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The Challenge of Food Waste Governance in Cities: Case Study of Consumer Perspectives in Los Angeles

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Abstract: Food waste has been linked with food insecurity, environmental degradation, and economic inefficiency. Although research on food waste has increased recently, food waste tends to be poorly conceptualized and is often disproportionality focused on local consumer decisions. For this reason, this paper critically analyzes perspectives on food waste in Los Angeles (LA) as a case study in order to understand the structural challenges of food waste governance in cities. To achieve this goal, this study uses content analysis of interview data of key stakeholders in LA's food system and descriptive statistical analysis of survey data of university undergraduate students in LA. Findings in this paper suggest that students purchase, consume, and waste food in line with broader national trends in the U.S. Additionally, students indicated that the causes and solutions of food waste management lies with more responsible individual decisions and sustainable local food practices. While students noted that they may have acted differently towards food waste reduction if structural opportunities existed, results from the survey reveal that the role of corporations, global food system flows, and the political economy of food production remain relatively unrecognized by students in their perceptions of food waste. Although responsible consumer practices are clearly an important aspect of food waste reduction, findings in this paper suggest that food waste governance may be limited by a narrow local consumer focus.

Keywords: food system; food waste; urban governance; consumer; Los Angeles

1. Introduction

Food waste is one of the world's most pressing global challenges. Although food waste can be defined as food loss or spoilage during harvest [1], food consumed [2], food for animals [3], or a set of social relations [4], food waste is defined here as any edible food that is lost during the food system [5]. To this end, researchers have increased attention on the structure, flows, and outcomes of food waste. This has included scholarship that focuses on the psychology of consumer food waste behaviors and perspectives [6–10], circular economy studies to close or reduce material resource loops [11,12], life-cycle perspectives to assess holistic impact of food waste flows [13], industrial ecology studies to reassess how to reuse waste [14], and collaborative consumption frameworks which often emphasize the value of the sharing economy as a way to reduce food waste [15,16].

In this paper, food systems and food waste flows are conceptualized as part of a broader political ecological approach which critically analyzes the production and consumption of food in the context of capitalism [17,18]. As noted by many scholars within a political ecology framework [19–22], food waste continues to be conceptualized as the result of individual decisions, even though food waste is created from production to consumption in the food system [5,23–25]. In addition, consumer food waste is often theorized as a separate and unrelated process from corporate food system flows and key manufacturers, retailers, and other food businesses even though these institutions clearly shape how, where, and when people access, consume, and waste food [26]. Although the lens of political ecology

is partial and not capable of elucidating all complexities related to the perpetuation of food waste flows, it is useful in highlighting the causes, solutions, and spatial patterns of food waste in cities and how and where food is produced and for whom and by whom food waste is generated [17,18].

Although some locales have developed food reduction strategies especially in Europe and Asia [27,28], many cities have left food waste reduction to non-state community, household, or individual actors [20,29]. This ad hoc approach to urban food waste management has led to the perpetuation of food waste in many contexts as local institutions are unable to overcome the quantity and structural limitations of food waste production.

As noted in recent studies [30,31], Los Angeles (LA) exemplifies many of the key challenges associated with the decentralization of food waste management. 815,000 tons or 28% of LA's total waste is food [32]. Although food retailers, government departments, civil society, households, and individuals work to reduce food waste in LA [32,33], LA's decentralized governance structure has weakened the city's ability to reduce food waste [31].

To this end, this paper critically analyzes undergraduate student perspectives on food waste as a case study in order to understand the challenges of food waste governance in LA. While the results of this student survey do not reflect the experiences of all LA residents, their perspectives are instructive to situate and clarify the challenges associated with conceptualizing food waste governance in LA. The students chosen for this survey are not representative of the broader population, as they are a relatively young and privileged sub-group in LA; however, they are a useful group for analysis given that they are a relatively well-educated, young-adult population which will be key to food waste management in the near future. Once they graduate, enter the workforce, start families, and institutionalize a routine of daily activities, these students will create food waste management practices at the household level and collectively contribute to city level governance of food waste.

In this way, given that these students will likely take key roles in society, they will be in a position to promote food waste management solutions that fit their lifestyles and ideologies on food waste reduction. While these strategies might include consumer driven solutions at the individual or household level, they could also incorporate structural solutions at the city or regional level to reduce food waste across the food system. These uncertainties suggest that the perspectives of university students are important, as they might suggest the range of future possibilities for food waste management in the city. In this way, this paper's findings are relevant for multiple audiences: academia, policy makers, food corporations, and individuals concerned about food waste management.

Two research questions drive this study. First, how do students purchase, consume, and waste food, and how do students conceptualize the causes and solutions of food waste in LA? Second, what do these findings suggest for current approaches towards food waste management in cities, and how might an urban political ecology perspective highlight challenges in the governance of food waste in cities? To answer these research questions, this study utilizes interview data of key stakeholders in LA's food system and a survey of undergraduate students at the University of Southern California (USC).

In short, findings in this paper suggest that students purchase, consume, and waste food in line with broader national trends in the U.S. To start, students suggest that consumers are the most important producer of food waste and the key to its reduction. In this way, students suggest that food waste management is determined by individual decisions and local food practices. Additionally, students indicated that the causes and solutions to food waste management lies with more responsible individual decisions and sustainable local food practices. While students noted that they may have acted differently towards food waste reduction if structural opportunities existed, results from this survey reveal that the role of corporations, global food system flows, and the political economy of food production remain relatively unrecognized by students in their perceptions of food waste. Although responsible consumer practices are clearly an important aspect of food waste reduction, findings in this paper suggest that food waste governance may be limited by a narrow local consumer focus.

The structure of the paper is as follows. This paper begins with an examination of the political ecology of urban food waste, critical assessment of food corporations in urban food waste management,

and a delineation of the methods used in this study. Then, through the case study of university students at USC, this paper critically analyzes the challenges associated with food waste governance and the roles that different institutions play in food waste reduction.

2. The Political Ecology of Urban Food Waste

In the context of record amounts of global food waste [24], food waste research has increased dramatically in the last ten years. In particular, scholars have examined the quantity and sources of food waste [5,25] as well as the best ways to conceptualize food waste in the food system [19,21,22]. Given that food waste is often oversimplified as equivalent to disposal [34], individual decisions or behaviors, many scholars have worked to conceptualize food waste throughout the food system [1,20,35].

This includes food loss and spoilage wasted during the production and immediate post-harvest phases. Food waste commonly refers to food excess at the market and consumption stages of the food system. Alternatively, some food scholars theorize food waste as a set of social relations [4], food that is edible but wasted [5], food that could be fed to other organisms [3], or food needed to remain alive [2].

In the research employed in this paper on food waste in LA, food waste is defined as edible food that is lost in the food system [5]. Importantly, as noted in key research studies on food waste, approximately one-third of food produced is wasted at some point in the five stages of the food system [5,24,25]. This includes food wasted in agricultural production, post-harvest handling and storage, processing and packaging, and distribution and consumption phases, with most U.S. food wasted at the end of the food system near retail processing and distribution or household consumption phases.

Scholars have developed many innovative approaches to examine the issue of food waste. To start, this has included a critical analysis of the psychology of consumer food waste behaviors and perspectives [6–10]. Researchers have also examined food waste using a circular economy framework in which inputs and outputs, including waste flows, are minimized by closing or slowing the material resource loops [11,12]. In addition, important research exists to examine food waste through a life-cycle perspective to assess the environmental impacts of all stages of a food product's existence from extraction to consumption to waste [13]. In the field of industrial ecology, the reduction, reuse, and recycling of food waste is a growing area of interest to rethink and leverage the value of waste in industrial resource streams [14]. Through different conceptual frameworks, each of these perspectives provides a unique lens to examine the complexities of food waste production, regulation, reduction, and reuse, and recycling.

Importantly, scholars have also emphasized the potential of a collaborative consumption framework which allows consumers to both take and give resources through interaction with other consumers. This has been most evident in the growth of the sharing economy, as a way to reduce food waste [15,16]. Although food sharing may not be a fix all to the problem food waste, it can energize people to rethink how their food system is organized and contribute to a more non-linear collaborative circular approach to resource use in food systems. While the collaborative consumption framework could be useful in a range of cultural contexts across the Global North and Global South, scholars have also pointed out that it can simultaneously reinforce existing inequalities and produce new forms of exclusion even as it opens up new spaces for innovation and partnership [36].

In what follows in this paper, this study utilizes an urban political ecology framework to examine how and where food is produced and for whom and by whom food waste is generated. As noted by key urban political ecologists [18,37–39], the methods of conceptualizing the causes, solutions, and spatial patterns of food waste in cities reflects broader ways of understanding the human-environmental interface. In particular, food systems and food waste generation should be recognized as multi-scalar socio-ecological processes operating as an outgrowth of contemporary capitalism and its contradictions and inefficiencies. As noted by numerous scholars [17,40,41], this tension has been explored through a range of cutting-edge political ecological analyses of global and local food systems.

For many scholars, a political ecology approach has underlined that that the decentralization, privatization and devolution of food waste governance to households and local institutions may not successfully reduce food waste [20,31]. Moreover, some have suggested that neoliberal governance is reinforced when people conceptualize food waste as a result of individual choices at the local level without connection to global food flows or the political economy of food production. In this context, neoliberal governance is defined as a shift towards privatization, decentralization, and devolution of state responsibilities to local non-state actors. It is associated with a smaller and punitive welfare state; loose finance rules and lower taxes; smaller and more privatized services; and, an emphasis on personal responsibility and restricted citizenship [42,43]. Within this context of scholarship, some scholars emphasize that broader shifts in thinking are needed to overcome what they defined as the false corporate-consumer food waste distinction and conceptualize food waste as the result of global food flows and the political economy of food production rather than a local, consumer driven problem. In the following sections, this paper will explore these dynamics.

3. Food Corporations and Urban Food Waste

Although some U.S. cities have developed food waste programs within the last decade, many cities have been hampered by a decentralized governance structure, lack of time or interest in food waste reduction, and a strong dislike of government regulations [20,31]. This has often resulted in the devolution of food waste program responsibility to local food organizations or households [7,18,20]. Given that LA has a strongly decentralized mode of governance [44,45], food waste governance has been limited in its impact or scope [31].

Even though 61% of U.S. food wasted is at consumption, production (17%), handling and storage (6%), processing (9%), and distribution and market (7%) collectively total almost forty percent of total food waste [5]. As stated in the National Resources Defense Council's (NRDC) study on U.S. food waste [24], food waste is caused for different reasons across the food production system. During farming harvest, inclement seasonal weather, crop disease, food commodity market fluctuations, extreme quality preferences, labor expenses or shortages, and food safety concerns can all contribute to large volumes of food left on fields or lost at harvest. During the food processing state, trimming, screening, and sorting processes filter out lower quality food for disposal. In the food distribution stage, inadequate transportation, handling, refrigeration, and storage of food can lead to food loss as well as food simply being rejected by food retailers.

Scholarship on food waste in the retail sector has increased recently, as researchers have noted that food businesses contribute to food waste streams, yet little is known about the quantity, quality, or rationales for food waste remediation or reduction strategies [46–48]. In addition, food corporations, including food manufacturers, processors, distributors, and retailers, also all see a value in the reduction of food waste in their food system flows, so they are similarly invested in increased research attention to the study of food waste in the food system.

However, while both scholars and food corporations are both interested to study food waste and reduce its size in the food system, there are different opinions as to why food corporations are motivated to reduce food waste in their system flows. On the one hand, some have argued that food corporations prioritize food waste reduction as a way to maximize system efficiency and reduce costs [46–48]. Alternatively, other scholars [24,49] note that food retailers contribute to food waste through their priorities to have fully stocked and aesthetically appealing product displays at all times, excessively large or promotional food displays, and the chucking of slightly damaged or supposedly expired foods. Also, the marketing and use of "sell by," "best by," and "use by" date labels facilitates consumer confusion and the throwing out of safe food. In addition, restaurants contribute to food waste through their large and inflexible portions, expansive menu options, and unexpected sales fluctuations. For these reasons, while food waste at households is caused by lack of interest or mindfulness, passive food planning, impulse or bulk purchases, and an inability to understand date labels, food retailers and restaurants clearly have a significant role in setting the context for consumers to waste food.

Thus, while almost forty percent of total food waste is produced by farmers, manufacturers, processors, wholesalers, and retailers in the production, harvesting, processing, and distribution stages of food production, this waste occurs because of inefficiencies in the food system as well as corporate goals which often prioritize profits motives and financial speculation in food markets rather than food waste reduction [3,23,49,50]. In this way, some scholars suggest that the distinction between consumer food waste and corporate food waste may be a false binary given that food businesses influence the way that consumers buy, use, and waste food [1]. As noted by numerous scholars [26,51,52], food corporations often work diligently to project their companies as ecologically sustainable and socially just.

As part of this corporate rebranding towards sustainability, many food companies have utilized the U.S. Environmental Protection Agency's (EPA) Food Recovery Hierarchy [53]. In this heuristic, the EPA recommends that food companies reduce food waste in this order: first, source reduction; second, feeding hungry people in poverty; third, feeding animals; fourth, industrial uses; fifth, composting; sixth, incineration or landfill.

While the Food Recovery Hierarchy is often promoted by key industry leaders such as the U.S. Zero Waste Business Council and the Food Waste Reduction Alliance (FWRA) for its capacity to reduce food waste inefficiencies and promote corporate stewardship [54,55], scholars have also suggested that it has been promoted by many food corporations to enhance company brand more than actually reduce food waste in the system [26].

Since corporate food data are not publicly accessible, the FWRA food waste study of key food businesses is an important report on the state of food waste among the largest food corporations in the U.S. The 2013 FWRA study states that the largest food companies, inclusive of food manufacturers, retailers, and food service businesses, generate 48 billion tons of food waste per year in the U.S. While some of this food waste is converted to animal feed, compost, or food donations, most is landfilled. Importantly, this study suggests that 84% of food waste is generated by households and restaurants with only 5% from food corporations. These data are significantly different from other studies which suggests that food companies produce almost 40% of total food waste in the U.S. once all aspects of the food supply chain are measured [24,49]. These two estimates diverge in part because of the considerable issues with how food waste is collected, measured, and compared.

In addition, these data neglect the farm production, postharvest, handling, storage, processing, packaging, distribution, and retail phases where food is wasted in the supply chain and the ways in which companies shape food consumption and waste patterns at restaurants, households, and other food outlets. Moreover, while the FWRA suggests that food corporations are collaborating to reduce food waste, most companies do not share or publicize their supply chain data to competitors or the public. For this reason, the impact of the FWRA and corporate food initiatives are quite uncertain as it provides the illusion of systemic change without accountability or measures to assess corporate stewardship or its devolution of responsibility to households and consumers [56,57].

4. Methods

The methodology in this paper follows a two-step process. As described below, this study uses content analysis of interview data of key stakeholders in LA's food system and descriptive statistical analysis of survey data of university undergraduate students in LA. While in-depth interviews help to provide important context for the governance structure of food waste in LA, the survey results provide a sampling of a small but important set of consumer perspectives on food waste in the city. In this way, each data set are critical to understanding the full picture of food waste governance challenges in LA.

In this research, 51 in-depth interviews were conducted with food retailers, LA government administrators, market vendors, food consumers, and local food organizations from 2006–2016. These interviews were conducted to understand the structure and roles of key institutions in the food system, and how different institutions produce, regulate, or reduce food waste. In this way, these interviews provided important background context for the student survey. While fieldwork was conducted

between 2006–2016, most interviews were completed in 2013–2014. This included six interviews with administrators at food grocers, eleven interviews with administrators at the LA Unified School District, LA Bureau of Sanitation, and LA Solid Waste Division, eleven interviews with food vendors at LA farmers markets, twelve informal discussions with consumers at LA markets, and eight interviews with food rescue and food justice organizations.

Interviews were conducted during business hours and followed a list of questions, although the discussion was open ended. These interviews were recorded and transcribed with agreement from the interviewee. All interviews were cited in the same manner: Interviewee role, institution, date. As multiple interviews were completed on the same day, many interviews have the same interview date. Interviews were edited for grammatical clarity when necessary.

As part of these interviews, I asked interviewees about their role in the production, regulation, and reuse of food waste. Next, I utilized a triangulation method to analyze interview data across different sources in relation to each other in order to understand the relative importance of what they said and the context in which they disclosed information [58]. These data were then used to generalize about the structure of food waste governance in LA.

Then, in line with the protocol set by scholarship on survey techniques [59] USC's Institutional Review Board (IRB) for Human Subjects Research, I conducted a survey of 175 undergraduate students in a general education course called Spatial Sciences 265: The Water Planet at USC in 2015. With the help of my teaching assistant, this survey was conducted twice, with 80 students surveyed in the Spring 2015 term and 95 in the Fall 2015 academic term. In Spring 2015, the enrollment of the class was 95 students, but 15 students did not come to class on the day the survey was conducted. In Fall 2015, the enrollment of the class was 120 students, but 25 students did not come to class on the day the survey was conducted. The survey responses were based on perceived food waste, not food logs or food diaries.

Students completed the survey within 30 minutes. As part of the human subjects approval process by the university, the students were informed of the study's purpose, participant involvement, alternatives to participation, and confidentiality, given that this survey was voluntary, confidential, and not related to graded course work. While it is possible that the survey results were negatively influenced by students' concerns about grades or participation in the survey, I had the teaching assistant fully administer the survey, in line with the human subjects approval process. Moreover, the teaching assistant and I both reiterated the anonymity and voluntary nature of the survey participation process in class. Although it is possible that some students may have felt pressure to complete the survey, the guidance that we followed from the university's human subjects approval process ideally minimized the risk of influencing the survey results; however, these factors were taken into account upon review of the survey results.

The forty-seven questions in this survey ask students about the causes of food waste, food purchasing patterns, types of food wasted, participation in local food waste initiatives, roles of different institutions in food waste governance, and perspectives on solutions to food waste (see Appendix A). Questions for this food waste survey were developed from the primary investigator's field experience on food waste issues and previous surveys conducted by previous scholars [24,49,60].

After completion of the survey, I conducted descriptive statistical analysis on these survey data through summary statistics and tables to summarize the results of the sample. Additionally, I conducted some exploratory inferential statistical tests, such as correlations and chi-squares. However, these analytical test results were not examined in this paper, as the data sets were either too small, non-normally distributed, derived from non-random samples, or produced test results with no statistical validity or statistical significance. Also, given that the purpose of the survey was to examine how students purchase, consume, and waste food and how students conceptualize the causes of solutions of food waste in LA, there was little interest in this paper on identifying predictive or causal relationships between data or dependent variables and independent variables. The purpose of this paper was to examine the meaning behind the students' behaviors, practices, and perspectives on food

waste in the city. While the descriptive statistical patterns identified in this paper were not inferential, predictive, or conclusive given their non-representative nature and small size, descriptive data analysis highlighted key trends in the study population.

5. The Urban Governance of Food Waste in LA

5.1. The LA Food System

As shown in Figure 1, a range of private, government, and non-profit organizations are active in LA's food system [32,33]. Given that LA is polarized by race and class, food access differs significantly by community type. As noted in previous studies [61,62], many parts of East LA and South LA have been classified as food deserts due to their lack of high-quality affordable food. Of the 17% LA County food insecure residents, 50% are seniors and 25% of children [63,64]. In regards to food waste, recent estimates suggest that LA waste 815,000 tons of food yearly or 28% of total waste stream. These markers suggest that LA is among the worst for food insecurity and food waste in the U.S. state of California [32].

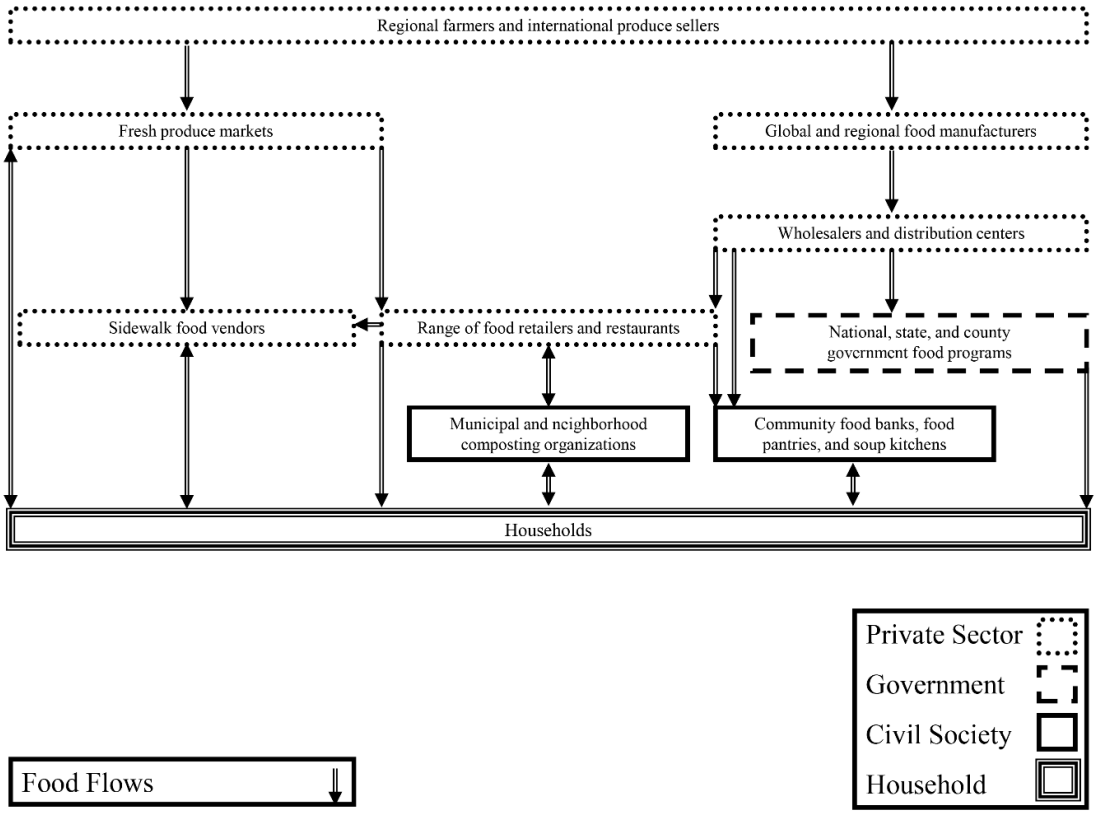

Figure 1. The Food System in Los Angeles.

5.2. Governmental Food Waste Reduction Initiatives in Los Angeles

The city and county of LA manage commercial businesses including restaurants, hotels, food processors, caterers, and other food service establishments (FSE); household composting; and, household curbside food waste programs [31,65]. However, interviews with the managers of these programs stated that these programs have been limited by lack of participation, interest, time, money, city enforcement, or facilities to process waste (Administrator, Los Angeles Bureau of Sanitation, 28 August 2013; Administrator, Los Angeles Bureau of Sanitation, 30 August 2013; Administrator, Los Angeles Bureau of Sanitation, 23 October 2013).

In addition, the structure of what is often called waste subscription service in LA has been an additional hurdle to the reduction, reuse, and recycling of food waste. Although only a small part of

the management of food waste in LA, it has been severely underperforming because of the structure of service delivery. In particular, the number and scope of available programs have been limited by the structure of waste hauler services. Multiunit and commercial properties are serviced by private waste haulers in what is often referred to as a "Wild West" open permit system as individual properties negotiate services [31].

> The current system is an open permit system for business and apartments. We refer to it as the Wild West. People in any given neighborhood have to meet individual contracts from a list of companies. And, so there is no transparency as to what type of rates they are paying. It is very inconsistent whether you can get recycling or not, and there is a lot of truck route overlap. There is very little efficiency. Also, it is very difficult for the city in the current system to hold companies to high standards. (Administrator, Advocacy Organization, 13 September 2013)

This open permit system has resulted in inefficient or non-existent services and price inconsistencies [66]. Although LA has initiated the process to move towards an exclusive franchise model of waste services so that waste haulers would have to provide food waste recycling to receive city approval to operate, the future of this policy shift is unclear due to resistance from the business community who dislike the idea of increased government regulation (Administrator, Advocacy Organization, 13 September 2013). Even though the decentralized nature of LA's governance structure, structural limitations associated with the open permit system, and low program participation have weakened LA's ability to initiate progressive policy, the city's manage commercial, composting, and curbside food waste programs continue to operate.

5.3. Corporate Food Waste Reduction Initiatives in Los Angeles

In LA, food businesses operate multiple food waste programs, including food bank donations, green energy initiatives, and zero waste policies [54]. However, as noted by scholars [26,56], corporate programs have arguably been promoted to legitimate companies as sustainable and socially just. Very often, corporate efforts to promote food waste reduction is part of a broader sustainability marketing effort to maximize profits, minimize inefficiencies, and bolster public perception as a legitimate ethical green company [26]. Given that food waste generation is an inefficiency along all parts of the food supply chain, it is important to minimize food waste for all institutions within the food system.

> I have to keep (sustainability innovations) cheap. I can't add dollars to what we are doing. You have to be very careful how you manage your resources and where you go to do business. So, when you (try to develop food waste reduction initiatives), you are looking for efficiencies. (Administrator, Food Retailer, 1 July 2014)

Moreover, while reducing food waste can save companies money, many advocates are skeptical of these companies' motivation to commit to food waste reduction long-term (Administrator, Advocacy Organization, 13 August 2013).

> (Is this local food waste reduction) project (for show)? There are other ways where (large food retailers) can be (contributing), but no one wants to (look beyond their own company). (Administrator, Food Advocacy Organization, 12 August 2013)

5.4. Non-Profit Food Waste Reduction Initiatives in Los Angeles

LA non-profits are active in food waste reduction [31]. While some are focused on local issues, others aim to change global food production, distribution, and consumption systems [67]. In terms of mission, some non-profits focus on social justice, inequality, and social change, while others focus on poverty reduction or environmental stewardship.

Although food non-profits arguably play an important role in urban food systems, they are limited in key ways. To start, while many leaders of local non-profits suggest that it is important for

the structural causes of food insecurity and food waste to be recognized, they often focus their mission in the local community where neighborhood relationships are strongest.

> (We need to focus on our mission at the local level and not at the global level because we could lose focus). We are trying to build a network in Los Angeles in every community where food waste is happening. We want to make a change at the community level in neighborhoods. (Administrator, local food non-profit organization, 12 August 2013)

In addition, in the area of food waste management, food rescue non-profits redistribute more than 25,000 tons of food to the food insecure yearly [68]. Although this is significant, it represents only a fraction of the city's food waste [32]. The amount of rescued food used to feed people is dwarfed by the amount of food entering landfills.

Also, it is unclear that food non-profits can actually implement their mission, given the extreme financial and human resource constraints which are both unstable and insufficient for long-term stability. Funding is tied to donor priorities, which can change. In addition, given that corporations provide a significant amount of financial and in-kind donations to local food organizations, food non-profits are often confronted with the contradiction of accepting resources from institutions which are core to the excesses and inequalities of global food systems [31,69,70].

Moreover, leaders of food non-profits often suggest that individuals, households, and communities can produce significant impact in food insecurity and food waste levels; however, it remains unclear that local non-profits can effectively fill in gaps from government or private sector institutions [71–73]. To this point, many scholars suggest that local food non-profits both romanticize the power of local communities to implement change [74] and contribute to a neoliberalization, atomization, and depoliticization of food issues as non-profits become divorced from structural causes which produce their operating context [31,41,75].

6. Case Study: Food Waste Survey Data

6.1. Food Waste Survey Context

As the co-course instructor for The Water Planet, I led lecture on the world's water supply. While food systems were discussed, food waste was not a focus of the course. For this reason, students' perspectives on food waste were likely from general knowledge not necessarily gained from the course.

According to the self-reported survey data, students in the course were 62% white, 49% women, and an average of 19 years old. Although this course and the USC student body represent a relatively wealthy set of students, as 41% of students reported incomes over $200,000, it boasts one of the highest international student populations in the U.S. and has an increasingly diverse student body which reflects the dynamism of LA [76] (Figure 2). While the income, race, and ethnicity of the surveyed student population likely played a role in food consumption patterns and perceptions of food waste, the purpose of this survey was not to create a representative sample of the LA population but rather to examine an important sub-population in the city to see if any trends are evident in food waste practices and perspectives. Additionally, while the micro-context of each student's lifestyle and food waste behaviors are not available in the data set given the limited focus of the questions asked in this study's survey, the data highlight important findings on food waste behaviors and perspectives in the city of LA. In turn, these data may provide insight into some of the key challenges that often limit food waste governance in the urban context.

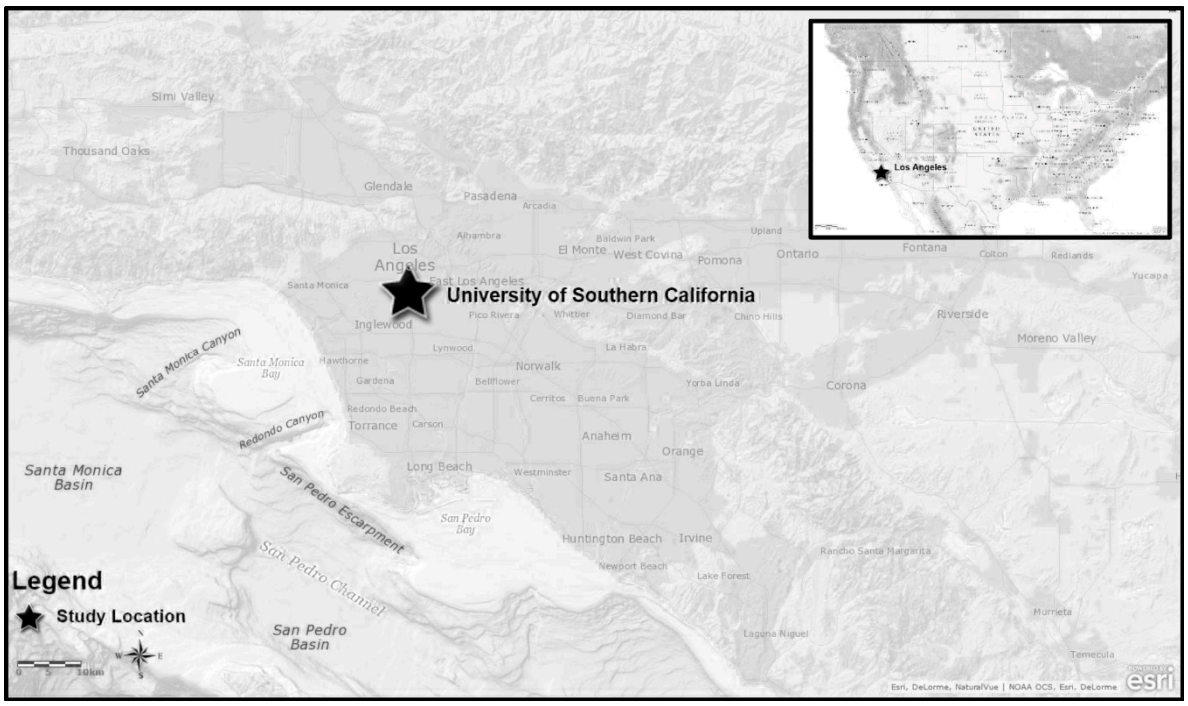

Figure 2. The Los Angeles Study Area.

6.2. Food Purchasing Patterns and the Types of Food Waste

As expected, students consumed food in apartments or houses (52%), restaurants (24%), and dormitory dining halls (21%). According to survey results, 62% of students wasted food often (multiple meals daily) or sometimes (some meals throughout the week). The most common reason given why students wasted food at meal time was that they lacked interest in keeping leftovers (52%) or food prepared during the cooking process was wasted (28%). As shown in Table 1, most students said that they wasted less than 10% of food (55%) or 11–25% of food (39%). Although these numbers indicate lower waste totals than the U.S. average of 25% [24], it is likely that students underreported their food waste, a common trend globally [7,10,49].

Table 1. Quantity of Food Wasted by Students.

What Percentage of Food Do You Throw out in a Typical Week? (Circle One Only)	Number of Responses (N = 176)	Percentage
Less than 10%	96	54.55%
11–25%	68	38.64%
26–49%	10	5.68%
More than 50%	2	1.14%

As illustrated in Table 2 below, the most common foods wasted by students were the following: fruits and vegetables (45%), followed by dairy (16%), grains (14%), meat (12%) and seafood (9%). These numbers are higher for fruits and vegetables and lower for the other categories as compared to other key studies [5,25]. This may be because students may not have enough money to buy expensive proteins, such as meat and seafood, or due to religious preferences.

Table 2. Types of Food Wasted by Students.

If You Do Waste Food, What Are the Most Common Foods You Waste? (Circle All That Apply)	Number of Responses (N = 230)	Percentage
Fruits and Vegetables	103	44.78%
Seafood	20	8.70%
Meat	27	11.74%
Dairy	36	15.65%
Grains	33	14.35%
Other	11	4.78%

Survey results suggested that students wasted significant amounts of food and rarely used sustainable methods to reduce or reuse food waste. Most often, students disposed of food in the waste bin (70%) or the sink drain or incinerator (22%). Less than 7% of students used compost bins, gardens, or other alternative methods of disposal, although this is similar to the results in other studies [24]. According to the survey and as stated in Table 3 below, the main reasons students wasted food was because the food was smelly, moldy, or slimy (37%), past due date (27%), bought too much food (18%), or unwanted leftovers (16%). According to the survey, students rarely keep expired food, as students reported that they keep food after the expiration date sometimes (32%), rarely (26%), or never (26%). These reasons are typical as compared to other surveys of food waste consumers [20,21,49].

Table 3. Reasons Students Waste Food.

If You Do Waste Food, Why Do You Throw out Food? (Circle All That Apply)	Number of Responses (N = 258)	Percentage
Past Due Date	69	26.74%
Bought Too Much Food	47	18.22%
Smelly, Moldy, Or Slimy	95	36.82%
Leftovers	40	15.50%
Other	7	2.71%

Most food consumed was purchased from a major food grocer (46%), while farmers markets (19%), restaurants (17%), and bulk food stores (13%) were also important. Although 79% of students stated that they check first to see what they have in their house and 71% of students noted that they make a shopping list or have meals in mind, 62% of students surveyed buy food that is not on their list. According to the survey, this occurred because students thought products look or good or appealing (53%) or had a good price or were discounted (30%). This suggests that students may have been persuaded by retailers to buy food that they did not need, a problem well-documented by researchers [1,3,23,24].

6.3. The Causes of Food Waste

In regards to the causes of food waste, students attributed most blame to consumers. This reinforces other studies which emphasize individual food behaviors as the main cause of food waste [20]. The highest reasons given by students were the following: lack of consumer interest in food waste reduction (23%), lack of consumer information in food waste reduction (20%), overproduction of food (20%), and lack of consumer time or capacity to reduce food waste (18%). Lack of political will from government (14%) and low-quality packaging or transportation of food (14%) were listed as secondary reasons, with little blame given to private food retailers.

As shown in Table 4 below, when asked about the institutions which produce the greatest amount of food waste in LA, students said that restaurants (37%) and consumers (28%) were most to blame, while food processors and manufacturers (16%), food grocers (10%), farmers (4%), farmers' markets (3%), and government (2%) were given less responsibility for food waste creation.

Table 4. Producers of Food Waste According to Students.

What Institutions Produce the Greatest Amount of Food Waste in Los Angeles? (Circle All That Apply)	Number of Responses (N = 219)	Percentage
Farmers	8	3.65%
Food Processors and Manufacturers	35	15.98%
Food Grocers	22	10.05%
Farmers' Markets	6	2.74%
Restaurants	82	37.44%
Government	4	1.83%
Consumers	62	28.31%
Other	0	0.00%

To this point, students noted that food is wasted at households because of spoilage (24%), little concern with waste (24%), impulse and bulk purchases (22%), poor planning (19%), and confusion over expiration dates (10%). Students reported that food waste at restaurants is caused by large and inflexible portions (35%), expansive menu options (28%), and unexpected sales fluctuations (19%), while food waste at the retail level is caused by 'expired' sell by dates (19%), overstocked product displays (15%), unpopular items (15%), damaged goods (15%), expectation of cosmetic perfection (13%), and availability of fresh, and ready food until closing (10%). In these answers, students recognized the role that restaurants and food retailers play in creating a context for facilitating increased food waste by consumers; yet, most of the blame is given to consumers.

6.4. The Solutions to Food Waste

77% of students reported that food waste reduction should be a priority because of its connection to hunger and food insecurity (36%), environmental damage (32%), and economic inefficiency (28%). When asked which institution has the most significant impact on food waste reduction, students listed individuals (36%), food retailers and manufacturers (26%), government (13%), and non-profits (10%). As shown in Table 5 below, in terms of action to reduce food waste, students noted that society should improve public awareness on food waste (43%), take action at the state or national level (31%), support and enable food recovery and food donations (26%), establish national food waste reduction goals (26%), encourage customers to serve smaller portions and save leftovers (22%), and promote better understanding of expiration dates among consumers (20%).

While these answers may imply that students are open to support increased regulations of food waste in the private sector, students reported that the programs with the greatest potential to reduce food waste are non-profit food rescue (48%), composting (30%), and curbside food waste pickup (16%). These programs are more focused on civil society and household solutions at the end of the system than food manufacturers, processors, wholesalers, and retailers.

Moreover, when asked about existing LA programs, less than a third of students were aware of existing programs, such as non-profit food rescue (33%), household composting (24%), restaurant food waste recycling (16%), and household curbside food waste pickup (14%). While many of these programs are small or ineffective, it is clear that these programs are also poorly publicized among USC students. As expected, as illustrated in Table 6 below, students reported that they do not participate in these programs because of a lack of time (33%), lack of facilities or infrastructure (27%), lack of information in food waste reduction (25%), and lack of interest in food waste reduction (13%). Thus, while there is some interest among students to reduce food waste in the abstract, students maintain mixed positions as to the cause and solutions to food waste [9,10,21]. Not surprisingly, given the lack of actual structures to implement food waste reduction, students continue to throw food waste in landfill bound bins.

Table 5. Key Alternatives to Food Waste Reduction According to Students.

Which of the Following Alternatives Are Key Ways to Reduce Food Waste? (Circle Top Three Only)	Number of Responses (N = 670)	Percentage
Conduct regular food waste audits and set targets for food businesses	48	18.60%
Disseminate and encourage adoption of best practices by businesses	33	12.79%
Encourage innovation in online solutions and new technologies	29	11.24%
Establish national food waste reduction goals	67	25.97%
Take action at the state and local level	79	30.62%
Support and enable food recovery and food donations	68	26.36%
Improve public awareness on food waste	110	42.64%
Encourage shoppers to be smarter about what they buy	47	18.22%
Promote better understanding of expiration dates among consumers	52	20.16%
Encourage consumers to serve smaller portions and save leftovers	58	22.48%
Expand alternative outlets and secondary markets for second-rate but edible foods	25	9.69%
Enact regulatory measures that incentivize complete harvest	27	10.47%
Analyze needs at the item level in stores to reduce in-store waste	25	9.69%
Other	2	0.78%

Table 6. Reasons for Lack of Food Waste Reduction According to Students.

If You Do Not Participate in Any Food Waste Reduction Strategies, Why Not? (Circle All That Apply)	Number of Responses (N = 277)	Percentage
Lack of interest in food waste reduction	36	13.00%
Lack of information in food waste reduction	68	24.55%
Lack of time	92	33.21%
Lack of facilities or infrastructure	76	27.44%
Other	5	1.81%

7. Discussion and Conclusions

Although interview data of key food institutions provided important background context on the structure of the food system, this study centered on the analysis of student food waste survey data in order to understand the challenges associated with food waste governance in LA. While the income, race, and ethnic composition of this student population may have influenced their food consumption patterns and perspectives on food waste, the results of this student survey are not intended to reflect the experiences of all LA residents. Rather, their perspectives are instructive to situate and clarify the challenges associated with conceptualizing and implementing food waste management in LA today and in the near future.

Findings in this paper suggest that students purchase, consume, and waste food in line with broader national trends in the U.S. Additionally, students indicated that the causes and solutions to food waste management lies with more responsible individual decisions and sustainable local food practices. This is supported by scholarship on the psychology of consumer food waste behaviors and perspectives [6–10] and collaborative consumption frameworks which often emphasize the value of the sharing economy as a way to reduce food waste [15,16].

In line with critiques from other scholars who utilize a political ecology framework [19–22], students in this survey continue to conceptualize food waste as the result of individual decisions, even though food waste is created from production to consumption in the food system [5,23–25].

Additionally, this idea persists even as scholars have suggested that the privatization, decentralization, and devolution of food waste governance to local food organizations and households may not reduce food waste [20,21,31]. In addition, consumer food waste is often theorized as a separate and unrelated process from corporate food system flows and key manufacturers, retailers, and other food businesses, even though scholars have argued that these institutions clearly shape how, where, and when people access, consume, and waste food [26,41,50]. Although responsible consumer practices are clearly an important aspect of food waste reduction, survey results interpreted through an urban political ecology lens may suggest that food waste governance could be limited by a narrow local consumer focus.

While consumers are the key source of food waste in the U.S., almost 40% of food waste is produced by farmers, manufacturers, processors, wholesalers, and retailers in production and distribution. This waste exists as a result of food system inefficiencies and corporate speculation in food markets [3,23,49,50]. As noted by key scholars, the distinction between consumer food waste and corporate food waste may be artificial, as businesses influence the purchasing and waste patterns of consumers [1,20]. As food companies project their image to be more sustainable and socially just, some scholars have noted that many food corporations also strategically point to consumers as the cause of food waste [51,52].

As noted in other key studies [26,56,57], food companies often prioritize food waste management solutions which are highly visible and promote the company's brand, such as donating food to local food organizations and repurposing food for alternative energy sources. Often, these initiatives are hard to measure, company-specific, and narrow technical fixes. Although corporate initiatives help to institutionalize progressive environmental practices into the market, some scholars have suggested that these initiatives may be often driven by market logics rather than environmental or social justice [51,52].

In this way, corporate food waste management may be limited by its own contradictions, as the producers of food waste receive benefits from its existence and deflect attention from their own internal food waste flows. In addition, many corporate food initiatives are dependent on wealth accumulation as a source of charity, yet this same drive to build corporate wealth is also related to uneven patterns of food access and the need for food charity [50,77].

Within the context of LA's decentralized governance structure and low levels of participation in food waste programs, it is not surprising that students conceptualize food waste as an individual problem. Even so, data in this paper suggest that students may reinforce neoliberal governance when they conceptualize food waste as the result of individual choices, personal responsibility, and community engagement at the local level unrelated to global food flows or the political economy of food production, in line with other key studies on this topic [20,31].

Building on the extensive literature on scale and food activism [41,74,78], this research suggests that broader shifts in thinking may be needed to conceptualize food waste beyond a local, household consumer driven problem. While the results from the student survey are clearly not sufficient in their own right to prove this point, they do suggest that some of the above concerns are possible limitations in the debate around food waste management in cities. Moreover, although a critical political ecology perspective is clearly not capable of explaining all aspects of food waste management, such as the psychology of food waste behaviors or individual food waste patterns, it is instructive in highlighting some limitations with food waste management associated with structures of power, such as food companies and government, and the uneven processes of food production, distribution, and waste creation.

While this research has examined student perspectives on food waste in order to understand food waste management, key studies have argued that the dual challenges of food insecurity and food waste cannot be overcome by amending the existing food system [50,79]. Food insecurity, hunger, and food waste may persist, at least in part, because of uneven capitalist accumulation and financial speculation in the global food system as well as economic and social inequality associated with poverty and income inequality.

To this end, future research should examine the structure and development of food waste reduction schemes within the cultural and historical context of the urban political economy at particular locales. While scholars should measure the size, scope, and impacts of food reduction schemes, the results of this paper's survey and related data findings suggest that food waste reduction may be strongly impacted by the relationship between social attitudes towards food waste and the governance structures which enable or inhibit such actions to be realized. Student perspectives at USC clearly represented one small population within LA, yet they stated that they might have acted differently towards food waste reduction if structural opportunities existed for them to act more proactively towards food waste reduction. In this way, students could be in a better position to contribute to food waste reduction as consumers as well as be part of a broader shift towards structural food system level solutions to food waste reduction as well.

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Appendix A : Selection of Key Survey Questions*

1. Which of the following are major reasons why food waste exists in Los Angeles? (circle all that apply)

    a. Overproduction of food
    b. Low quality packaging or transportation of food
    c. Lack of political will from government
    d. Lack of consumer interest in food waste reduction
    e. Lack of consumer time or capacity to reduce food waste
    f. Lack of information in food waste reduction
    g. Other

2. What institution produces the greatest amount of food waste in Los Angeles? (circle one only)

    a. Farmers
    b. Food processors and manufacturers
    c. Food grocers
    d. Farmers' markets
    e. Restaurants
    f. Government
    g. Consumers
    h. Other

3. At what stage in the food system is the most food wasted? (circle one only)

    a. Farm production
    b. Postharvest, handling, and storage
    c. Processing and packaging of food
    d. Distribution of food
    e. Food consumption
    f. Other

4. Which of the following are major reasons why food is wasted at the household level? (circle all that apply)

    a. Little concern with food waste
    b. Confusion over expiration dates
    c. Spoilage
    d. Impulse and bulk purchases
    e. Poor planning
    f. Other

5. What percentage of food do you throw out in a typical week? (circle one only)

    a. Less than 10%
    b. 11 – 25%
    c. 26 – 49%
    d. More than 50%

6. If you do waste food, what are the most common foods you waste? (circle one only)

    a. Fruits and vegetables
    b. Seafood
    c. Meat
    d. Dairy
    e. Grains
    f. Other

7. If you do waste food, why do you throw out food? (circle one only)

    a. Past due date
    b. Bought too much food
    c. Smelly, moldy, or slimy
    d. Leftovers
    e. Other

8. How do you usually throw out food? (circle all that apply)

    a. Throw in waste bin
    b. Place in sink drain or incinerator
    c. Compost in bin or garden
    d. Burn inside or outside
    e. Other

9. Do you participate in any of the following food waste reduction strategies? (circle all that apply)

    a. Curbside food waste pickup
    b. Composting
    c. Food rescue (to give to food pantries, soup kitchen, or shelters)
    d. Informal food waste picking (‘dumpster diving’)
    e. Other

10. If you do not participate in any of the above food waste reduction strategies, why not? (circle all that apply)

a. Lack of interest in food waste reduction
b. Lack of information in food waste reduction
c. Lack of time
d. Lack of facilities or infrastructure
e. Other

11. Who usually shops for food in your household? (circle one only)

a. You
b. Partner or roommate
c. Parent
d. Sibling
e. Other

12. Where do you buy your food? (circle all that apply)

a. Farmers' market
b. Major food grocer
c. Bulk foods store
d. Restaurants
e. Online
f. Other

13. Where do you eat most of your food? (circle all that apply)

a. Dormitory dining hall
b. Apartment or house
c. Restaurant
d. Other

14. How often do you go shopping for food? (circle one only)

a. Daily
b. Multiple times per week
c. Once a week
d. Once or twice a month
e. Other

15. How often do you cook at home? (circle one only)

a. Daily
b. Multiple times per week
c. Once a week
d. Once or twice a month
e. Other

16. Do you keep food after the expiration date? (circle one only)

a. Always
b. Sometimes
c. Rarely
d. Never

e. Other

17. What institution has the biggest impact on food waste reduction? (circle one only)

a. Farmers
b. Food retailers and manufacturers
c. Government
d. Non-profit organizations
e. Individuals
f. Other

18. Which of the following programs has the greatest potential to reduce food waste? (circle one only)

a. Curbside food waste pickup
b. Composting
c. Food rescue (to give to food pantries, soup kitchen, or shelters)
d. Informal food waste picking ('dumpster diving')
e. Other

19. Are there any government sponsored programs to reduce food waste in Los Angeles? (circle all that apply)

a. Household curbside food waste pickup
b. Restaurant food waste recycling
c. Household composting
d. Food rescue (to give to food pantries, soup kitchen, or shelters)
e. Other

20. Which of the following are key ways to reduce food waste? (circle all that apply)

a. Increase university, school, company, or organization regulation of food waste
b. Increase government regulation of food waste
c. Require that food waste bins are part of the city's recycling programs
d. Hold food retailers and manufacturers to higher standards for food waste reduction
e. Mandate that people pay according to the amount of food waste they produce
f. Other

21. Which of the following alternatives are key ways to reduce food waste? (circle top three only)

a. Conduct regular food waste audits and set targets for food businesses
b. Disseminate and encourage adoption of best practices by businesses
c. Encourage innovation in online solutions and new technologies
d. Establish national food waste reduction goals
e. Take action at the state and local level
f. Support and enable food recovery and food donations
g. Improve public awareness on food waste
h. Encourage shoppers to be smarter about what they buy
i. Promote better understanding of expiration dates among consumers
j. Encourage consumers to serve smaller portions and save leftovers
k. Expand alternative outlets and secondary markets for second-rate but edible foods
l. Enact regulatory measures that incentivize complete harvest

m. Analyze needs at the item level in stores to reduce in-store waste
n. Other

*Note: Some survey questions were not included in Appendix A due to their length or lower level of relevance to this paper.

References

1. Parfitt, J.; Barthel, M.; Macnaughton, S. Food waste within food supply chains: Quantification and potential for change to 2050. *Philos. Trans. R. Soc. B Biol. Sci.* **2010**, *365*, 3065–3081. [CrossRef] [PubMed]
2. Smil, V. *Enriching the Earth*; Massachusetts Institute of Technology Press: Cambridge, MA, USA, 2004; ISBN 978-0262693134.
3. Stuart, T. *Waste: Uncovering the Global Food Scandal*; W. W. Norton: New York, NY, USA, 2009; ISBN 978-0393068368.
4. Gille, Z. From risk to waste: Global food waste regimes. In *Waste Matters: New Perspectives on Food and Society*; Evans, D., Campbell, H., Murcott, A., Eds.; Wiley-Blackwell: Malden, MA, USA, 2013; pp. 27–46. ISBN 978-1118394311.
5. Gustavsson, J.; Cederberg, C.; Sonesson, U.; van Otterdijk, R.; Meybeck, A. *Global Food Losses and Food Waste*; Food and Agriculture Organization of the United Nations: Rome, Italy, 2011; Available online: http://www.fao.org/docrep/014/mb060e/mb060e00.pdf (accessed on 23 March 2013).
6. Aschemann-Witzel, J.; de Hooge, I.; Amani, P.; Bech-Larsen, T.; Oostindjer, M. Consumer-related food waste: Causes and potential for action. *Sustainability* **2015**, *7*, 6457–6477. [CrossRef]
7. Hebrok, M.; Boks, C. Household food waste: Drivers and potential intervention points for design—An extensive review. *J. Clean. Prod.* **2017**, *151*, 380–392. [CrossRef]
8. Morone, P.; Marcello Falcone, P.; Lopolito, A. How to promote a new and sustainable food consumption model: A fuzzy cognitive map study. *J. Clean. Prod.* **2019**, *208*, 563–574. [CrossRef]
9. Schmidt, K.; Matthies, E. Where to start fighting the food waste problem? Identifying most promising entry points for intervention programs to reduce household food waste and overconsumption of food. *Resour. Conserv. Recycl.* **2018**, *139*, 1–14. [CrossRef]
10. Stancu, V.; Haugaard, P.; Lähteenmäki, L. Determinants of consumer food waste behavior: Two routes to food waste. *Appetite* **2016**, *96*, 7–17. [CrossRef] [PubMed]
11. Geissdoerfer, M.; Savaget, P.; Bocken, N.M.P.; Hultink, E.J. The circular economy—A new sustainability paradigm? *J. Clean. Prod.* **2017**, *143*, 757–768. [CrossRef]
12. Jurgilevich, A.; Birge, T.; Kentala-Lehtonen, J.; Korhonen-Kurki, K.; Pietikäinen, J.; Saikku, L.; Schösler, H. Transition towards circular economy in the food system. *Sustainability* **2016**, *8*, 69. [CrossRef]
13. Schott, A.B.S.; Andersson, T. Food waste minimization from a life-cycle perspective. *J. Environ. Manag.* **2015**, *147*, 219–226. [CrossRef]
14. Girotto, F.; Alibardi, L.; Cossu, R. Food waste generation and industrial uses: A review. *Waste Manag.* **2015**, *45*, 32–41. [CrossRef]
15. Michelini, L.; Principato, L.; Iasevoli, G. Understanding food sharing models to tackle sustainability challenges. *Ecol. Econ.* **2018**, *145*, 205–217. [CrossRef]
16. Morone, P.; Falcone, M.P.; Imbert, E.; Morone, A. Does food sharing lead to food waste reduction? An experimental analysis to assess challenges and opportunities of a new consumption model. *J. Clean. Prod.* **2018**, *185*, 749–760. [CrossRef]
17. Heynen, N.; Kaika, M.; Swyngedouw, E. Urban political ecology: Politicizing the production of urban natures. In *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism*; Heynen, N., Kaika, M., Swyngedouw, E., Eds.; Routledge: New York, NY, USA, 2006; pp. 1–20. ISBN 978-0415368278.
18. Heynen, N. Urban political ecology I: The urban century. *Prog. Hum. Geogr.* **2014**, *38*, 598–604. [CrossRef]
19. Cloke, J. Empires of waste and the food security meme. *Geogr. Compass.* **2013**, *7*, 622–636. [CrossRef]
20. Evans, D. Blaming the consumer—Once again: The social and material contexts of everyday food waste practices in some English households. *Crit. Public Health* **2011**, *21*, 429–440. [CrossRef]

21. Evans, D.; Campbell, H.; Murcott, A. A brief history of food waste and the social sciences. In *Waste Matters: New Perspectives on Food and Society*; Evans, D., Campbell, H., Murcott, A., Eds.; Wiley-Blackwell: Malden, MA, USA, 2013; pp. 5–26. ISBN 978-1118394311.
22. Pikner, T.; Jauhiainen, J.S. Dis/appearing waste and afterwards. *Geoforum* **2014**, *54*, 39–48. [CrossRef]
23. Bloom, J. *American Wasteland: How America Throws Away Nearly Half of Its Food (and What We Can Do about It)*; Da Capo Lifelong: Cambridge, MA, USA, 2011; ISBN 978-0738215280.
24. Gunders, D. *Wasted: How America is Losing up to 40 Percent of Its Food from Farm to Fork to Landfill*; Natural Resources Defense Council: New York, NY, USA, 2012; Available online: http://www.nrdc.org/food/files/wasted-food-IP.pdf (accessed on 12 October 2015).
25. Lipinksi, B.; Hanson, C.; Lomax, J.; Kitinoja, L.; Waite, R.; Searchinger, T. *Reducing Food Loss and Waste*; World Resources Institute: Washington, DC, USA, 2013; Available online: http://www.unep.org/pdf/WRI-reducing_food_loss_and_waste.pdf (accessed on 28 June 2014).
26. Warshawsky, D.N. Food waste, sustainability, and the corporate sector: Case study of the Kroger Company. *Geogr. J.* **2016**, *182*, 384–394. [CrossRef]
27. European Federation of Food Banks. Food Waste. 2016. Available online: https://www.eurofoodbank.eu/poverty-waste/food-waste (accessed on 15 June 2016).
28. Marra, F. Fighting food loss and food waste in Japan MA in Japanese Studies—Asian Studies. Master's Thesis, Leiden University, Leiden, The Netherlands, 2013.
29. Davies, A.R. *The Geographies of Garbage Governance: Interventions, Interactions, and Outcomes*; Ashgate: Burlington, VT, USA, 2008; ISBN 978-1138276567.
30. Bornstein, S. Don't Waste LA. 2011. Available online: http://www.dontwastela.com/wp-content/uploads/2013/06/DWLA_Report_Finalweb1.pdf (accessed on 12 December 2013).
31. Warshawsky, D.N. The devolution of urban food waste governance: Case study of food rescue in Los Angeles. *Cities* **2015**, *49*, 26–34. [CrossRef]
32. Los Angeles Food Policy Council. *Overview of Food System Issues: Snapshot of the Los Angeles Regional Food System*; City of Los Angeles Good Food Office: Los Angeles, CA, USA, 2013; Available online: http://goodfoodla.org/good-food/overview-of-food-issues/snapshot-of-the-los-angeles-regional-food-system/ (accessed on 19 January 2014).
33. Los Angeles Food Policy Council. *Building a Healthy Food System for Los Angeles: Strategic Priorities 2012–2013*; City of Los Angeles Good Food Office: Los Angeles, CA, USA, 2013; 1203p, Available online: http://goodfoodla.org/wp-content/uploads/2013/02/Good-Food-Office-Strategic-Priorities-3-8-13-1203pm.pdf (accessed on 31 August 2015).
34. Tammemagi, H.Y.; Tammemagi, H. *The Waste Crisis*; Oxford University Press: New York, NY, USA, 1999; ISBN 978-0195128987.
35. Alexander, C.; Gregson, N.; Gille, Z. Food Waste. In *The Handbook of Food Research*; Murcott, A., Belasco, W., Jackson, P., Eds.; Bloomsbury: New York, NY, USA, 2013; pp. 471–484. ISBN 978-1847889164.
36. Richardson, L. Performing the sharing economy. *Geoforum* **2015**, *67*, 121–129. [CrossRef]
37. Keil, R. Urban political ecology 1. *Urban Geogr.* **2003**, *24*, 723–738. [CrossRef]
38. Keil, R. Progress report—Urban political ecology. *Urban Geogr.* **2005**, *26*, 640–651. [CrossRef]
39. Swyngedouw, E.; Heynen, N. Urban political ecology, justice and the politics of scale. *Antipode* **2003**, *35*, 898–918. [CrossRef]
40. Bulkeley, H.; Gregson, N. Crossing the threshold: Municipal waste policy and household waste generation. *Environ. Plan. A* **2009**, *41*, 929–945. [CrossRef]
41. Guthman, J. Thinking inside the neoliberal box: The micro-politics of agro-food philanthropy. *Geoforum* **2008**, *39*, 1241–1253. [CrossRef]
42. Leitner, H.; Sheppard, E.S.; Sziarto, K.; Maringanti, A. Contesting urban futures: Decentering neoliberalism. In *Contesting Neoliberalism: Urban Frontiers*; Leitner, H., Peck, J., Sheppard, E.S., Eds.; The Guilford Press: New York, NY, USA, 2007; pp. 1–25. ISBN 978-1593853204.
43. Peck, J.; Theodore, N. Mobilizing policy: Models, methods, and mutations. *Geoforum* **2010**, *41*, 169–174. [CrossRef]
44. Soja, E.W.; Scott, A.J. Introduction to Los Angeles: City and region. In *The City: Los Angeles and Urban Theory at the End of the Twentieth Century*; Scott, A.J., Soja, E.W., Eds.; University of California Press: Berkeley, CA, USA, 1996; pp. 1–21. ISBN 978-0520213135.

45. Wolch, J.; Pastor, M., Jr.; Dreier, P. Introduction. In *Up Against the Sprawl*; Wolch, J., Pastor, M., Jr., Dreier, P., Eds.; University of Minnesota Press: Minneapolis, MN, USA, 2004; pp. 1–41. ISBN 978-0-8166-4298-4.
46. Cicatiello, C.; Franco, S.; Pancino, B.; Blasi, E. The value of food waste: An exploratory study on retailing. *J. Retail. Consum. Services* **2016**, *30*, 96–104. [CrossRef]
47. Göbel, C.; Langen, N.; Blumenthal, A.; Teitscheid, P.; Ritter, G. Cutting food waste through cooperation along the food supply chain. *Sustainability* **2015**, *7*, 1429–1445. [CrossRef]
48. Thyberg, K.L.; Tonjes, D.J. Drivers of food waste and their implications for sustainable policy development. *Resour. Conserv. Recycl.* **2016**, *106*, 110–123. [CrossRef]
49. Ventour, L. *The Food We Waste*; WRAP, 2008. Available online: http://www.ifr.ac.uk/waste/Reports/WRAP%20The%20Food%20We%20Waste.pdf (accessed on 23 July 2013).
50. Clapp, J.; Fuchs, D. Agrifood corporations, global governance, and sustainability: A framework for analysis. In *Corporate Power in Global Agrifood Governance*; Clapp, J., Fuchs, D., Eds.; Massachusetts Institute of Technology Press: Cambridge, MA, USA, 2009; pp. 1–25. ISBN 978-0262512374.
51. Aras, G.; Crowther, D. Corporate sustainability reporting: A study in disingenuity. *J. Bus. Ethics* **2009**, *87* (Suppl. 1), 279–288. [CrossRef]
52. Young, W.; Tilley, F. Can businesses move beyond efficiency? The shift toward effectiveness and equity in the corporate sustainability debate. *Bus. Strategy Environ.* **2006**, *15*, 402–415. [CrossRef]
53. Environmental Protection Agency, USA. Reducing Food Waste. 2013. Available online: http://www.epa.gov/foodrecovery (accessed on 15 April 2013).
54. Food Waste Reduction Alliance. Analysis of U.S. Food Waste among Food Manufacturers, Retailers, and Wholesalers. 2013. Available online: http://www.foodwastealliance.org/wp-content/uploads/2013/06/FWRA_BSR_Tier2_FINAL.pdf (accessed on 2 January 2014).
55. U.S. ZeroWaste Business Council. Mission and Vision. 2014. Available online: http://www.uszwbc.org/about-uszwbc/mission-and-vision (accessed on 17 December 2014).
56. Ionescu-Somers, A. The food and beverage industry. In *The Business of Sustainability*; Steger, U., Ed.; Palgrave Macmillan: New York, NY, USA, 2004; pp. 178–198. ISBN 978-1403933966.
57. Steger, U. Cross-industry research findings. In *The Business of Sustainability*; Steger, U., Ed.; Palgrave Macmillan: New York, NY, USA, 2004; pp. 11–60. ISBN 978-1403933966.
58. Miles, M.B.; Huberman, A.M. *Qualitative Data Analysis*, 3rd ed.; Sage: Thousand Oaks, CA, USA, 2013; ISBN 978-1452257877.
59. Fowler, F.J. *Survey Research Methods*, 4th ed.; Sage: Thousand Oaks, CA, USA, 2009. [CrossRef]
60. Stop Food Waste. 2015. Available online: http://www.stopfoodwaste.ie/ (accessed on 14 December 2015).
61. Vallianatos, M.; Misako-Azuma, A.; Gilland, S.; Gottlieb, R. Food access, availability, and affordability in 3 Los Angeles communities, project CAFÉ, 2004–2006. *Prev. Chronic Dis.* **2013**, *7*, A27.
62. Jetter, K.M.; Cassady, D.L. The availability and cost of healthier food alternatives. *Am. J. Prev. Med.* **2006**, *30*, 38–44. [CrossRef] [PubMed]
63. Fed Up with Hunger. Hungry No More: A Blueprint to End Hunger in Los Angeles. Jewish Federation of Greater Los Angeles and MAZON: A Jewish Response to Hunger. 2009. Available online: http://cfpa.net/LosAngeles/ExternalPublications/Mazon-BlueprintToEndHungerInLosAngeles-2009.pdf (accessed on 12 May 2013).
64. Los Angeles Food Policy Council. *Los Angeles Food System Snapshot 2013*; City of Los Angeles Good Food Office: Los Angeles, CA, USA, 2013; Available online: http://goodfoodla.org/wp-content/uploads/2013/11/LA-Food-System-Snapshot-Oct-2013-small.pdf (accessed on 4 February 2014).
65. Halverson, B.D.; Romano, R.T. *Overcoming Barriers to Implementing a Residential Food Scrap Recycling Program in the City of Los Angeles*; Bureau of Sanitation: Los Angeles, CA, USA, 2013.
66. Reyes, E.A. LA Poised to OK Sweeping Overhaul of Trash Collection. *The Los Angeles Times*. 2014. Available online: http://articles.latimes.com/2014/mar/31/local/la-me-zero-waste-20140401 (accessed on 31 March 2014).
67. Los Angeles Food Policy Council. *Resources: Local Good Food Organizations*; City of Los Angeles Good Food Office: Los Angeles, CA, USA, 2013; Available online: http://goodfoodla.org/resources/local-good-food-organizations/ (accessed on 19 November 2014).
68. California Association of Food Banks. Hunger Fact Sheet. 2014. Available online: http://www.cafoodbanks.org/hunger-factsheet (accessed on 8 March 2015).

69. Henderson, G. 'Free' food, the local production of worth, and the circuit of decommodification: A value theory of the surplus. *Environ. Plan. D* **2004**, *22*, 485–512. [CrossRef]
70. Poppendieck, J. *Sweet Charity*; Viking: New York, NY, USA, 1998; ISBN 978-0140245561.
71. Agyeman, J.; McEntee, J. Moving the field of food justice forward through the lens of urban political ecology. *Geogr. Compass* **2014**, *8*, 211–220. [CrossRef]
72. Busa, J.H.; Garder, R. Champions of the movement or fair-weather heroes? Individualization and the (a)politics of local food. *Antipode* **2014**, *47*, 323–341. [CrossRef]
73. Miewald, C.; McCann, E. Foodscapes and the geographies of poverty: Sustenance, strategy, and politics in an urban neighborhood. *Antipode* **2014**, *46*, 537–556. [CrossRef]
74. Born, B.; Purcell, M. Avoiding the local trap: Scale and food systems in planning research. *J. Plan. Educ. Res.* **2006**, *26*, 195–207. [CrossRef]
75. Shannon, J. Food deserts: Governing obesity in the neoliberal city. *Prog. Hum. Geogr.* **2014**, *38*, 248–266. [CrossRef]
76. University of Southern California. About USC: Facts and Figures. 2016. Available online: https://about.usc.edu/facts/ (accessed on 18 May 2016).
77. Roy, A. *Poverty Capital*; Routledge: New York, NY, USA, 2010; ISBN 978-0415876735.
78. Feagan, R. The place of food: Mapping out the 'local' in local food systems. *Prog. Hum. Geogr.* **2007**, *31*, 23–42. [CrossRef]
79. Lang, T.; Heasman, M. *Food Wars: The Global Battle for Mouths, Minds and Markets*; Earthscan: Sterling, VA, USA, 2004; ISBN 978-1853837029.