sat for too long, or food left at the end of the night. In America, dumpsters fill up every day with perfectly intact packaged items still within their expiration dates, baked goods less than twenty-four hours old, and deluxe meals that never made it to the dining room¹⁴. Many businesses could donate unused food due to fear of liability, but don't for fear of liability.

Liability and negative publicity concerns are the number one reason food businesses decide not to donate surplus food. In 1996, however, Bill Clinton signed into federal law the Good Samaritan Food Donation Act, which protects donors to nonprofits such as homeless shelters, soup kitchens, and churches who feed hungry people, except for in cases of gross negligence or intentional misconduct¹⁵. Ideally, Crop Swap Missoula would raise awareness of

¹⁴ Leist, Philip. *Rebuilding the Foodshed: How to Create Local, Sustainable, and Secure Food Systems*. Santa Rosa, Calif.: Post Carbon Institute; 2013.

¹⁵ "Waste Not, Want Not: Feeding the Hungry and Reducing Solid Waste Through Food Recovery." Environmental Protection Agency. Accessed May 1, 2015.

the federal law, encouraging more food businesses to donate to the Missoula Food Bank and the Poverello Center homeless shelter, as well as local churches that serve meals to those in need.

When customers purchase food for the home, it is not uncommon for people to buy more than they need due to prepackaged items that give the consumer no choice in how much they buy. Sales, such as buy-one-get-one-free, convince customers to buy more than they will use, and even Community Supported Agriculture shares deliver more than a family will eat in a week. Planning ahead, buying in bulk, and sticking to a shopping list could solve many of these issues, but excess food around the house is a common problem that could use a more large-scale creative solution. Crop Swap Missoula will allow users to share their excess food with their neighbors, whether from gardens, fruit trees, or refrigerators. According to the authors of *Transforming Food Waste into a Resource*, 14% of US food waste happens at the household level¹⁶. Therefore, creating a system that allows for fast and easy sharing would significantly decrease waste in this area.

For food waste that cannot be avoided, this exchange will link users who have compost piles on their property, or chickens or pigs, with neighbors who would be willing to save their food scraps. Composting creates an extremely useful soil amendment full of organic matter that can greatly improve soil quality upon incorporation. Using food waste in this way creates a valuable resource rather than a dangerous landfill waste. An organized system of collaboration and participation encouraging the sharing of food resources will provide numerous environmental, financial, and social benefits within a community.

The Evolution of Collaborative Consumption

Prior to the Internet age, sharing resources mainly took place between small groups of friends, family, and neighbors. Aside from libraries that have always offered short-term book rentals, no widespread organized system for sharing existed. If you needed something, you most likely needed to go out and buy that something. Owning so much has not come without consequences. When we own things, we must also care for and store those things. According to the Self-Storage Association, the self-storage industry has been one of the fastest-growing

¹⁶ Gaiani, Silvia. *Transforming Food Waste into a Resource*. Cambridge, UK: Royal Society of Chemistry, Publishing, 2012.

sectors of the United States commercial real estate industry for nearly 40 years now with more than 52,000 self-storage facilities at the end of 2013 for Americans to store everything that cannot fit into their houses, garages, and sheds¹⁷. Though the storage industry has continued to grow, so has another sector of the economy, one that trumps the accumulation of possessions and instead encourages the collaboration and cooperation of complete strangers to pool resources.

This alternative model of consumption was made possible when the internet became available to the masses via the World Wide Web in 1991 and could be said to have started in 1995 when eBay launched their website connecting buyers and sellers worldwide. Businesses as well as individuals could connect quickly and easily to make online purchases or sell unused items. Today eBay is one of the world's largest online marketplaces with more than 149 million active buyers globally and more than 700 million items listed¹⁸.

Shortly after the founding of eBay, Craigslist came onto the scene, starting as an email list of San Francisco events in 1995. When the site went public in 1996 it evolved to offer local classified ads and forums where anyone could search for just about anything, including jobs, housing, goods, services, romance, local activities, and advice. Today Craigslist sees more than 50 billion visits per month, with 60 million users in the United States alone¹⁹.

In 2001 came the "free-access, free content Internet encyclopedia"²⁰ Wikipedia, which is currently ranked as the sixth most popular website in the world²¹. Wikipedia allows users to create and access their own up-to-date encyclopedia content instead of having to rely on and store mountains of outdated books. Now along with exchanging our possessions, we are exchanging knowledge.

In 2003, more traditional models of sharing popped up with the creation of Freecycle.com and Couchsurfing.org. Freecycle was founded with the intention of diverting useful items from landfill by allowing users to offer their items for free to the community. Freecycle now has more than 5,000 groups and 7 million members worldwide²². Couchsurfing offers a social network connecting travelers worldwide with hosts willing to lend their couch for

¹⁷ "SSA 2015 Fact Sheet." Self-Storage Association. 2015. Accessed April 30, 2015.

¹⁸ "Who We Are." eBay Inc. Accessed May 1, 2015.

¹⁹ "Fact Sheet." Craigslist. Accessed May 1, 2015.

²⁰ "Wikipedia." Wikipedia. Accessed May 1, 2015.

²¹ "Wikipedia.org Site Overview." Alexa. 2015. Accessed April 30, 2015.

²² "History & Background Information." The Freecycle Network. Accessed May 1, 2015.

an evening, or maybe more. This hospitality exchange allows for an alternative form of travel for those on a budget or those looking for an experience not offered by hotels or hostels. It offers the exchange of meals, ideas, values, and culture, but more importantly it is an exchange of trust between complete strangers. Couchsurfing now has 10 million members in more than 200,000 cities worldwide²³.

It may have begun slowly and unassumingly, so quietly that most of us may not have noticed the shift, but in the last several years, examples of online collaborative consumption have become far too many to name, and the phenomenon too big to ignore. Today anyone with access to the internet can post extra rooms in their house on Airbnb, VRBO, or HomeAway, their cars on RelayRides, Uber, or Lyft, their bikes on Liquid, their pets on DogVacay, their skills on TaskRabbit or Zaarly, their wifi on Zon, their money on Lending Club, Kickstarter, Indiegogo, or Kiva; the list goes on. We can literally share almost anything, anytime, and with anyone.

Driving forces behind the sharing economy

The collaborative consumption economy we are experiencing today would not be possible without the Internet and mobile technology. With Wi-Fi, 4G, and GPS at the fingertips of millions, we can quickly and efficiently find our way to any number of services in minutes, if not seconds. But ability is not the only driving force behind the transition; the world is also experiencing rapid population growth and urbanization. According to the United Nations Population Fund, more than half the world's population now lives in towns or cities and that number is expected to reach 5 billion by the year 2030²⁴. Cities are naturally dense and as they have become even more tightly packed, the need to share resources has been born out of necessity. If everyone in San Francisco owned a car, the city would not function, which is why cities generally offer adequate public transportation, but residents occasionally find themselves needing a vehicle temporarily. When services like Zipcar, that offer car rentals by the hour, came onto the scene, people began to abandon car ownership; saving money on parking, insurance, licensing, registration, and maintenance in the process.

²³ "Our Story." Couchsurfing. Accessed May 1, 2015.

²⁴ "Urbanization." United Nations Population Fund. 2015. Accessed April 30, 2015.

This cost savings became a driving force during the 2008 recession, when millions of workers were laid off, homes were foreclosed on, and oil and food prices were on the rise. People had to get creative and find income in new ways. Sharing lowers the cost, and the necessity, of ownership. Sharing can also generate income, and at the same time increase access to expensive goods and services for those who would otherwise be priced out of the market. But sharing resources did not only gain in popularity due to economic urgency, this economy also grew out of an increased awareness that consumerism as we have come to know it cannot continue exponentially.

Unbridled consumerism requires the continued extraction of natural resources such as water, wood, and oil, putting immense pressure on the planet. It also requires that we continually buy, throw away, and buy again, creating an incredible amount of waste. Sharing resources through collaborative consumption can use land, energy, and resources more efficiently. It can reduce the need to consume goods and services at such a breakneck pace, simultaneously reducing our waste and energy use along with our carbon footprint²⁵. Sharing maximizes the use of things we already have, reducing the need to mine raw materials for new products²⁶. We do not have to go without to be sustainable per se; we just need to find creative ways to share the resources that already exist in such abundance.

Though countless platforms for peer-to-peer exchange currently exist, a widespread efficient model for the exchange of food has not yet been created. With rampant food waste and losses putting increasing pressure on natural resources, adding to pollution, and costing us billions, we must get to work on exploring a system of cooperation and coordination for the sharing of food. We should build networks that connect growers and producers at all levels with food buyers and eaters in a way that serves everyone involved²⁷. Here in Missoula, Montana, a project that aims to do just that is under way. The platform, Crop Swap Missoula, plans to offer a fast and efficient system for posting surpluses either for discount, donation, or trade online that will instantly be available to users through a website and an email alert system for those that are signed up.

²⁵ Orsi, Janelle, and Emily Doskow. *The Sharing Solution: How to save Money, Simplify Your Life & Build Community*. Berkeley, Calif.: Nolo, 2009.

²⁶ Tomalty, Ray. "Ours Is Better than Yours." *Alternatives Journal* 40, no. 2 (2014): 18-22.

²⁷ Astyk, Sharon, and Aaron Newton. *A Nation of Farmers: Defeating the Food Crisis on American Soil*. Gabriola Island, B.C.: New Society Publishers, 2009.

Potential benefits of food sharing

A community food exchange would have many financial, environmental, and social benefits. Overall, the exchange will reduce food waste, and food insecurity for low-income users by increasing food donations to nonprofits. It will also reduce some of the ecological and social costs of waste. Users can save money on groceries by obtaining food through the exchange at a discount, through a barter transaction, or for free. Keeping more local food in the system and out of the landfill will reduce demand for food that travels long distances, reducing fossil fuel use for transport of those goods. It will reduce associated food-packaging waste, and reduce overall energy consumption. It will also provide more nutrition through access to fresher food that users may not be able to afford otherwise, and support small, local producers by creating more markets for unsold product.

Crop Swap Missoula also aims to create community connections by allowing users to get to know their neighbors and make friends, fostering social capital. If used by farms and food businesses, the exchange will reduce purchasing and labor costs, lower disposal costs, and it could have tax benefits for those that donate food. It will also create an opportunity for free advertising and promotion of events through the forum and calendar components that will be incorporated into the site.

Obstacles and failures of similar models

A unique set of challenges awaits anyone entering into the sharing economy. The technology can be complex and the idea can be hard to grasp for potential users. Quite often, new platforms experience turbulence with governing bodies, as the services fall into legal gray areas, since most laws and regulations are in place for traditional industry. As stated in the *Journal of Environmental Law and Litigation* article, *The Legal Landscape of the Sharing Economy*, “our laws were designed to regulate relationships in a competitive economy, not a collaborative one”²⁸. In order to understand the most common obstacles to success within the

²⁸ Kassan, Jenny, and Janelle Orsi. "The Legal Landscape of the Sharing Economy." *Journal of Environmental Law and Litigation* 27, no. 1 (2012): 1-20.

sector, a team of researchers at collaborativeconsumption.com conducted a study of 45 prominent companies that have either undergone major changes or have failed altogether over a five-year period. They discovered that the most common reason for failure or setbacks was scale, meaning that the companies were not able to create sufficient levels of supply and demand to keep their systems running smoothly. Companies also experienced setbacks due to unclear value propositions, lack of product focus, insufficient funding, and regulatory issues²⁹. I will discuss each of these issues they apply to the creation of a small-scale peer-to-peer food exchange in Missoula, Montana. If problems can be anticipated and addressed early on, the project will have a better chance of success.

As stated above, the most common reason for failure is due to scale. Within the collaborative economy, start-ups do not produce the goods or service, nor are they purchasing. They assume the availability of a particular unused or underutilized good or service exists, and that there is a market for such assets. For example, cars are highly unused or underutilized goods. Many of us own cars, but most of these cars sit idle for hours, or even days or weeks on end. For many, it makes sense to connect with others that may need a car for a short time and exchange the use of their car for a small fee. This method of exchange decreases the need for cars within a given community and makes more efficient use of existing vehicles. However, if there are not enough people that need short-term rentals, or there are not enough cars listed for the amount of users seeking such rentals, the system may fail. Regardless of the good or service available, companies that cannot achieve critical mass of supply and demand will not last long.

Twenty-four percent of companies reviewed had trouble in this area. If Crop Swap does not have enough suppliers posting surplus food to the site, those seeking deals will stop looking. Similarly, if the supply exists, but there is nobody claiming the food, suppliers will cease to post their excess. The best way to combat this issue according to Paula Andruss, author of *How to Start a Business in the Sharing Economy*, is to start with supply³⁰. In order to address the issue of scale, Crop Swap Missoula will administer a survey of potential users to gauge interest, as well

²⁹ Anderson, Lauren. "Mapping Failure: Studying Failure Is a Recipe for Success in the Collaborative Economy." Collaborative Consumption. December 18, 2014. Accessed May 1, 2015.

³⁰ Andruss, Paula. "How to Launch a Business in the Sharing Economy." *Entrepreneur*, December 24, 2014.

as conduct outreach at farmer's market board meetings, the Missoula Food Co-op, and other avenues where food producers gather. Currently one survey has been submitted via the Crop Swap Missoula Facebook page, accumulating fifteen replies so far. This information has been taken into account by myself as well as by the group of business school students that are currently building the Crop Swap Missoula website. Though this is the most cited reason for failure, it will not be the first priority for the food exchange. Reasons for this decision will be discussed shortly.

The second most common reason for setbacks in the sharing economy is an unclear value proposition. Companies must be explicit about the value of, and the need for, the service. In order to portray the value of the food exchange, food waste awareness and education will be key. Since the Facebook page began in the summer of 2014, educational posts have been central to the page and will continue to be incorporated into the project. Persuading users that they need the service will be far more challenging. Though farmers could recover otherwise lost revenue by using Crop Swap as a secondary market, they are busy and a few have admitted that they would not likely take the extra step at the end of a long market day. It must prove to be a fast, efficient system that can make money for food producers, and also save money for anyone seeking a deal.

Convincing new users to try Crop Swap may be difficult. There may be fear or distrust associated with obtaining food through such nontraditional means. The outreach campaign should first target those more deeply involved in the food community such as food preservers, smoothie enthusiasts, chefs, and homesteaders. Bulk foods or largely unmarketable foods may find a market more easily within this community, and until the site gains traction, this crowd could keep the project on its feet. Additionally, if the drought in California begins to impact food prices or supply, which it quite likely will, the potential for users to see a personal need for the service could certainly increase.

The third most frequently cited cause of setbacks or failure was a lack of focus. This can refer to the products, service area, or the means of exchange. Allowing the exchange of too wide a variety of goods could hasten failure. This should not be an issue, as Crop Swap will only encourage the exchange of food, though if any and all food is allowed to be exchanged, this could cause confusion. Similarly, if the geographic focus is too widespread, potential users could turn away. Convenience is key. People do not want to spend a significant amount of time traveling for one food item when they could do all of their shopping at one grocery store much

easier. The food exchange will be limited to the Missoula area initially so that traveling significant distances will not be required. The exchange could potentially be limited to specific neighborhoods even if Missoula winds up being too big a geographic area, however we won't know until the site has been up for at least one season. If the project is successful, the plan is to expand to other cities, each with their own separate platform.

Lack of focus on the means of exchange on the platform could also be detrimental, as users may not be confident of how to best make use of the service. For example, since Crop Swap will allow users to sell, swap, or donate food items on the site, this could prove to be too many options. Again, it will be difficult to know if this is the case until the site has been in use for a while. The plan is to observe use patterns over the first season and administer a survey among users, and then change accordingly. If we determine that users prefer a more streamlined experience with fewer options, we will make changes as necessary. Limiting the geographical area and the options for exchange may make the exchange more efficient, unfortunately there is no easy way to know before the launch of the website.

The fourth obstacle to success upon entering the collaborative economy is insufficient funding. As the project is currently self-funded and does not plan to earn revenue, this will certainly be a significant hurdle. So far, costs have been relatively low. Promotional materials were printed with the help of a local nonprofit, and the website is being built at no cost by a group of business school students. The only cost at the time of this writing has been the cost of purchasing the domain name and website hosting for one year. In the future, Crop Swap can explore crowd-funding options, which would appropriately enlist help within the collaborative economy it plans to enter, through Kickstarter, Indiegogo, LendingClub and others. We have also planned to create and maintain relationships with local organizations that are in line with the Crop Swap mission. A relationship between Crop Swap Missoula and the Community Food and Agriculture Coalition (CFAC) has been discussed, we also hope to work closely with the Missoula Urban Demonstration Project (MUD) once the exchange proves to be a successful model, and grant-writing and social venture capitalist investments can be explored. For now, however, the project will remain self-funded.

The fifth, and arguably most important potential deterrent, is regulatory issues. The peer-to-peer exchange of food is incredibly new and highly sensitive. Food safety is critical and trust paramount to the success of the system. Montana has some of the most lenient cottage food laws

in the nation. These laws³¹ allow for the sale of non-potentially hazardous foods such as breads, jams, chutneys, etc. to the public without permits and without having to be made in a commercial kitchen. Missoula, however, restricts these sales to farmer's markets³². All other food sales require some type of license, for example, a Temporary Food Service license.

Private groups or events are exempt from licensing requirements. Crop Swap Missoula plans to allow the sale, donation, or trade of any and all foods to the public, though the sales would be private exchanges. We do not yet have final word whether the exchanges would be considered private events or not by the Missoula Health Department. Crop Swap may need to restrict membership in order to be considered a private group, or licenses may need to be verified and food supply restricted to licensed food sellers. Before launching the website, we will gather feedback, discuss options, and address concerns from city council members, food producers, and consumers. Since laws vary from place to place, this step is absolutely crucial to avoid legal repercussions.

Every precaution will be taken to ensure the safety and protection of users prior to promotion of the site. This will most likely require a "terms of use" agreement, a privacy policy, and a set of disclaimers on the website. One similar food-based model of exchange in the San Francisco Bay Area, the Cropmobster Community Exchange, has a very extensive Terms of Service agreement that Crop Swap could use as a model, but it will still need to be prepared by legal experts.

Another similar platform that allows for the exchange of food surpluses via a smartphone app, Leftoverswap, also has a Disclaimer of Warranties and Limitations of Liability section on their web page placing legal responsibility on the user. The popular ride-sharing site Uber has run into legal trouble for taking this route. While Uber claims that they are merely providing a platform, others argue that they are running an illegal taxi service. Though this may have given the company a rebellious reputation, they will likely weather the storm, as Google recently

³¹ Condra, Alli. "Cottage Food Laws in the United States." Harvard Food Law and Policy Clinic. August 1, 2013. Accessed May 1, 2015.

³² "Temporary Food Service Frequently Asked Questions." Missoula County Official Website. September 10, 2014. Accessed May 1, 2015.

invested \$258 million in the company³³. Including legal terms of use agreements on the Crop Swap site will be necessary.

Though food waste is a widespread and incredibly complex global issue, using technology to facilitate organized food-sharing efforts could reduce its impacts. We do not need to produce more and more food; we need to look in fields, pastures, barns, gardens, supermarkets, pantries, and fridges³⁴. At the community level, a small-scale food exchange could provide economic, environmental, and social benefits to residents. Collaboration could result in a more efficient use of resources and assets that could make the community stronger and more resilient. Since collaborative models often find themselves in legal limbo, or worse, legal trouble, the first and most important task will be to establish conclusively what Crop Swap is legally, and outline the permitting requirements for its users. Once the rules are clearly established, disclaimers, privacy policies, and terms of use elements can be prepared and the website completed. After the essential legal features have been created, we can focus our efforts on outreach to farmers, food businesses, and gardeners willing to post surplus food to the site. We will present to a number of boards and councils within the food community. Once food supply is assured, demand should naturally surface on the site as well. We will look for funding based on the needs we find after the first season. At this stage projecting the arc of Crop Swap is speculation, but designing the service with the mistakes of similar efforts in mind increases the chance of success.

There is no denying that the collaborative economy is a strong evolving force. As author Juliet Schor puts it in her article, *Debating the Sharing Economy*, “the ease with which individuals, even strangers, can now connect, exchange, share information, and cooperate is truly transformative”³⁵. It has been exciting navigating through largely uncharted territory. My hope with the food exchange is that food habits will change when a new more resourceful way of handling excess food is made easy and convenient. Recycling was an uncommon practice only a

³³ Owyang, Jeremiah. "Google Enters the Collaborative Economy in a Big Way." The Huffington Post. February 10, 2015. Accessed May 1, 2015.

³⁴ Smil, Vaclav. *Feeding the World a Challenge for the Twenty-first Century*. Cambridge, Mass.: MIT Press, 2000.

³⁵ Schor, Juliet. "Debating the Sharing Economy." Great Transition Initiative. October 1, 2014. Accessed May 1, 2015.

few decades ago and now it is mainstream. The rapid growth of the sharing economy alludes to the fact that people understand that the current linear model of production is unsustainable and that an alternative approach to consumption is needed. Models such as Crop Swap can lead to a more localized, sustainable and resilient food systems and should be explored further.