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The Hidden Contribution of Food Literacy to Food Waste Reduction

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食品ロス削減に関わるフードリテラシーの隠れた貢献に関する研究

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SUMMARY

Around 820 million people still face hunger everyday while approximately one-third of world food produced for human consumption is wasted. The coincidence of these two factors implies both a problem (hunger) and a solution (recovering waste). The issue of food loss and waste (FLW) poses serious problems not only for humans but also impacts natural resources, too. Thus, FLW is an indication that the current food value chain system can be improved in terms of efficiency and sustainability. Reducing FLW can also be channeled to promoting the human right to adequate food, by facilitating a food supply is more available, accessible, and sustainable. However, simply diverting food waste does not necessarily lead to corresponding reductions in food poverty, as various intermediaries and final recipients' face challenges to utilize waste. After describing the historical background and theoretical basis for exploring the role of food literacy in efficient food waste utilization in Chapters 1 and 2, this empirical part of thesis zooms from the macro-level (multilateral institutions, food donors) to the on-the-ground actors (intermediaries and recipients) while documenting the hidden role of food literacy.

To begin the empirical section, Chapter 3 explores the UN Food and Agriculture Organization's (FAO) contribution to, and challenges faced by, FLW. Adapting to the changing global economy and social trends, this multilateral organization, which is mandated to resolve world food issues, seeks evolve its internal structures to remain relevant, while struggling against institutional boundaries and external jurisdiction. FAO has been the main proponent for the right to adequate food, with this approach becoming increasingly important for FAO's relevance, but promoting this right often asks FAO to go beyond its historical purview of agricultural development. In practice, its governing structure has prevented FAO from systematically integrating the right to food into its everyday functioning. In the meantime, more flexible partnerships with sub-national actors have become crucial for FAO to achieve its new mandate and sidestep institutional inertia. In regard to FLW, FAO has found that it must find ways to engage more directly with individual consumers and operate at institutional levels in which it has historically avoided. The dynamics of FLW have meant that individuals and small organizations are powerful actors in food value chain system, whose knowledge, skills and experience directly influence FLW outcomes. This thesis identifies and analyzes 1) how and where individual consumers treat/reduce FLW through participant observation, and 2) seeking the ways to connect actors in the food value chain system – in particular, donors, intermediaries, and consumers. One of these connections, a collaboration between Kyoto University (KU) and FAO is explored in Chapter 6.

Developing the practical basis for food literacy's role in reducing FLW, Chapters 4 and 5 focus on the charity movement that has been pivotal in food re-distribution efforts in Japan. Citizens are increasingly aware of the contradiction between the rising need for social food provision and the sheer amount of food wasted. Food banks have become the foremost channel by which to connect "surplus" food and people who are in need. The findings in chapter 4 suggests that while the food banks to establish links between the available food and target recipients, the adequacy and utility of the food depends on the recipients' food literacy. Only when recipients have sufficient food literacy as outlined in Vidgen and Gallegos (2014), is the food is ultimately utilized. The discussion continues to Chapter 5, in which another charity called Children's Canteen (CC) transforms donated food into meals suitable for children facing poverty and creates spaces of positive commensality. Here in CC food literacy is institutionally practiced outside the households. Such organizations are the embodiment of an aggregate and shared "institutional food literacy" that helps to optimize the capability to effectively transform food and dining experiences under difficult. The empirical cases presented in these two chapters converge on a more basic conclusion that food literacy contributes to reducing FLW.

Despite the prominent role of food literacy in finally diverting FLW, the food literacy practitioners in these case studies are not cognizant of their contribution. Chapter 6 explores the potential for using education and other interventions to render food literacy more visible and thereby empower people to cultivate and implement this set of skills. In this chapter, the author implements a KU-FAO collaboration project in two sections: simple awareness raising and more direct empowerment of individual food literacy. First section (6.1) is an impact evaluation study of the impact of raise awareness about the issue of food waste reduction at KU canteens. The impact was positive when the users were informed in detail about the cause food waste generation and their pre-existing achievements in reducing food literacy ('public' displays of food literacy). Combined with the KU canteen's institutional food literacy, a consistently low generation of food waste is maintained. Yet here is also evidence of the hidden aspect of food literacy: instead of recognizing food literacy's underlying contribution, people point to motivations such as thrift, care and love, or charity. Nevertheless, such motivations create interfaces in which food literacy of the various parties in the food value chain interact to mutually enhance their capacity to avoid or reduce FLW. Second section (6.2) aimed to understand how educating others can serve as a form of empowerment or conscientization about one's underlying food literacy. Utilizing FAO's educational material, educators could deliver basic FLW information, but more interestingly, were forced to recognize and reveal their latent food literacy in their role as spokespersons. It can be understood that taking on the responsibility of reviewing and delivering the education material help developed intimate

awareness between their daily food literacy practice and its role in their capacity to minimize FLW.

In the final chapter, the author consolidates the findings of the case studies and experimental interventions. The overall conclusion that emerges affirms the hidden contribution of food literacy – individual, institutional, or public – in reducing FLW, and scope for intervention into this liminal area. While basic awareness can help nudge or maintain improved behaviour around FLW, educating others serves as a stronger source of empowerment for recognizing and acting upon food literacy to play a more efficient role in the food value chain system. Hence, in order to solve the issue of FLW, it is important to advance consciousness about food literacy widely among the population. Such a task is already on the radar for academics and multilateral organizations like FAO, but this conclusion of thesis imply more concerted effort to value the contributions of the lowest-level actors in reducing FLW and relativizing the role of the more commonly lauded institutions. From here, it becomes more important to at the policy level to develop benchmarks or assessment tools for food literacy that ensure all of society is capable of participating in optimizing the food value chain system.

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Abbreviations

CAO	Cabinet Office
CC	Children's Canteen
CESCR	Committee on Economic, Social and Cultural Rights
CFS	The Committee on World Food Security
FAO	Food and Agriculture Organization
FB	Food bank
FLW	Food Loss and Waste
FW	Food Waste
FWR	Food Waste Reduction
ICESCR	International Covenant on Economic, Social and Cultural Rights
IFWC	International Food Waste Coalition
KU	Kyoto University
MAFF	Ministry of Agriculture, Forestry and Fisheries, Japan
MHLW	Ministry of Health, Labour and Welfare, Japan
MoE	Ministry of Environment , Japan
MUFPP	Milan Urban Food Policy Pact
NGO	Non-Governmental Organization
NPO	Non-Profit Organization
SDGs	Sustainable Development Goals
UN	United Nations
2HJ	Second Harvest Japan
WWF	World Wildlife Foundation

Chapter 1

GENERAL INTRODUCTION

Free from hunger is the ultimate institutional mandate of Food and Agriculture Organization of the United Nations (FAO) since its very foundation. The world food production has significantly increased with development in technology, agricultural land reform, applications of chemicals, etc. Behind the glory of this success, on one hand, FAO estimates that about a third of food produced for human consumption is lost or wasted globally; this amounts to about 1.3 billion tons per year (Gustavsson et al. 2011), while 820 million people struggle in hunger every day (FAO 2019a). Although reducing these numbers is a key goal that is emphasized in the 2030 Agenda for Sustainable Development, the goal is not as simple as allocating surplus food to people. To establish a more adequate, sustainable food supply chain for the present and future, aggressive global efforts are required (Gustavsson et al. 2011).

1.1 Global challenges around food security and food loss and waste

The word food loss or food waste does make sense the meaning, yet subjectivity and perception of food differ from person to person, there is no universal definition of food loss and waste (FLW). Currently, FAO is working toward harmonization of the term definition, in order to provide accurate measurement of the scale/size of FLW. The most recent FAO annual flagship publication defines FLW as:

“(F)ood loss and waste as the decrease in quantity or quality of food along the food supply chain. Empirically it considers **food losses** as occurring along the food supply chain from harvest/slaughter/catch up to, but not including, the retail level. **Food waste**, on the other hand, occurs at the retail and consumption level (FAO 2019a).”

Food loss occurs through the food production fields, manufacturers, and during transportation of the food, whereas food waste is generated in the retails and households. Monitoring FLW is

crucial, not only measuring the numbers of FLW but also the causality of why it is generated. FAO also analyses *critical loss points* along with the statistics. Critical loss points refer to “points along the food supply chain where food losses and waste are most prominent and have the greatest impact on food security (FAO 2019a).” As in the same manner, FAO also identifies critical waste points at the retail and consumer level.

Unlike the statistics of food yields and production, monitoring and measuring FLW is more complex as it involves so many actors, so many food routes to follow, and socio-economic and cultural elements affect the study. Hence the partnership with multilateral actors is curtail for both monitoring and reaching for the solution.

As more people live far from the farmlands, the food must travel all the way to where people live: cities, consequently, people in the cities are more distant from where food is produced. Given the expected increase in urbanization to nearly two-thirds of the world population in 2050, maintaining and/or improving food security in urban areas is a main concern for policymakers and international organizations (UN DESA 2018). Although addressing potential food scarcity will undoubtedly feature prominently, improving food distribution and reducing food loss and waste, which represent one-third of the world food production, must also be seen as indispensable (Gustavsson et al. 2011). However, because food loss (in the value chain) and food waste (retail to consumption) arise from extremely complex social, institutional, and logistical factors, resolving them requires engagement at many levels and creative solutions. Indeed, feeding a larger urban population and mitigating natural resources loss involves imaginative efforts to reduce, recycle, reuse, and even re-purpose potential waste across the food sectors and demographic continuum (Parfitt et al. 2010, Godfray et al. 2010a, Godfray et al. 2014, FAO 2019a). The FAO, the multilateral institution best poised to address this issue, has been calling for the attention to FLW and set up their own initiative (Save for Food) alongside the broader FAO framework for the urban food agenda (FAO 2019).

1.1.1 Individual Consumer behaviour and Food Literacy

The alarming amount of FLW generation does not necessarily ring the bells of consumers because it is unlikely for them to physically see FLW at once. It is difficult for consumers to cognitively bridge the issue of FLW and their daily food habit/practice and leftovers on their plates. According to the Ministry of Agriculture, Forestry and Fisheries (MAFF) and Ministry of Environment (MoE) reported that Japan generates 6.43 million tons of food waste per year;

55% of its waste is from food industries, and 45% of its waste comes from households (See figure 1-1). Post-consumer food waste is contributing to almost half of all food waste generated per year (MAFF 2016). The statistics show that consumers have a relatively big role in the food industries.

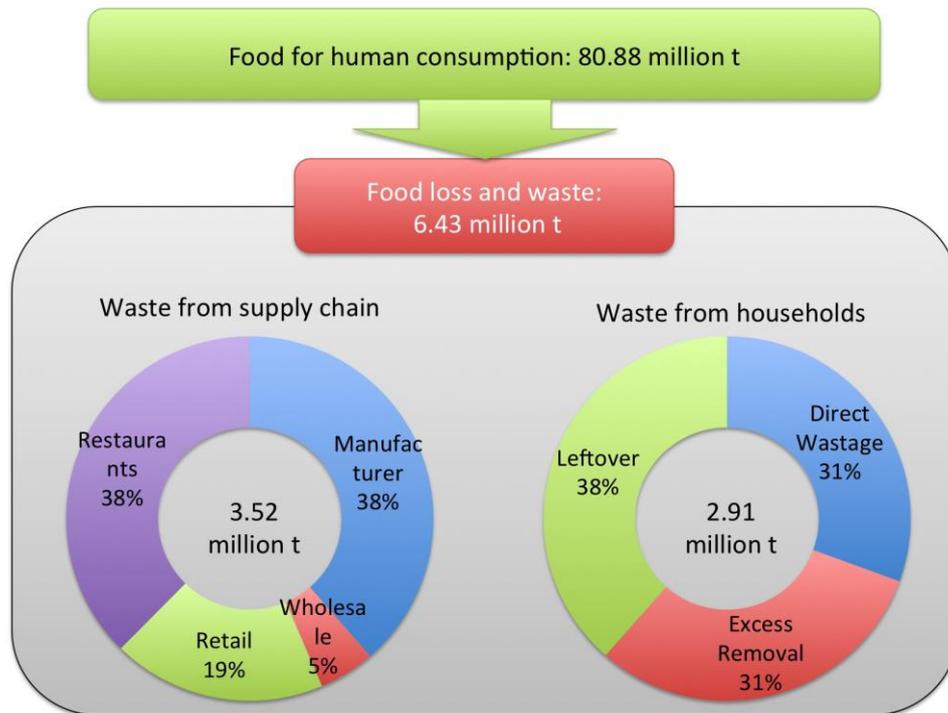


Figure 1-1. Total amount of food loss and waste and its breakdown in Japan, created by author¹ (source: MAFF 2016, MoE 2016)

FLW includes retailers generates 3.52 million tons of waste; the most reported causes from manufactures, wholesales, and retails are imperfect shape/size food, returned and cancelled products, unsold products. Restaurants and bars report the cause of food waste is unutilized food and leftovers. Causes of food waste in households are direct wastage of food products, excess removal of edible parts of food, and leftovers. Here in the statistics, although the FLW is measured by each food supply chain sector, the reason why FLW is generated is not by the

¹ The definition of FLW of FAO and Japanese government' definition of food waste is different. Food waste in Japan refers all edible food product/food parts tat is disposed regardless where in the supply chain.

sector's single responsibility. In many cases, either the critical loss point or critical waste point, it is inter-twined responsibility. For instance, the leftover in restaurants is measured in the restaurant sector, but the cause is likely by the customer/consumer who left it. There might be more food waste generations because of the marketing technique of the retailers to sell more, and vice-versa, there might be consumer's deliberate habit/decision to buy food products, which have a longer best-before date unnecessarily. As lists a few, the cause of critical loss/waste points is not caused by single reasons, and yet the current discourse is as if each actor has to work on the issue of FLW as their own responsibility. As more food supply chain becomes a long distance, more actors in the chain have to work in isolation. To fill in the gaps, food literacy plays an essential role (Vidgen and Gallegos 2014). This has been studied in many fields of academia; study of health and nutrition, food miles, food citizens, environmental studies, etc. The study of FLW is no exception; food literacy is proven to be effective to reduce food waste in households (Cappellini and Parsons 2012, Quested et al. 2013, Farr-Wharton et al. 2014, Stanc et al. 2015, Romani et al. 2017). However, the intersection of the actors in the supply chain has not been vigorously discussed in the context of Food literacy. While the most common unit of analysis when discussing food literacy is the individual, analyses often focus on the household, where responsibility for planning, purchasing, preparing, and consuming are shared among household members. This study expands this approach even further by studying the (shared or combined) food literacy of non-household domestic institutions.

One point of intervention, which has recently garnered attention in the 2030 Agenda for Sustainable Development due to its synergistic resolution of poverty and resource waste, is the harnessing food charity. Because food charity (re-distribution and feeding) is in many ways a microcosm of the food loss and waste issue at large, it is a fruitful prism for academic research. Individual consumers are not just passive eaters, but also an active player in food distribution, food management, and feeding them and others around by cooking and commensality. Undoubtedly, their deeds are helping for those food insecure, and utilizing food surplus is considered as moral and collective good. And yet, often it is not recognized how the food is transformed, utilized, and eaten by those players and receivers. In this regard, researching the relationship between FLW reduction and charity activity is worth identifying where *critical saving points* in the realm of charity.

1.1.2 Food banks

Often FLW is now seen as ‘end of pipe’ or terminal of conduit (Evans et al. 2013b). FLW was, for a long time, understood primarily at the macro level, as a transient phenomenon related to post-war food system reconfigurations and frictions in world trade. The welfare dimension of food ‘waste’ (or, rather surplus) arose prominently in the post-war period when leftover wartime food production in North America was transformed into aid for countries in Europe, and for Japan (Rietkerk 2016). Achieving food surpluses was imbued with virtuous meanings such as security, economic strength, and sovereignty, while the distribution of unneeded food, as aid was understood as a heroic, benevolent act. This macro-level context largely set the stage for the management of food surpluses at the micro-level, wherein honourable food companies release surplus or unwanted food for distribution to needy people (Evans et al. 2013b).

The high relative poverty rate in Japan made people take actions publicly; these actions and movements unintentionally contribute a lot to reduce food waste, or at least it brought up people’s attention to food waste. People have realized that this is the resource we should utilize in order to support the people who are in need of support. The primary goals might not be reducing food waste from the beginning, nonetheless, they are the ones to add new value to the food, and make food accessible to food.

The presence of food banks has recently become a norm in Japan, although the concept of food banks was imported from the United States. The initial impetus for food banks in Japan was not chiefly to reduce food waste but was in reaction to the increasing poverty in the country. According to the MAFF, there are 120 food banks currently in operation (MAFF 2020) (see figure 1-2). The biggest food bank, Second Harvest Japan (2HJ), started in 2002 and has continuously expanded its range of activities (“History”). In line with the expanding scope of food bank activities, the term “food waste” has received more attention in recent years.

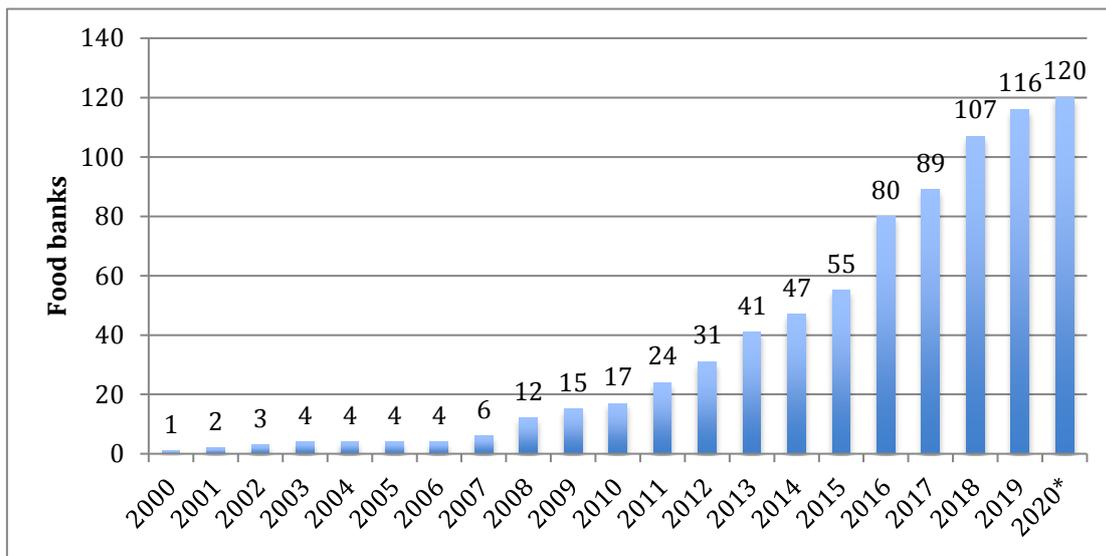


Figure 1-2. The yearly number of food banks in Japan recreated by author (source: MAFF 2020)

* 2020 report is up until March 2020.

It is obvious the growth in the number of food banks represents the needs of their work. Although the amount of food donation is growing, the more rapid increase of food banks divides the donation, as the figure 1-3 indicates, the amount of food donation they handle per food banks have become smaller. This might be solved as food banks in Japan gains more recognition and acceptance from the public as well as accountability from the donor food corporations. However, this is precisely the vulnerable point of food bank charity activity: their activity is constrained by the unstable resource of food, no permanent partnership with donors, volunteer-based labours, no access to food or the recipient's choice, etc (Silvasti and Riches 2014). Criticism for food banks are 1) the recipients have no rights to choose/select food what they want, 2) sometimes food quality is questionable, and 3) accepting food bank assistance often stigmatize the recipients as poor. Despite the compliments of food bank acts as a food waste saver, chapter 4 reveals the reality of food bank assistance recipients and analyse their relationship with the aid food.

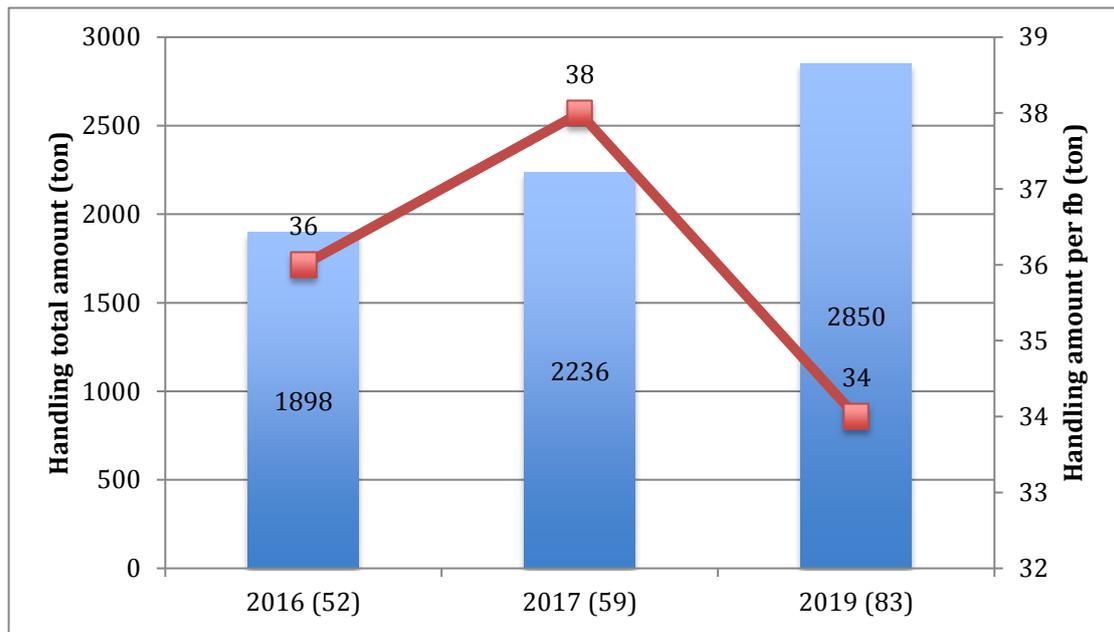


Figure 1-3. The quantity of food donations handled by food banks in Japan created by author (source : MAFF 2020)

1.1.3 Children's Canteens

Japanese Children's Canteen (CC), or *kodomo-shokudo*, is a loosely defined charity institution that aims to address child food poverty and related issues at the grassroots level. These charity organizations are often the recipient organizations of food banks. The organizers of CCs are usually not family or kinship related, but rather draw together the management and domestic skills of community members to solve local food poverty, social isolation, and other forms of insecurity. For Japan, the unusually rapid spread of CCs has been associated with a counter-movement against individualism and urbanization: 1) the name Children's Canteen itself represents a clear mission against child poverty, 2) cooking and feeding children is familiar to people and seemingly easy to start, 3) people have a strong image of what an ideal, loving family should look like, and sharing meals is considered to be the potent symbol (Yuasa 2019b).

The foundation of the CC movement began with a volunteer who began opening her home in 2012 as a place for children to dine together because she has recognized the extent of child poverty in her community. This CC became an inspiration for others who wanted to do something about child food poverty in their communities (Yuasa 2016). By 2019, there were 3,718 canteens in Japan, up from 319 in 2016 (Yuasa, 2019a) (see figure 1-4).

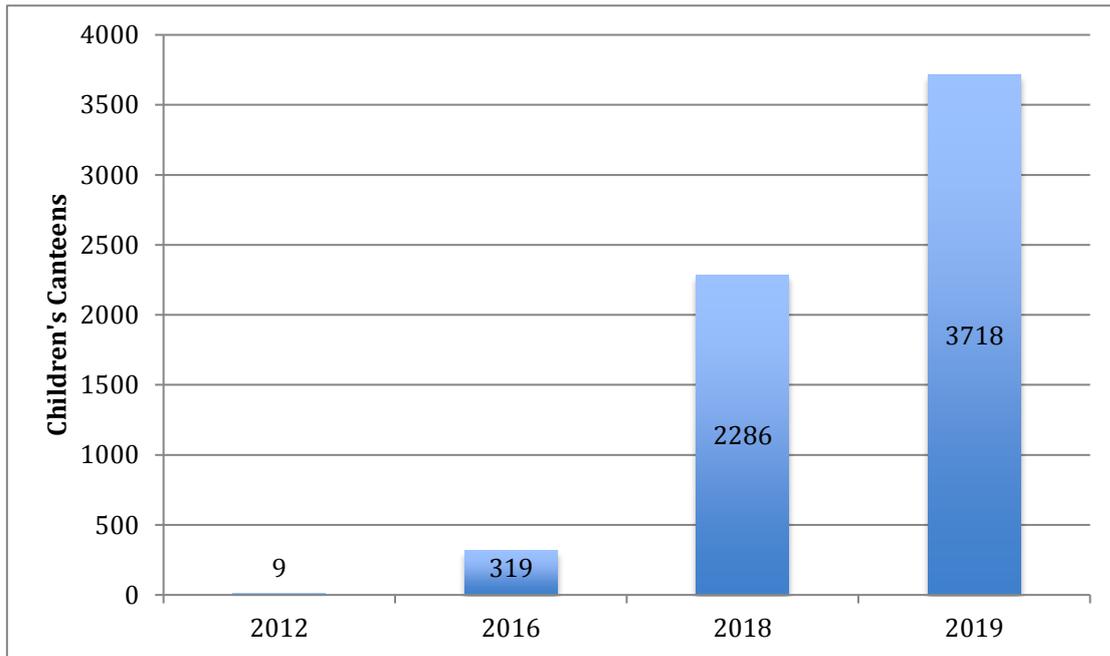


Figure 1-4. The yearly numbers of CCs in Japan created by author (source: MUSUBIE 2019)

CC is unique as an organization in many ways; this emerging organization involves many stakeholders such as food donors (food producers, corporations, manufactures, retailers, etc.), hosts (planners, managers, and volunteer cooks), financial and legislative supporters (sponsors, municipalities, and foundations), and recipients (community members and children). CCs, like soup kitchens, are interesting here as they approach food waste much like a household would: caringly transforming food into meals that balance factors such as variety, nutrition, and cultural appropriateness, while being frugal and avoiding waste. Because achieving these goals is routinely challenged by the skewed and untimely flows of food donations, the food literacy of CC organizers is an indispensable faculty.

Broadly speaking, CCs are a derivation of soup kitchens that, at least nominally, focus on the nutritional and social challenges facing children. Axiomatically, they can be defined as a space where young children can visit and receive free or low-cost meals. CCs emerged as a reaction to the sudden recognition of child poverty, the extent of which only became a matter of public record in Japan in 2009. In 2012, Japan scored the highest relative child poverty rate in the OECD, 16.3%. Although the figures improved to 13.9% in 2015 (MHLW 2016), the scope remained a shock to the public because many people in Japan believed food poverty had been eradicated after the post-war boom years.

CCs have been covered by the media many times as a heart-warming story to counterbalance

darker reports about the high child poverty rates. This is precisely because the right to adequate food is practiced; the food is considerate for the recipients, and transformed shape and taste adequately acceptable in their culture. In this context, even if the original ingredients were food waste, the negative connotation is not attached to the prepared food. In chapter 5, the detailed breakdown of food source as well as mechanism and players of food transformations is discussed with the key concept of food literacy.

1.2 Research question and the over view of the thesis

FLW is a unique object; it can be saved or wasted, can be transformed or rotten, can be appreciated, or stigmatizing the poor. It completely depends on one's perception of what is good to eat and what should be discarded. One key concept to understand the relationship between people and food is food literacy. This is practiced silently in all the supply chain with some or all four pillars: Select, Plan & Manage, Prepare, and Eat (Vidgen and Gallegos 2014).

FAO certainly see the value and importance of individual behaviour change and its contribution to food waste reduction. As the core problem shift from increasing the food production to the improvement for efficient, sustainable food supply chain, FAO recognizes the individual consumers as a powerful contributor, not mere eaters of food. Yet, as FAO's institutional nature, it struggles to find ways to communicate directly to individual consumers. This aspect is discussed in chapter 3. This thesis is organized mostly by institutions: international organization to grassroots civil organization. There are huge communicational gaps in between, and yet they share the same goals; to protect food security and eradicate poverty. Yet, the issue of FLW is not communicated thoroughly.

Consumers also can be a distributor or server of food, especially in charity activities; but the reality of their activity nor their contribution outside households has not been studied as much as supply chain actors and households. Through fieldwork and ethnography, this thesis illustrates and sorts the food literacy practices with FLW in the realm of charity; food banks (chapter 4) and Children's Canteens (chapter 5). How the practice of daily food literacy laid out in our daily life, and how it contributes to FLW reduction. Chapter 4 reveals how the recipients of food bank assistance Select, Plan & Manage, Prepare, and Eat with their limited resources, and the importance of their food literacy for their own wellbeing. Chapter 5 explore the new paradigm of food commensality: it is not in domestic households, and yet, is the replica of ideal households set up in the community. Here, food literacy is key to replicate

heart-warming ideal families. Even if the food the CC staff utilize was once labelled as food waste, it is going to be transformed into appreciated food with their food literacy. Having discovered the power of food literacy through the food literacy research in the charity, we consumers, even the practitioners in food banks or CCs, do not recognize or find the link between their deeds and contribution of food waste reduction (FWR). In order to find the bridge between the food literacy practices of daily lives and the goal of FWR, chapter 6 first section (6.1), investigate the interface of food literacy in both the institution (Kyoto University canteens) and consumers (Kyoto University students). Chapter 6 second section (6.2) is a pilot project of consumer empowerment through FWR educational material (FAO 2018d).

Chapter 2

Literature Review

2.1 Background on Food Waste

The topic of food waste, which includes its origins and scale, as well as the responsibility for managing the problem, has been vigorously discussed from ethical, socio-cultural, anthropological, and technical points of view. Humans have been interacting with material objects daily; creating, naming, sorting, categorizing, judging, exchanging, selling, buying, consuming, arranging, add/devaluing, possessing, keeping, displaying, rejecting, hiding, buying, distancing, discarding, just to name a few. The interaction with material objects represents who we are, where we belong, what culture it is, what economy it is, and so does the interaction with food, what we eat, how we eat, who we eat with matter our lives (Crowther 2018). The relationship between our lives and objects always uniquely embedded. As Mary Douglas (1978) wrote in *Purity and danger*, any culture has own set of shared value, judging what is pure or impure, what is clean and taboo, therefore categorizes what is in (acceptable) or out (unacceptable) as a society/community. She defines ‘dirt’ as ‘matter out of place,’ and she describes food leftover as “(f)ood is wholesome when served, but as soon as someone has eaten a little, and left it, it is ‘orts’, remains, dirty (Fardon 2010).” Drawing her theory, Thompson and Haigh (2017) argues food waste could further defined as ‘matter out of time.’ In the western culture, serving food which is rotten causing hygiene trouble is considered to be “incivility” or “immorality,” therefore the person/restaurants/organization who caused it deserve blames or punishment (Thompson and Haigh 2017). Likewise, the person/occupations who associates with waste and dealing with waste are seen as inferior or poor or despised, such as garbage collectors, urine and feces collectors for fertilizers (Wilk 2014), or people who beg for food waste from upper-class (Matsubara 1893).

What about food waste, which is expelled from the food supply chain due to the damage/misprint of package, wrong shape and size, or miss-order? Food waste was seen as a surplus and the symbol of wellness in the past. Wilk (2006) took bottled water as an example of how a material is perceived and altered the image and therefore shapes our society, culture, and

community. Water is seen as a public-good and should be protected by the basic human right, but on the other hand, water is commoditized with corporate brandings and causing degradation and extraction of natural resource in another place. The branding gives the thought of purity, which is given by the nature, and yet the same nature causes disasters and pollute the local water, and human chemical treatment and technological intervention make the polluted water clean and safe to drink. “(T)he logic of modern capitalism, which makes sense at one level of analysis, and absolute nonsense at another (Wilk 2006).” This analogy can be perfectly applied to the issue of food waste; as it makes sense for corporations or restaurants to throw away edible but damaged-package, misprint, miss-order, close to best-before-date products or someone’s leftover to bins, and make no sense for people out side of the context to throw away edible food for no sufficient reason. At one level, it might be labeled as ‘dirt,’ ‘useless,’ ‘matter out of place,’ ‘rubbish,’ or ‘waste,’ it could certainly be ‘purified,’ ‘preserved,’ ‘saved,’ ‘reused,’ and ‘recycled’ at another level with some intervention. The challenge of our modern food supply chain is not a matter of quantitative food availability, but the challenge to shift the perspectives of our daily relationship with food.

Excess, unwanted or surplus food is typically comprised of items whose (monetary) exchange value has declined to around zero. With the act of donation, new potential value is immediately created, such as use value (as food for potential recipients), public relations value (as marketing for donating parties), and environmental value (as diverted waste for national or global initiatives) (Facchini et al. 2018). This is the basic claim made by Thompson in *Rubbish Theory* (1979). In Thompson’s model, however, new forms of value would only be fully realized when the donated food is ultimately consumed. In practice, however, intermediaries such as recipient governments or food banks allow donors to claim this value at the moment of donation by taking on the burden of valorization. Donors can wash their hands of the problems of sorting, distribution, and transformation, and they can largely ignore future waste created in this process. This phenomenon traces its roots to post-war international food aid regimes, wherein recipient countries are obliged to be thankful for food aid even if the contents may not be very useful or suitable (Friedmann 1982). At the national level, food banks serve the purpose of instantly valorizing donated food that, from the donors’ point of view, no longer had exchange value. In effect, food banks, recipient organizations, and final recipients are obliged to express gratitude and to affirm the good intentions of the donors even before the potential value of the donations can be explored.

The conditions of this exchange of value bring food donations into the realm of gift-giving, a field which has been more extensively conceptualized. Here, it is important to recognize that food bank stocks are dependent on donors but that donations can vary widely in terms of usability. Since the amount, type, and physical condition of the donated food directly influence how easy or difficult it will be to transform and distribute, food banks are not unjustified in recognizing a hierarchy of gifts. In Marcel Mauss's (2002) original model of gift-giving, the receiver must reciprocate by providing something of equal or higher value in return. Although recipients such as food banks, local organizations and needy people can provide few tangible gifts in return (perhaps only downstream waste disposal), they can return (moral) feedback that can help valorize various dimensions of the donated food that are important to givers (including social recognition, tax status, respect, and praise from third parties) (Kishigami 2016). By regarding the receipt and management of food assistance as a process of transformation, we can observe how recipients play a role in creating new values for food.

The process of transforming excess or unwanted food into new values requires a precise look into the nature and characteristics of the actual gifts. Packages of spicy foods are, for example, less directly usable by families with young children compared to milder flavors. In order to analyze the contents of food assistance and its subsequent transformation and consumption, the food must inherently be de-commoditized: in short, donated food cannot simply be understood as a generic source of nutrition. In *The Social Life of Things: Commodities in Cultural Perspective*, the editor Arjun Appadurai (1986) documents how the exchange of goods allows new owners to bring their approach to the construction of its value. One of the contributing authors argues that even mass-produced goods (commodities), when purchased or attained, and recognized by people as theirs, can become singularized (Kopytoff 1986). Singularization can be understood as the personalization of goods in general terms. How various recipients treat donated food determines its potential value? Donated food can be thrown away, directly consumed, or processed further in order to increase its use value. This thesis presents a range of empirical examples that demonstrate how donated food is de-commoditized in a general sense, and then singularized by recipient organizations or final recipients in order to consummate the process of avoiding food waste and benefiting needy people (chapter 4 and 5).

Because each link in the chain of custody of food donations sees the foods and the recipients of the food assistance differently, the study in chapter 4 aims to render more transparent how the value of food is transformed and/or appreciated at each link in the chain. One particular focus of

the study that is less prevalent in the literature, are the realities faced by recipients who must use this food. Accessing such groups, given the sensitive social circumstances of poverty, requires a thoughtful mix of qualitative and quantitative methods.

2.2 Food Literacy as a means of transforming food

The idea of utilizing food waste emerged after the discursive shift away from celebrating the “surplus” food of the post-war boom years to more differentiated understandings of resource use and malnutrition (Hawkes and Webster 2000). This was part of a broader trend of recognizing inefficiencies of all kind in the food system from the 1970s, with terms of like over-abundance, micro-nutrient deficiency, obesity becoming part of an international narrative of food insecurity and environmental damage (Wijnhoven 2015). At the individual level, uneconomical and/or excessive food habits persisting from the “surplus” era were increasingly recognized as problematic. Scholars documented that poor food literacy not only compromised healthy/nutritious dietary habits but also diminished people’s capacity for efficient domestic management (Vidgen and Gallegos 2011, National 2016). Reflecting this, the term food literacy comprises four elements: (1) Planning and Management, (2) Selection of food, (3) Preparation, (4) Eating (Vidgen and Gallegos 2014). Food literacy is therefore relevant not only for the nutritional education but also from the food waste reduction perspective. At the household level, both quantitative and qualitative research provide evidence that food literacy and cooking skills; including well-planned grocery shopping, advance preparation, and creative (re)use of already-purchased food are important levers in reducing food waste (Quested et al. 2013, Farr-Wharton et al. 2014, Stanc et al. 2015, Romani et al. 2017). In short, it appears that high food literacy among the population decreases household food waste and increases the capacity for people to efficiently manage seasonal swings and other disruptions in food distribution.

Food literacy in households has been often considered as a women’s domestic realm. According to Wrangham (2009), men were hunters, and women took a domestic role of cooking at home while the men hunted to acquire quality food or higher-status foodstuff. This gender role coupled men and women as a team, which was then formalized as marriage, thus unmarried men are at a disadvantage because they cannot fully apply their time to hunting. This analysis puts women and cooking as less important than men because of hunting activities. Although this is a popular analysis of gender roles in academia or popular culture, it is not always true from an ethnographic point of view. Gender roles are often argued as a biological or natural fact that is

inescapable, supported by the fact that only women can bear children and breastfeed. But men can also rear children and raise them, as well as cook for his family; the gender role of cooking and division of labour is a socially and culturally constructed fact (Crowther 2018).

For a long time, gender roles and the marriage institution derived from them have been a dominant food security net, called a “family.” Securing lineage and bloodlines thus maintain that the social group/family serves as a food security network. Mealtimes are a significant social demonstration, in particular in a patriarchal society, the types of food and amount of food indicates who the breadwinner of the family is, and the others would get smaller portion sizes, or less quality food. But in the modern form of a family, is not necessarily serving as a strong food security union, or a demonstration of status, but to remind themselves that they remain a family unit (Ishige 2016).

The role of households extend to shopping as well; Daniel Miller (1998) argues that the concept of thrift is a demonstration of sacrifice for love and care. When mothers save money by limiting the spending of food purchase and optimizing the nutrition and palate with the limited resource as using leftovers, the saved resource are spent for greater good or collective good for her family (Miller 1998). The sacrifice includes buying the discounted food but optimize the flavor and taste, denying her own preferred taste but cook as the other member’s taste, remaking leftovers to avoid repetitions, as such, the practice of thrift is making the family food literacy, family identity, and using up leftovers thus prevents food waste generation (Cappellini and Parsons 2013). The food waste prevention/reduction is a complex, high demand of food material knowledge and food literacy competency (Munro 1995). Despite the widespread image of commensality being the symbol of happy family, the actual effort and labour of its aspect is overshadowed by its image. Cappellini and Parsons (2012) found the thrift, sacrificial practice of resource management in households contributes to reduce/prevent generating food waste, and it involves “a series of skills competencies which are related to knowledge of surrounding both material elements of the food stuffs and likely context of their (households’) reuse.” Our relationship with food is constantly changing; what used to be considered as women’s role, or domestic practice is no longer functioning as a food security safety-net it once used to be. As more women join the workforce, as more people move to urban areas abandoning farming, the role and size of family are affected by the change. On top of the outside labour, people face the problem of food loss and waste.

Nonetheless, food waste is not generated only in households, but also every stage of food value

chain system. Food serving operation such as schools, restaurants, canteens, cafeterias generate substantial amounts of food waste (Capps et al. 2019). Ravandi and Jovanovic (2019) report that up to 30% of food waste reduction in reducing plate size from large to small, however, the total sum of food waste is smaller with large plates. The research concludes that prioritizing effective FWR strategies is necessary (Ravandi and Jovanovic 2019). Aubert and Brisebois (2019) understand food waste as a socially constructed phenomenon. Their research investigates the interface between retailers and consumer groups to identify the processes of the social production of food waste; they list the four processes: 1) economization of wastes, 2) expiry date over edibility, 3) construction and implementation of what is freshness, 4) difficulties to recognize their responsibility on food waste generation. .

From the public health point of view, increasing rates of diabetes and obesity, unhealthy diet habits ring a bell for some intervention. Yet, organizing commensality and having nutritiously adequate meals involves good knowledge and skills of food; it is labour-intensive, time-consuming act, too.

Although the term Food literacy has mostly been developed from Nutrition study, the term is used in multi-dimensions. Food literacy from the policy maker's perspective, it means food security and origins of where food comes from; food literacy from health sector's perspective, it means daily nutrition intake and healthy eating behavior; food literacy in commercial sector, it means hygiene and efficient food management; food literacy from domestic household perspective, it means thrift practice and preparation of meal, love and health, identity of family (Vidgen 2016); food literacy from economic and environmental perspective, it means knowledge and skillset for food loss and waste prevention and reduction. All actors and sectors have their own *food literacy* but within their context.

The decrease of food literacy or de-skilling of food in the general population is reported and discussed in academia for decades (Coratuglio and Slater 2016, Vidgen and Gallegos, 2014). As literacy is a necessity of education, could the concept of food literacy be a formal education? In 1950s – unsurprisingly around the same time of the emergence of *surplus* food – food corporations developed and introduced processed food with active advertisements. As the globalization and free trade of food develop, rural economy is affected; the affected farmers leave the lands and migrate to cities in the search of jobs. The mass-production depletes the soil, water, and other natural resources with pesticides/herbicides. At the same time, the mass is fed with processed food laden with sugar, salt, and fat and this leads to health epidemic of

chronical disease and obesities (McMichael 2000, Albritton 2009, Sumner 2013). McMichale (2000) observes food is not a mere commodity, but food/diet is a way of life for both materially and symbolically, thus the way of food is a resistance to an oppression by food corporates. Education is political in nature, in this story is applied to Freire's conscientization theory, Food Corporation is an oppressor, and the oppressed citizens could be educated to be liberated (1970). Sumner (2013) argues that food literacy should be spread, just like a literacy, in order to achieve more equitable world. While Freire's conscientization might help consumers to be liberated from the *hostile food environment* (Sumner 2013), the challenge on conscientization is no measurable constituency (Lloyd 1972). What is more, the conscientization alone is not enough to make a social change; it has to be supported by other facilitations of larger political or economic elements (Duncan 1977). Furthermore, as Freire points out that education is not politically neutral, determining the globalization or food manufactures/corporation as enemies might not help, especially when it comes to the issue of food loss and waste.

Although there is a great expectation and momentum for developing assessment tools of food literacy, there yet has nor been a unified tool developed (Amouzandeh, Fingland and Vidgen 2019).

2.3 Food insecurity and charity

2.3.1 Food banks

Food waste may be understood, in turn, as an opposing expression of care, in which the opportunity for nutritious and socially meaningful interaction is devalued and taken for granted. Although food waste used to be a symbol of wealth and abundance, i.e. 'surplus', its understanding has radically shifted in the context of growing food poverty (Rietkerk 2016). With structural inequalities causing persisting food insecurity even in economically developed countries, figuring out effective ways of re-distributing this in a targeted and efficient means has become an enduring challenge (Evans et al. 2013a). Initially, food banks were viewed as a sensible convergence of food waste reduction and poverty alleviation, achieved by operating as a middleman between people who have food surplus/waste and needy people.

As the 2HJ slogan states, "transform *mottainai* (the Japanese word describes things too good to be wasted in this case) into thank you!" In this slogan, it is apparent that food donations are not inherently beneficial, but must be actively repurposed, after which recipients are obliged to feel

thankful for the charity. Here already exists the presumption that the transformed food will indisputably be recognized as usable by final recipients. Often, however, food banks transfer the food to a further intermediary, or so-called recipient organization, which will sort and transform the food once again before providing it to final recipients, such as low-income families and the elderly. In general, it is important to recognize that donations exchange hands numerous times before they are potentially consumed; at each link in the chain of custody, effort must be made to transform donations, a process which usually entails disposal of some unsuitable food. In short, before donations can be consumed by final recipients, labor and waste are invariably involved.

It is commonly believed that the upstream problem of food waste can be significantly reduced by donating excess or unwanted food to needy people. The act of food charity is meant to not only solve an environmental problem (waste) but also a social problem (food poverty). These goals align well with the 2030 Agenda, specifically Sustainable Development Goal 12.3.1 concerning consumption and production patterns, which aims to halve food waste at retail and consumer levels by 2030 (FAO 2017a). However, the assumption that food, which is donated, will necessarily be diverted from waste and be appreciated by targeted groups relies on an optimistic view of food as a universal nutritional commodity. As the history of food aid has shown at the worldwide and national levels, needy people are not able or willing to utilize donated food for a variety of logistical, cultural, and idiosyncratic reasons (Clapp 2012, Douglas et al. 2015, Friedmann 1982). This history suggests that the act of donating food should not intrinsically be considered altruistic or benevolent unless care and effort are given to ensuring that the food is finally utilized. At the national level, food banks are often recognized as brokers of such transactions, helping to match food donations with needy recipients. However, fundamental misalignment between the supply of donations and the demand (or capacity to utilize) by targeted groups cannot be “solved” by such brokers. Food banks, as an intermediate space for managing food donations, attempt to mitigate this burden for final recipients but are also obliged to receive mismatched or skewed food deliveries from donors who are less sensitized to the challenges of utilizing these foods.

What is also notable is the degree of separation between upstream actors, such as donors and food banks, and final recipients. The gulf between these actors can lead to logistical and social challenges in effectively distributing food donations (Douglas et al. 2015), which raises a fundamental question concerning the realistic reductions in food waste achievable through such

networks. Indeed, while a general understanding of some of the final recipients' needs is common, upstream actors are not necessarily aware of how, or if, final recipients use the donated food. A recent report on food banks by MAFF (2016) that traces the amount of food donations handled by each food bank does not consider how much food the final recipients actually utilized. Given this uncertainty, should food donations be considered benevolent even though it is unknown how much of the food will finally be consumed or wasted? This is important, as donors may receive tax benefits or benefit from reduced waste disposal costs even though a portion of the donation is likely to become food waste at a later stage. Unfortunately, there is considerable uncertainty about the portion of any donation that is eventually wasted because it is hard to track waste along the entire chain of custody. However, what does become visible through research, and is presented in this chapter 4 and 5, are the characteristics of donated food that impact its potential usability. These characteristics include:

- The quality of food: flavor, freshness, damage
- The balance of food types: is there a suitable range or is there too much of one food?
- The skill required to prepare the food: do final recipients have the capacity (skill, time, desire) to cook the donated food?
- The context of the food reception: is the environment to receive or consume donated food socially and culturally acceptable?
- The timing of the food receipt: can donated food be integrated into the lifestyles of the final recipients?

In summary, the complexity of the food donation delivery network and the characteristics of the donated food impact the potential for achieving food waste reductions. This thesis (in particular, chapter 4) explores the divergence between the simplistic understand of food donation as gifts and the more complicated experiences of burden and relief that arise along the uncertain pathway to becoming utilized by final recipients.

2.3.2 Food waste and the right to adequate food

One of the primary mechanisms for achieving this distribution in western countries has been the model of the food bank. The adoption of the food bank approach was, however, somewhat delayed in Japan; the booming economy of the 1960s and 1970s encouraged the virtues of excess production while the shame surrounding food poverty pre-empted the widespread adoption of a culture of food donation (MoE 2006). As the collective belief that Japanese

citizens were soundly middle-class and food secure was eclipsed by the publication of poverty statistics for the first time in 2009, food aid distribution became an important, if socially awkward, social initiative in Japan (National Institute of Population and Society Research 2017). It was under this context that food banks emerged to manage both poverty and the long-simmering problem of food waste.

Although food loss (production, post-harvest, and processing stages) represents a significant component of food system inefficiency, food waste (at retail and consumption stages) is more relevant for purposes of reducing food poverty. In contrast to food loss, food waste represents a tangible and accessible resource that can be converted into food assistance for disadvantaged groups. Matching food waste (supply) with suitably needy people (demand) becomes the next major challenge. Recent attention has been given to apps and websites, which match restaurants/retailers who want to give away or sell leftover food with people who want or need it (MAFF 2019). Although high-tech solutions may be on the horizon, food banks have long dominated the role of food matching, largely because they are preferred by donors due to their capacity to absorb the uncertain provision of unwanted food. Food banks have been researched for many years and from many aspects, such as the logistics, nutrition and social impacts. However, this research body also includes a strand of critical research questioning the fundamental suitability of food banks for performing their expected function. Riches (2011) and Rideout et al. (2007) view food banks as part of the problem since their mode of assistance neither guarantees long-term food security, nor a nutritious or culturally appropriate supply of food.

Criticism of food banks often focuses on the fact that the amount and composition of the food made available to food banks depends on unstable flows of residuals that arise from inefficiency in retail and low demand from consumers. The content of food donations has made it vulnerable to claims that it provides unbalanced nutrition and is often culturally inappropriate (Teran and Tarasuk 1999). Furthermore, in many contexts, the receipt of food assistance is reported to be “shameful” (van der Horst, Pascucci, and Bol 2014). Even industry insiders, such as the General Association of Japan National Food Bank Promotion Council (2017) reported that there are many mismatches between food banks and recipients, such as the timing of deliveries, food preferences, availability of fresh produce, and contractual/legal expectations. For these and other reasons, many researchers argue that the supply of food aid, as brokered by food banks, invariably fails to meet demand (Riches 2011; Booth and Whelan 2014). Indeed, Booth and

Whelan (2014) argue that although food banks provide some benefit to both the donors and recipients, food banks reproduce and facilitate the current food system, which inherently creates a lot of waste and continues to struggle to independently resolve food insecurity. A middle ground view, as presented by Kobayashi (2015), views food banks more optimistically, arguing that their efficiency and operational capacity can be improved. Foreseeing increasing demand for food safety nets, he predicts that food banks should decrease their dependency on capricious donations by widening their scope; he suggests encouraging donors to provide not only food but also money and other supplies using tax incentives and ideals of corporate social responsibility (CSR). This study takes a parallel view that the efficiency of food aid under the current model is dependent not only on food banks' operations but on the commitment of recipient organizations and final recipients to transform donations into usable food under adverse social and economic conditions.

Modern meals have become more individualized as more pre-prepared meals available everywhere, anytime in our lives. It is questionable whether individual, pre-prepared meals are inadequate or not, it seems commensality is seen *culturally* adequate. The word *Koshoku* is invented to describe people who eat alone. In comparison to *Koshoku*, *Danran* is a word to describe sharing meals together with people who are close, especially among family members. The image of an idealized family is often described as a family happily eating together. In the image of a modern family, family bonding is being emotionally connected, without a superior or inferior family member, unlike families connected through social class (Noda 2015). This ideal is reflected in the *shokuiku* promotion policy as well. Noda points out that raising a child who is mentally and physically healthy is tightly connected to commensality/*danran* by which *shokuiku* policy referencing proposal excerpts such as “in recent years, there are many families who eat alone, individually, and without any specific reason to eat alone, namely *Koshoku*. Communication through social eating makes one realize the joy of eating; it brings spiritual, and mental wellness. Therefore it is important to have as many opportunities to eat together as possible (MAFF 2005).” “Co-eating among the family makes children realize the joy of eating food as well as educate them about manners and etiquette, and the basics of socialization (MAFF 2011).”

Although commensality is nationally recommended, Shinada (2015) argues that modern people do not have time to eat together. Her statistical data shows the number of nuclear families that co-dine together decreased by almost half during the period from 1988 to 2012. In order to

properly promote co-dining opportunities as family, policy makers should either increase the income of low-income families or decrease the working hours of the rich breadwinner couple.

In Japan, the word *shokuiku* is used to indicate a general, broader sense of knowledge about food. According to MAFF, the official translation of *shokuiku* is “Food and Nutrition Education/Promotion.” The official guidebook of *shokuiku* covers numerous topics about food such as, where our food comes from, seasonality of food, food safety, emergency food, the importance of social eating, and food loss and waste. But most of the guidebook emphasizes nutrition education and healthy dietary habits (2012 [2019]). The word “food literacy” is sometimes interchangeably used to indicate *shokuiku*, but the author would like to make a clear distinction between food literacy and *shokuiku*, for the purpose of this dissertation. In this dissertation, the phrase “food literacy” is used to indicate “the ability of food planning and management, selection of food, preparation of food, cooking, and eating/social eating” (Vidgen and Gallegos 2014).

2.3.3 Children's Canteens

CCs, whose purview goes beyond nutrition assistance and whose young recipients are uniquely sensitive to stigmatization, avoid some of the rigidities that impact food banks. Although the CC movement developed in response to poverty in Japan, most CCs are open to the community regardless of need, thereby avoiding the class-based stigmatization often associated with government welfare (Yuasa 2019b). CCs are also commonly called *ibasho*, meaning “safe space,” with the connotation of being nurtured and cared for (Nanahoshi 2018, Yuasa 2019a, Tamura 2016). The main conduit for this care is the accessible and hospitable food experience for the community, which must be achieved despite the challenges of sourcing suitable ingredients. Unlike food banks, which rely on the food literacy of the recipients to assemble wholesome meals from their inconsistent and unbalanced donations, CCs must deliver attractive and healthy food to fulfil their goal.

The average rate of child poverty in Japan is 13.9% in 2015, yet the situation is different in Okinawa. Okinawa has the highest relative poverty rates, and child poverty rate in Japan, which is 29.9% (CAO 2017). These rates are reflected in many statistics. The average income in Okinawa is 3,498,800 yen per year, and this is the lowest in Japan. Okinawa also has a high divorce rate, alcohol addiction rate, underage drinking rate, obesity rate, domestic violence rate, bone fracture rate, liver disease rate, lifestyle disease rate, easily married rate, pregnancy in

adolescence rate, low education rate, and unemployment rate. In this dire situation, Okinawa could be an embodiment of a future Japan. Consequently, there are more elaborate CCs from the Okinawan people's responses and much to be learned (chapter 5).

Despite the popularity of CCs among academics and journalists in Japan, there has been little attention paid to the crucial role of food preparation by CC organizers. Food literacy is expressed in everyday CC operations, ranging from sourcing food and planning meals to improvising when ingredients are poorly matched. With food coming from all sorts of donors, including farmers, corporations, manufactures, retailers, and individuals, high food literacy is an indispensable asset in handling the unpredictable donations (Nomura 2020). In a sense, CC organizers operate much like household domestic managers trying to align what is left in the pantry with the desires and preferences of each household member. The following section describes how this expression of food literacy was captured in case studies throughout Japan.

As the CC movement grew in size and influence, its intersection with the issues of food loss and food waste was inevitable. Food donations usually comprise food that is diverted by upstream actors before being discarded, usually by food processors, farm cooperatives, or grocery stores. Food banks or other intermediary organizations may receive these donations, after which they sort out what can be used and discard the unusable portion. Food banks, in turn, can pass the donated food on to individuals but often the food is transferred to recipient organizations that have better access to needy people. The efficiency with which individuals and recipient organizations re-organize and transform the donated food determines the final proportion of the donated food that is wasted. For donors, CCs are an important intermediary organization for food as they render donated food as a contribution in the fight against child poverty. Makoto Yuasa, the president and CEO of the NPO Japan Kodomo-Shokudo Support Center MUSUBIE, remarks that, "CCs have started to become infrastructure in Japan, which means that the existence of CCs has become normalized" (Yuasa 2019a). And yet, CCs, unlike many other recipient organizations in the food donation sector, do not usually start out professionalized; they are often established by interested individuals in a home or community center. In practice, they use their ingenuity to make use of available food, monetary donations, and space to create suitable environments for co-eating. This flexibility and ingenuity, which often derives from food literacy, is well-aligned with the challenging process of transforming mismatched or skewed food donations into nutritionally and socially appropriate meals.

One of the common inspirations for establishing a CC is the desire to counteract what is

perceived in Japan as the increasingly individualized and socially alienated modern meal. The Japanese word *koshoku*, which bears a pejorative connotation, was invented to describe people who eat alone. In contrast, *danran* is the word used to describe sharing meals together convivially, especially among family members. Social interaction in mealtime has been studied keenly by many social scientists, with meal timing, setting, seating order, etiquette, conversation, and food preparation all understood to have important impacts on, and meaning for, people's maturation and socialization (Carsten 1995, Mintz and Du Bois 2002, Ochs and Shohet 2006, Ishige 2016, Crowther 2018). Furthermore, the memory of home cooking – mostly by mothers or grandmothers – is associated with experiences of care-giving, love, altruism, and eating together (*danran*), in contrast to the modern convenience, speed, individual eating (*koshoku*) (Lupton 1996, Moisio et al. 2004, Ishige 2016). For many, *koshoku* is indicative of dietary deskilling, in which one's ability to plan, shop, prepare, and eat a meal together is diminished in value by subsequent generations (Noda, 2015). Although there are more structural factors at work, such as the shrinking the size of family, busy hyper-urban lifestyles, outsourcing food preparation to corporations, and a general lack of confidence in cooking, many view CCs as a home-grown, community-based method of revitalizing mealtime sociality. These institutions view the effort of creating a convivial space, which often includes ingenious efforts to combine mismatched food donations in creative ways, as symbol of care. Indeed MAFF is seeing an opportunity to promote *shokuiku* within the activity of Children's Canteen. MAFF conducted a comprehensive research on how they are operation, what are the obstacles and challenges for them to sustainably run, and how the canteens are conducting the *shokuiku* promotion. Posing a questions of how they are making effort to incorporate the activity of *shokuiku*; 86.5% of CCs answered that they eat together to provide a safe, social-eating place to children. 56.2% of CCs make the children to help serving/returning the plates/bowls that they used. 33.2% of CCs answered their children is helping the cooking, and 23.4% of CCs are conducting cooking events. In order to increase the food knowledge the CCs try to give the children lectures on seasonal food, nutrition etc. 28.5% of CCs teaching manners and etiquette of eating. There were a few CCs that are organizing the information exchange with farmers, fisheries, and daily producers, less than 10%. (N=274 CCs) (MAFF 2018). Despite MAFF's enthusiasm and active promotion of *shokuiku* to CCs, CC's capacity to provide it is still unknown.

2.4 Organizational Anthropology as methodology

Anthropology undeniably puts ethnography as the main research method. Although the discipline had begun its root as a study of tribes and indigenous groups of pre-industrialization, the methodology is now applied incessantly in the modern groups; includes organizations. Even though the size and scale vary in each organization, they all share the same value, vision, explicit culture, rule, division of labour and act in accordance with the organization (Gellner and Hirsch 2001, Urban 2019). The organizations are versatile, thus constantly changing by monitoring and restructuring themselves through adaptation of their perception of external conditions (Morgan 1990). The ethnographic study has done in not only huge business corporations or institutions (Urban and Koh 2013) but also small-scale organizations such as a development NGO or an ambulance service team (Mosse 2001, O'Neill 2001). The study of business corporations, Urban and Koh argue there are two directions; the organization's effect on its workers, communities, consumers or environment, or/and, study inside of organizations as a small/large society (2013). Mosse (2001) introduces 'participatory learning' and 'process monitoring' methods; both methods are inevitably inductively oriented, and inter-subjective.

However, the methodology of participant observation always poses the researchers how much he/she should be involved. While there are inseparable lines in between as a scientist or citizens, commitment or impartiality, this ethical dilemma must be addressed, openly discussed not only within the discipline but with other areas of study as well (O'Neill 2001). As for business organizational ethnography, there also be an ethical issue to be addressed. First and foremost, the researcher has to access to the organization/institution, and yet, very few organizations would welcome researchers unless there are some benefits for the organization in return. As for the output (or gathered data) of the study, 1) it must not be used as a manipulation of its consumers' needs and wants 2) the outcome must not cause any harm for its workers/staff/participants, 3) the output must not lead to make its employee obsolete (Urban and Koh 2013).

By acknowledging all the benefits and ethical challenges of the discipline, still, this thesis applies this methodology in all the research as an insider, participant (chapter 3-5), and also as a practitioner (chapter 6). This methodology is appropriate for this research because it can observe the variety of value in the way origination treats food by merging herself in the field, work together with the informants. Each organization has its own sets of value and point of view: each of them sees food differently, and treats food according to their rules and culture. The same

food product can be a food waste at an organization, but it can be a donation, and it can be an adequate meal in another organization at the same time. In other words, each culture has its own standard of *purity and danger* (Douglas 1978), therefore the author as an insider can investigate where is the critical loss/waste point of food in the operation, as well as the critical saving point of food where food, once labelled as waste, could be consumed adequately by people.

Chapter 3

Organizational Anthropology of the UN Food and Agriculture Organization

The Food and Agriculture Organization (FAO) has played a major role in promoting world food security since its foundation. The organization's membership is comprised of "states" but over time the policy development has come to focus more and more on individual cities, and eventually has come to reach individuals. Some challenges that are under the purview of FAO, such as food waste, have necessitated more direct engagement with people, or at least with more proximate institutions. While FAO's existing mechanisms have enabled it to help member states increase food production, efficient distribution and waste aversion have entailed closer work along the food value chain. The trend of urbanization also demands closer attention to the food value chain system since the people are moving from FAO's original domain, farms, to cities (UN DESA 2018). In this environment, updating the management of essential commodities such as food is at the top of the agenda. Since people are moving from where food is produced – rural area – to where food is consumed – urban area – the tackling of food loss and waste issue is an area of increasing interest for FAO. This chapter tracks, from an ethnographic insider point of view, the myriad ways in which FAO has re-imagined its role in managing the wider food value chain and, in particular, its contribution to managing food waste.

3.1 History of FAO

FAO has been a leading agent to lead and advice policy development on agriculture to the world to fulfill the mandate. FAO is one of the UN organizations, specializing on a broad swathe of the agri-food system in both developed and developing countries. In its original mandate, FAO was established in October 1945 to eradicate the hunger and malnutrition in the world following the mass destruction of WWII. The concept and policy of food security has been developed and changed adjusting its meaning and contents to serve the society/economy at the time. The great depression in the 1930s engendered more state-led economic management approaches, but by the end of WWII, this state-oriented focus to food and agricultural policy focused on establishing more explicit food security and safety nets. The world hegemony at the time, the

US, led the way in such state-led agriculture policy and implementation. For “Third World Countries” that were less aligned to a particular side during World War II, FAO also became known for implementing technology-led development programmes (Borlaug 2002).

In the beginning of the organization, the increase of the yields directly means a solution to the world hunger and malnutrition. State-leading land reform and agricultural mass-production, as well as the new technologies such as mechanization and chemicals were recommended. Worldwide, financial institutions and organizations were set up to provide subsidies and loans for farmers in order to upgrade technology and establish more modern food systems, hence stabilizing food price and accessibility. Government-led research and infrastructure projects, especially irrigation, raised agricultural productivity. The efforts of FAO contrasted with communist countries that were organizing stricter state control of land reform in their countries to plan and manage the food production and allocation. In either case, the focus on production and food security pre-empted discussion on post-food security issues, such as environmental problems, unhealthy consumption patterns and waste.

Food security and agriculture policies were often discussed in the dialogues of national policy. It was believed that the states’ deliberate intervention was necessary in order to stabilize the food production, farmer’s income, land and water resource management (Chang 2009). In the late 1950s, ensuring the food security was the top priority especially in developing countries, and most of the effort was dedicated to increase the yields per hectars by applying the fertilizers, pesticides and herbicides. However, while this policy has increased yields, it created new problems, too. There were harms to human health and eco-diversity, rise of pesticide-resistant pests, contamination to water and degradation of the soil (Pimentel 1996). The health and environmental hazards triggered an environmental movement globally; Rachel Carson’s famous book *Silent Spring* (2002) is one of the earliest indicators of this movement. At the wake of the harm done by the chemical and land reform, FAO had focused on the rural development. The smaller, and appropriate level of technology are applied in those projects to eradicate the poverty, provides necessary skills to help the rural farmers.

With the rise of the environmental movement associated with food production and consumption, more general awareness about the systemic challenges to the food system began to enter everyday imaginations. Maxwell and Slater (2003) note the increasing differentiation of the problem along four axes: 1) All countries are intertwined through food trade, therefore it is important for all countries to be aware of changes in food policy, trade deals, and environmental

regulation; 2) developing countries' food systems are rapidly developing and pose unique social challenges; 3) nutrition and diet choice have shifted, particularly in the case of rising obesity in low-income countries; 4) developing countries struggle to institute comprehensive food policies as they lack technical knowledge and budget. In part, the Millennium Development Goal (MDGs) evolved into the more globally-oriented Sustainable Development Goals (SDGs) as an admission that achieving national goals cannot be entirely undertaken by national governments. It needs collective effort and shifting the value and morals of a wider set of global stakeholders. It demands intervention into consumer behavior, changes to food transport, improving storage technologies, better distribution systems, protection of traditional food species and cuisines, effective management of local resources, ecologically sustainable agriculture, and achieving food security. The goals are more complex and each stakeholder in the food value chain needs to cooperate to tackle these targets. It also became clear, during the transition to the SDGs, that a broader set of issues (diet, waste, lifestyle) would become more intrinsic to policy success as a broader set of stakeholders (cross-national, more urban, more virtually connected) joined.

While MDGs had succeeded in reducing extreme poverty to some extent, people realized that the excess amount of food does not equal the eradication of hunger and malnutrition. The focus began shifting not only the national agriculture sector, but also all sectors in the food value chain system. To remain relevant and make an impact on the all the actors and agents in the food system, FAO had to adopt themselves and widen its engagement; not only with the member states, but also the cities, regions, or food sectors such as manufactures and retailers, and last and not the least, individual consumers. FAO's mandate had remained the same since the foundation in 1945, yet the world problems and condition had been changed drastically since then. The organization is trying adapt itself and remain relevant to the current global situation, however, it is has been challenging for FAO to embrace new domains for communication and partnership that comprise actors beyond their existing stakeholder base, including corporations, smaller-scale institutions, urban organizations, and individuals.

3.2 Insider research: Organizational Anthropology at FAO

As an intern at FAO, I operated as an embedded researcher. As an insider, I worked to achieve the goals of the FAO, but as a researcher I studied FAO's response to its rapidly changing global condition and its institutional framework. The 11 months internship was in the Food Loss and Waste Reduction team. The team is within the division of Nutrition and Food System (see

Figure 3-1 for the organizational structure). This long period of work facilitated both access and trust, while continuing my ontological role as a PhD student (on leave) at my home university. The research methodologies for such institutional ethnography, which include participatory learning and process documentation, were developed for multilateral organizations by David Mosse (2001). The main goal of such a methodology is to become sufficiently embedded that one begins to think like an insider, but is also still tethered to the critical research focus of a researcher. And indeed, during the internship period from June 2018 to April 2019, I worked full time and simultaneously documented the process of policy evolution inside FAO. The main challenge of institutional ethnography lies in final presentation, which must be respectful to the institution involved while also mindful of the need to take an objective (occasionally critical) view of the processes observed. In reviewing the analysis below, the reader is advised to keep this balancing act in mind.

Anthropologists have been studying the realm of international development for long time. Ethnography has also evolved from recording and observing as an embedded outsider (the Malinowski tradition) to becoming insiders and participants. Development also has changed from developed country offering funding to more neoliberal modes of development, with private sources funding market-led development (Mosse 2013). Still, development has mainly meant the eradication of poverty. Mosse (2013) reports that over time, development donors had been shifting from the Western developed countries to private capital, and now to funding from emerging countries such as China, Brazil, Russia, and India. Though these donors changed and rural areas evolved, FAO has held fast to many aspects of its founding mode of operation.

To begin with, FAO's basic governing structure has not evolved, though small amendments have been made. Figure 3-1 shows FAO's current organizational structure. FAO's main governing body is the Conference, which is held every 2 years to review the achievements of the organization, decide the budget for the coming period, and elect an executive council of 49 countries. The Council, and its appointed Director-General, is the executive organ of the Conference. The Council's terms of office is 3 years. The Director-General who is appointed by Council will serve for 4 years. He/she will instruct the work of FAO under the authority of Conference and Council. Under his/her management, there are Deputy Director-Generals who shall act in the Director-General's absence or other extenuating circumstances. Deputy Director-Generals are appointed by the Director-General with confirmation from the Conference and Council. FAO has 8 departments to serve the global agriculture/food issues;

Agriculture and Consumer Protection, Climate, Biodiversity, Land and Water Department, Economic and Social Development, Fisheries and Aquaculture, Forestry, Corporate Services and Technical Cooperation and Programme Management (l'agriculture 1976).

Within this largely consistent governing structure, FAO has made modest changes to re-orient it to current trends. Focusing on the internal dynamics as an insider, this chapter attempts to illustrate FAO's response to food policy trends and suggest where and how it is moving forward in this new context. Especially, this chapter focuses on how FAO builds the connection with new partners such as cities, private companies, minority groups, and advocate groups working toward reducing food loss and food waste reduction.

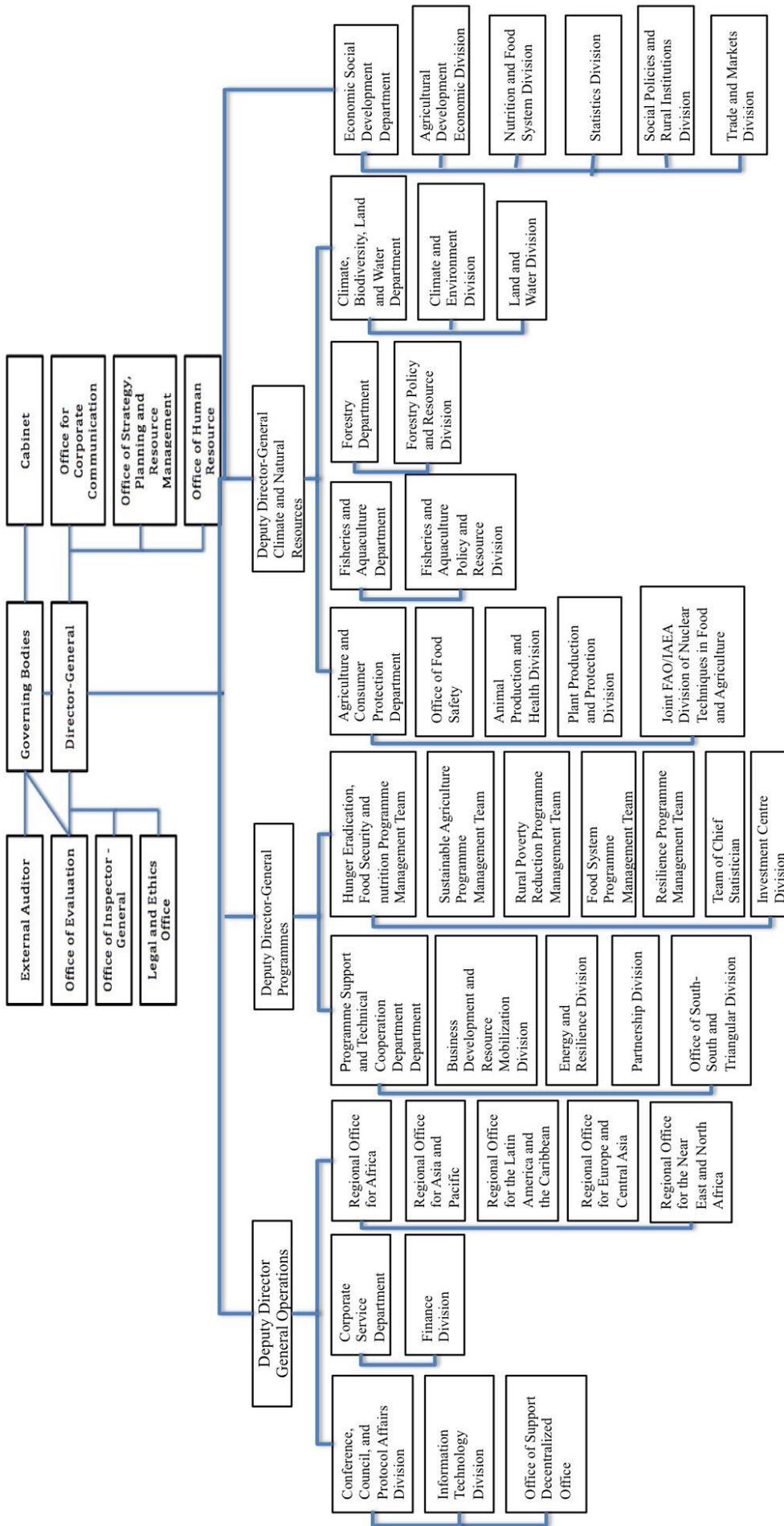


Figure 3-1. The organizational structure of current FAO created by author (FAO organizational chart)

3.3 The right to *adequate* Food

A human right to adequate food had been codified in Article 11 of the 1966 International Covenant on Economic, Social and Cultural Rights (ICESCR). Article 11 consists of two parts: 1) “The State Parties to the Covenant recognize the right to everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing (...),” 2) “The State Parties to the present Covenant, recognizing the fundamental right of everyone to be free from hunger, (...).” Although the language of the right to adequate food appeared in the ICESCR, FAO remained withdrawn from the engagement to the human rights for some decades. However, as a reaction to the 1973 – 1974 world food crisis, the public discourse paid attention to the right to food, and the word food security was defined as the “ability at all times of adequate world food supplies and basic foodstuffs (...) to sustain a steady expansion of food consumption (...) and offset fluctuations in production and prices” at World Food Conference in 1974 (FAO 1974). Consequences of trade and food aid, the fluctuation of food price was a matter which public demanded FAO to monitor and manage for its stability. Yet, it was much later years that the *individual* right to food had begun recognized. FAO had begun taking a leading role to enhance the right to adequate food in the 1996 World Food Summit, (Mechlem 2004, Anthes and De Schutter 2017). At the summit, “the right of everyone to have access to safe and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger” was reconfirmed by Heads of State and Governments. It progressed to the Committee on Economic, Social and Cultural Rights (CESCR), and its General Comment 12 states the right to adequate food adding and concretizing the obligations for states to “respect, protect, fulfill” its framework (CESCR 1999). Since the conclusion and adaptation of The 2004 Voluntary Guidelines to Support the Progressive Realization of the Right to Adequate Food in the Context of National Food Security by FAO Council, FAO’s visibility in the realm of human rights to food increased (Rae et al. 2007, Oshaug 2005). According to Athens and De Schutter (2017), despite the adaptation and effort to establish the human right specialized division called the Agricultural Development Economics Division (ESA), mainstreaming the right to adequate food had failed to be fully institutionalized in FAO. Despite the high demand by the public discourse that FAO take the leading role of human right to adequate food, the specialized division neither fully funded nor the protected the work domain of these staff. Ultimately, the specialized staff were relocated to other divisions/departments according to their expertise. With this, FAO acknowledged that it would

not fully institutionalize the right to adequate food, and yet the right to food is integrated and adopted within many projects in FAO but is interpreted by each division separately (Athens and De Shutter 2017).

The principle of the right to adequate food also applies to the food loss and waste reduction, and projects are taking places in many layers and with many national or non-national partners. FAO published a discussion paper on food loss and waste (FLW) and the right to adequate food (FAO 2018a). The paper discusses the presence of FLW is the “evident sign of the unsustainability” of the natural resource management and distribution which breaches not only the current generation’s right to adequate food but also the future generations’. FLW is a pure loss of not only the economic value but also loss of the natural resource as well as the nutrient value. FAO recognizes the problem of hunger lies not entirely in the amount of food production, but in the distribution and accessibility: “As oppose[d] (sic) to food distribution as the primary solution to hunger and food deprivation, the right to adequate food translates to the right to feed oneself in dignity (...) Moreover, the full realization of the right to adequate food requires that people become central actors to provide themselves in dignity (FAO 2018a).” Here, FAO emphasizes and affirms individuals not as powerless actors who simply receives aid from its donors, but also an important actor to guarantee their rights and reduce FLW. The report provides the example of how individuals can corporate to help themselves as well as be a part of the solution of to reduce FLW, such as by understanding the food label (best by, best before) collectively, raise awareness of FLW issues, and ... etc.

In many regards, adaptation of the right to adequate food discussion has to include all the actors, especially the representatives of food insecure people (De Schutter 2010). Having had a major reform in 2009, the Committee on World Food Security (CFS) became the “foremost inclusive international and intergovernmental platform for all stakeholders to work together to ensure food security and nutrition for all (Anthes and De Shutter 2017).” The author participated in the CFS in 2018, joining various seminars and events during the period, including the International day of Rural Women. The discussed topics ranged from gender, to nutrition insecurity, access to land and food, rural women, indigenous rights, development of agriculture entrepreneurship, and more.

As many researchers considered FAO’s contribution to human rights as positive, the organizational effort had mainstreamed the right to adequate food by raising awareness and its commitment (Moore 2005, Oberlienter 2007), CFS become an important outlet for FAO to

launch many project/campaigns to communicate the global multi-layered community. In recent years, FAO established a framework of 10 years of supporting small-scale farmers and organized the ‘Youth as Drivers of Innovation’ symposium. This event featured youth innovation in the agriculture sector. There were several panelists from different countries to present their agri-entrepreneurship and their success stories. Their claim and wish for FAO was to bring more partnership for the funding, and training on how to get funding. Yet what is more important for the young agri-entrepreneurs was raise awareness and education. They were demanding more effort for FAO to educate the younger generations to teach value and importance of food and agriculture. If there are more people who can value and respect the food, the young agri-entrepreneurs and their work also be respected and be sustainable as a business. In short, consumers also needed to cherish their right to food by not taking food for granted.

Even though the word ‘Food literacy’ never appears in the language of FAO, the value and importance of the skill and knowledge are obvious for FAO’s work. In addition to the food education demand from the youth and public, FAO’s publication and projects clearly reflect food literacy components as outlined by Vidgen and Gallegos (2014): plan and manage, select, prepare, eat. These programs include: Guide to Conducting Participatory Cooking Demonstrations to Improve Complementary Feeding Practices (FAO 2017b), cooking and nutrient demonstration lecture project on the field by the locals and local recipes in Guatemala (FAO 2018b), awareness campaign by famous celebrity chefs (FAO 2018c), manuals for how to handle food for better hygiene (2017c), promotion of eating fish/seafood with recipes in brochures (FAO 2013), promotion of eating pulses campaign with pulse recipes (FAO 2016a), and many more. In line with the awareness raising campaign, the educational material ‘*Do Good Save Food* (FAO 2018d)’, aligned with FLW reduction, was also developed.

3.4 Food Literacy in individual consumers matters

Since the focus for the food policy development shifted from the national agriculture policy to the improvement in food value chain system, it is vital to have various layers of external partnership to maintain FAO as relevant agent to influence the global community including individual consumers. Considering the FAO’s intergovernmental nature, the human right – obligation approach is often seen as too political and difficult to have member states’ consensus; nearly two thirds of FAO funding comes from external sources, and those rights based project are usually conducted with limited outside budget that is not supported by FAO’s annual core

budget (Anthes and De Schutter 2017). On the contrary to the high demand for improvement in the food value chain system to be more accessible and sustainable, the actual projects have to be conducted with limited budget or time limited. Therefore, creating and maintaining the external partnerships is crucial. FAO, which is struggling to make itself relevant outside of its core areas of expertise, must not only create new programs and policies or collect data, but also develop its communication sufficiently that they can reach different audiences in a credible and legitimate way.

3.4.1 Communication through online platform

My experiences at FAO, in developing a survey about food waste to online promotions, suggests that FAO is both struggling to choose an appropriate perspective to take and to mobilize the resources to do so. Expanding into new areas in such organizations requires the re-alignment of many pre-existing parts and connected institutional culture, which sometimes faces contradictions.

My first job at FAO was to create a survey for a new website called Community of Practice on Food Waste Reduction (CoP FWR) at the time. It was to set up as a sister website of an existing website of Community of Practice on Food Loss Reduction (CoP FLR). These websites are to serve as a platform of the information sharing and creating linkages between public entities, academia, private sectors and civil society on food loss and waste reduction. This is a first outcome of the joint project with all three Rome-based UN agencies; FAO, World Food Program (WFP), and the International Fund for Agricultural Development (IFAD). The survey was to ask general consumers what kind of information they would look for the new website of CoP FWR so the consumers can inspired to take action on FLW reduction or to share their work on FLW reduction. The questions were developed for the survey, included overarching ones, such as “Do you know that Sustainable Development Goal 12.3 states “by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses”?”, as well as ones which probed individual perspectives, such as “what is your definition of Food Waste?” or “In your own words, what is the main cause of consumer’s food waste? At home? At eating-out?” These questions were the result of significant discussion and effort between my colleagues and I, yet their final utility was put into question by the project framework.

Although I made the questions and attained the approval to place the survey into action, the means to convey the survey was ambiguous. I did not know whether this survey should be conducted without any budget, such as on a free online survey service, or if there would be a special FAO platform to convey this sort of survey. In the end, the survey was never posted because the donor of the CoP FWR project did not pay the project funding on time. This reflected even more serious fragmentation. The challenge is also to maintain the staffs; such as

the lack of staff in charge of writing and sending the regular CoP FLR newsletter etc.

Beyond project stability and funding, there are deep-seated concerns about the suitability of FAO taking on new roles such as communicating with consumers. Why should FAO get involved in the community of practice or even the individual habits of consumption? Why does FAO need to change people's habit and is such an intervention justified? This insecurity is reflected in numerous experiences of routine work and project implementation in FAO. For example, one day, an FAO officer shared his experience on his duty trip to a middle-east country. He was invited to a welcome party, but the food portion he was offered was too much to finish. He realized that the local participants were also served the same amount of food as his, but they naturally left most of the food on the plate. Afterwards he understood that serving enormous portions of food was a sign of wealth and welcome for the guests. He was shocked how much food was wasted for the purpose of its presentation, and how unsuited he was to intervene.

My expertise as anthropology, ironically, was as relevant ever, given the shift within FAO away from technical expertise and toward broader-based communication. In this new mode, people's stories and experiences are important to recognize as important context for implementation. While FAO is trying to make a habitual change in communities and individual consumers, it could not be done as a policy regulation or top-down order, but induce people to change their behavior by sharing the relevant stories and gaining supporters. Being the platform's facilitator means knowing how to communicate with varied levels of partners, how to plan and assemble human resources, raise a budget, implement, and promise an acceptable outcome. The CoP project is all about making the platform to share people's 'good practice' on the management of food loss and waste. To accomplish this, FAO has needed to wide its base of partners.

The platform's membership goes from individuals, communities, corporations, or academia, and it can share the knowledge gained through each partners' experience on prevention/reduction of food loss and waste. As for UN agencies, building partnership in every level is essential to achieve their objectives. Through this platform, FAO eventually connected with my home university to conduct a project. Their network is slowly expanding through these practical project implementations. The partnership is always a key, and the connection is beyond the national borders. To adopt the movement into Japan, the first pilot project was concluded with Kyoto University. The content of this project was build based on a previous project, including research that was conducted in Meh Fah Lang University in Thailand (Manomaivibool 2016); the protocol was subsequently imported to Kyoto University, Japan. These partnerships are

possible by concluding either Memorandum of Mutual-Understanding (MoU) or Letter of Agreement (LoA) between FAO and various institutions. The procedure began either FAO or institutions contact and make a work plan together. The work plan has to be with multiple divisions in order for FAOs to conclude the MoU as a whole organization. If the work plan is only between a few divisions or only one, a more basic LoA is concluded.

3.4.2 Communication through partnerships

Non-national government actors are increasingly playing a significant role in the realm of food policy due to the rapid global urbanization growth. The huge shift and flow of commodities, money, and humans impacts society and eco-systems in nonlinear ways; it creates both opportunities for optimizing development and serious challenges to production and consumption of food. For FAO, this necessitates new modes of interacting with urban areas, where national institutions may not be appropriate or available as partners. Working with non-national actors has also come to be seen as essential for expanding FAO's sphere of influence despite budget shortfalls.

In recent years, the uncertain contributions from the member states have become a problem for UN organizations and FAO is not an exception. This means they cannot get the annual full budget to run the organization. Sometimes the member states withhold the payment of the contribution as a diplomatic card in order to influence activities of the UN. To deal with this, officers were encouraged to work with both national governments as well as many institutions such as municipalities, universities, NPO/NGOs, and private companies, in order to access outside funding or human resources. This has increased the need of interfacing transdisciplinarily, while also decentering FAO's policy priorities toward issues, which can mobilize more stable and better-resourced partnerships. Due to the concentration of (financial) resources, therefore, perhaps it is not surprising that FAO's newer partnerships tend to emerge from principally city-based actors.

As the population size becomes larger, the impact of the urban areas becomes larger. Many cities are now become aware and conscious about the necessity of them being food secure and resilient to climate change. Creating and maintaining the sustainable food system governed by municipalities is in fashion. At the same time, the smaller scale of cities, institutions and private sectors are easier to mobilize, faster to make decision, and responds fast to the local issues compare to the national governments. Even if a national government expresses negative towards the global initiatives such as SDGs, it might still be possible to collaborate together if it is the

municipal or smaller level of institutions in the same country.

The Sustainable Development Goals (SDGs), set collectively in the 2015 UN General Assembly, were designed to tackle the most urgent global challenges by 2030. Facing both a shifting policy landscape and rapidly changing demographics, large institutions such as FAO face enormous internal challenges to accommodate these changes. Many of these tensions can be encapsulated in a quote by an FAO officer, who remarked: “in the past, poverty was prevalent in rural areas, so the most of the FAO’s works were focused on rural development, but now due to the rapidly growing urban population, food policy making and development are also focusing on urban planning.” Such significant shifts in target area/group and mandate are, however, not monolithic: although rural development remains an important area for FAO, it is inevitable that urban areas play an increasing role. Observing the accommodations and contradictions that emerge as multilateral institutions recalibrate to new imperatives is the main empirical focus of this chapter, with a particular focus on the growing role of urban initiatives at the FAO.

As Figure 3-2 indicates, food has a wide sphere of influence; it affects the environment due to production, land-use, water-use, food miles, natural resource management, waste management, and more, all of which are critical social aspects to meaningful achievement in the food and agricultural sector, such as access to food, nutrition and health issues, lifestyle, and community and identity formation.

The rapid growth in urban areas in the globe made cities into active key players for sustainable development in food security. The Mayor of Milan at the C40 summit launched the Milan Urban Food Policy Pact (MUFPP) in 2014. The proposal was designed in preparation for the Expo 2015 where Milan was the hosting city; the Expo’s theme was “Feeding the Planet, Energy for Life.” MUFPP is aiming at “tackling food-related issues at the urban level, to be adopted by as many world cities as possible (MUFPP History).” The 207 signatory cities are from all the continents and, in Japan include Osaka, Kyoto, and Toyama. The main activities of this pact is that signed cities adopt and develop 37 recommended actions structured into 6 categories (governance, sustainable diets and nutrition, social and economic equity, food production urban-rural linkages, food supply and distribution, food waste reduction and management) by following the international experts’ guidance for the sustainable and resilient cities (MUFPP 2018). In developing process of MUFPP, FAO has been a key player as a technical support for the expertise and data analysis on various topics. In the publication of the ‘Food for the Cities Programme’ (FAO 2016b), it aims to “create more resilient and inclusive

food systems within city regions and build a basis for action.” This includes ensuring access to food, generating decent jobs and income, increasing resilience against sudden shocks and/or dependence on imported foods, fostering rural-urban linkages, promoting multi-stakeholder dialogue process, protecting agro-ecological diversity while reducing ecological footprint, and supporting participatory and inclusive governance.

As the importance of the food value chain has recognized, and globally increasing population in urban area, FAO has set up FAO framework for Urban Food agenda (FAO 2019b, FAO and UCL 2018). In this framework, FAO states their mission in the following way:

“FAO is committed to assisting in the implementation of people-cantered, needs- based, inclusive and integrated policies, plans and actions that create resilient and sustainable food systems, enhance livelihoods and job opportunities in both rural and urban areas and guarantee freedom from hunger and all forms of malnutrition. FAO provides capacity-building and policy assistance to national and sub-national institutions for developing territorial food system approaches while also facilitating multi-scalar governance leading to sustainable food system and improved nutrition.”

Unlike the exclusive focus on rural development, and increase in the food production, recent global policy is increasingly focusing on cities and with this, the focus has shifted to sustainable, resilient food systems.

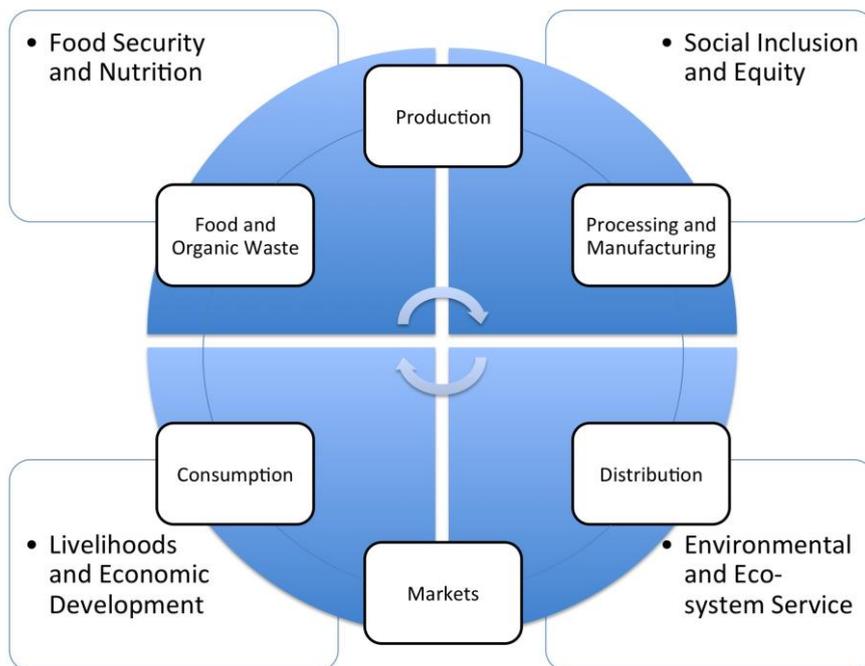


Figure 3-2. City region food system and its vision created by the author (source: FAO 2016b)

3.4.3 Communication through facilitation

In the practical level, FAO's Food for the Cities programme works with other collaborators to intervene in the development of sustainable and resilient city region by promoting and hosting a participatory multi-stakeholder dialogue, conducting research to assess food system, policy support and participatory planning. The evidence based result or knowledge gained through the process is going to be shared and disseminated among the multi-stakeholders, and later applied to the training. It is worthy to emphasize that the topic of food waste is more often a problem for cities in developed and economically growing countries, rather than developing countries. As a consequence, FAO now provides technical support for developed countries as well.

At the field level, the practice of Participatory Multi-stakeholder Dialogue has been already happening through FAO's facilitation. Since food loss and waste are generated in every stage of food value chain system, it is inevitable that all the actors in the system to commit to the solution.

In Thailand, Mongolia, and Malaysia, the Save Food Network has been established with the support from FAO; the national government launched it by strengthen the connection between multi-stakeholders as well as launching awareness raising events at the national and local city level (FAO 2015). In Italy, the Food Loss and Waste Reduction Network was about to start building the network at the time when I was in Rome. FAO was providing an opportunity and arranging the relevant stakeholders such as the UN agencies, government agencies, agricultural research institutions, academic institutions, private sectors and department, food processor associations and cooperatives, fresh market associations, producers/farmers unions, retailers, restaurants and hotel associations, and food and agricultural related organizations and groups. It begun with sharing their perspectives and activities, then they start discussing how they can corporate with each other to reach the common goal – reducing food waste.

As FAO's Food Loss and Waste team as a facilitator, these stakeholders of food value chain were to discuss to decide the chairperson, further meeting schedules, means for the communication and dissemination, its finance, and its branding and visibility. With these topics are discussed, this network aims to establish a common platform to concert harmonized effort to raise awareness of the issue and its benefits of reducing food loss and waste.

3.5 Education to set moral standard

The most obvious, and direct way of communicating with the individual consumer is education. Most actors in the food value chain system do not throw out edible food guilt-free; food waste is also less commonly generated because of a quality problem, but rather because of the current business rules, regulations, and inadequate knowledge about food edibility/treatment/preservation (FAO 2019a). FAO acknowledges that just pointing out and penalizing one actor within the food value chain system will not solve the problem, but by increasing the mutual understanding and the right knowledge to prevent/reduce food waste. The food industry generates food waste just as other actors, and therefore the problem needs to be addressed in both the industry and the consumer side as well. Thus, corporation with private sector is as important for FAO as ever before.

The International Food Waste Coalition (IFWC) is an EU-based multi-stakeholder initiative within the food industry. This non-for-profit-association binds many major food corporations such as Ardo, McCain, PepsiCo, SCA, Sodexo, Unilever Food Solutions and World Wildlife Fund (WWF). The coalition is aiming to collectively tackle the issue of food waste along the food supply chain (FAO 2016c). It was from their initiative that the creation of educational material on food waste reduction for children was funded. FAO recognizes the importance and scale of the coalition's operation, and FAO's expertise can be applied and utilized here as well. However, the challenge lies the timing of working speed of partners. The agreement of FAO and IFWC has concluded in 2016. The pilot test of the educational material was conducted by IFWC at 6 schools in January to July 2016 in Italy, France, and the UK. The result was reported to FAO to help with further improvements for the material. The result and feedback of the pilot test was sent to FAO, and the material was finalized according to the report.

FAO plays a key role to offer a platform for city mayors; national ministries, producers, retailers, and consumers to make sure all the actors are on the same page in order to achieve the 2030 agenda. The promotion of the goals and necessity of education for the achievement of the goals are also FAO's important role as an international organization.

In September 2018, FAO launched educational material for children to teach on food waste reduction (FAO 2018d). The materials are for 4 separate age groups. The textbooks has been developed by FAO with the strong interest by EU and private sectors for the increasing needs of educating children on food due to increasing disconnect between agriculture and food during children's upbringing in recent years. The keynote of the event, Biljana Borzan who is a

member of the European Parliament, is a strong supporter of this educational material; she directly pointed to the separation of the food and children along physical, cultural, and social dimensions. The value of food is necessary to be taught properly and behavioral change is required to reduce food waste. The many member states are already taking action on this and demand for collaborating with FAO on food waste reduction is high.

On top of these textbooks, FAO also published simple, summarized brochure of food waste reduction in 9 tips. This is introducing easy, everyday tips to reduce food waste with illustrations for children. After launching the educational material and its brochure, the feedback was quite positive. There were many requests from the member states that they would like to also have the adult version of the 9 tips. Doing so became one of my tasks. In order to communicate better, I first had to learn the correct meaning of its illustration. It was eye opening to realize that there were many teachings in one illustration. The illustration making also took for long time to improve my image draft. I asked my supervisor as well as colleagues to check if the images convey the right message, and clear to understand at the same time. It was not only the message and contents issue, but also I had to make sure to respect food culture and races, too. The images had to take the race balance into consideration since the images were going to represent FAO. Therefore, I made sure that I chose all skin color type people in the images to represent the universality.

There is a plan to establish the international day for food loss and waste reduction to raise more awareness and harness the global dialogue on this issue. This will be an opportunity for governments, private sectors and civil society to recognize and celebrate their effort in reducing food waste. This is very important because as FLW is generated at every stage of food value chain, thus all the stakeholders are responsible; however, translating this “responsibility” into mutual effort and collaboration is a separate challenge for FAO entirely. Since the food value chain system is invisible and difficult to have become directly aware of, especially the general consumers, the establishment of an international day of food waste day would provide a useful platform to realize all stakeholders to get them on the same page.

3.6 Making policies and influence the global community

Launching educational materials is just a start, not the goal. After all, the materials are meant to be disseminated, utilized, and appropriated in the context of each member state. In other words, the materials need to be recognized and confirmed by the member states, and the degree of

utilization or dissemination is up to them. FAO needs an extra effort to reach those national education boards/committees when it comes to the promotion of FLW reduction education.

FAO aims to make the FLW education is incorporated in the compulsory national education, the discretion lies in the Ministry of Education, not in the Ministry of Agriculture.

FAO need sub-national's corporation, too, because the material has to be disseminated and utilized for their work to be effective. To begin with, the material has to be translated into member states' language. Yet, FAO has limited budgets to make each language translation, it depends on the spontaneity of states or sub-national partners such as municipals, private companies or non-profit organizations. Sub-national partners are often swift and smooth to take action, however, managing to keep the quality contents and screening, proof-reading, printing, implementing, and gain approval are intense financially and labour-wise. The partner also has to have a certain level of knowledge, competency, budget, and commitment to keep the partnership with FAO. Although there are challenges in the partnership, it also brings benefits for both parties. For FAO, the sub-national partner's swiftness, finance, labour, and access to their knowledge and data. It is especially important to access their knowledge, experience, and data when it comes to FLW. The sub-nationals can also benefit by accessing to FAO's expertise, recognition, and accountability of the project/campaign.

For policymakers, on the other hand, they need accurate data sets, statistics, analysis, and evidence to make effective policies. This is also FAO's core work to function as a research institution to provide collective, international data analysis on the topic. FAO's important flagship publication, *the state of food and agriculture 2019* (FAO 2019a) were published, featuring all about FLW. This shows FAO's serious commitment to the issue of FLW to move forward as an organization.

The report provides not only the amount/size of FLW but also the vital analysis on why and where FLW is generated. According to the report, food loss is often caused by inadequate timing of harvest or affect by weather/climate on the farm, the poor physical infrastructure when food is transported, or inappropriate storage facilitation, human error, or inadequate skills of preservation, treatment, storing and packaging.

These causes are referred to as *critical loss points*. On the other hand, food waste is caused by limited shelve-life of food products, strict standards of shape/size/color, etc. Consumers also contribute to generating food waste by their poor purchase and planning practice, buying excess amount or/and poor food management at home, and inappropriate preservation/storing at home.

These causes are referred to as *critical waste point* (FAO 2019a).

FAO acknowledges the difficulties of even collecting the data; the report states the data and information shown in the report are still limited. Although the critical loss/waste points are shown, as well as figures on FLW is provided, still, the cause and size/amount of FLW varies in states, region, or continent. The FLW quantity data does not reflect accurate economic value or monetary value, because the weight does not equate with the value of food, food value differs and determined in the type/specific of the commodity. Hence, FAO holds expert meetings to discuss what the most appropriate, articulate methodology to measure the FLW. Proper, accurate data set accelerates the policy-making, yet the collecting data sets on FLW is always a challenge.

This is why raising awareness and creating public discourse is essential for FAO's work. Not only developing general moral education on food, but also all food value chain benefits when each of them acknowledges and understands the issue. Without each actor's understanding of the issue and corporation, it is difficult for FAO to access accurate data. It is an important work of FAO to provide accurate, relevant data and information to influence the policymakers, especially for the ministry of agriculture. Even though the data collection on FLW often lies in their work, the data is limited without the food value chain sector's corporation. At the same time, however, the limited data set should not prevent taking action. Therefore, FAO's work is now beyond the conventional partners: education and raising awareness of the issue is necessary for both data collection, as well as solve the issue. This is why, it is now important for FAO to reach other non-conventional institutions/organizations such as the ministry of education, academia, private sectors, or other civic organizations.

3.7 Conclusion

Using the case study of food waste, this chapter illustrates a new global trend and dilemma for multilateral organizations like FAO: how to adapt to shifting conditions and remain relevant. In order to achieve zero hunger, access to adequate food must be attained through a sustainable food value chain system. Food loss and waste gained more recognition globally in recent years in this context. This issue is significant in the sense that not only developing countries seek FAO's help on this issue, but also developed countries. To solve this issue, national governments nor FAO cannot operate independently, but it needs to embrace a wide range of actors who are involved in the food system. In order to reach this goal, cities, private companies

and individual citizens are becoming important players.

Therefore, FAO is no longer only consulting national governments but fosters various other non-national partners, too. The formation of partnership and networks are increasing and pervasive not only in the national level, but also sub-national levels. This is due to the rapidly increasing concentration of world population in cities and urban areas. These sub-national actors are gaining much more decision making power. Private companies are important partners not only as they have resources and direct impact on consumers, but also because they may themselves be seeking appropriate ways of communicating consumers for better habitual change. FAO and private companies have a mutual benefit for working together on this regard.

It is important to understand FAO's dynamics in order to study today's global food policy. Comparing with the 1950s-70s national agriculture land reform and mass-production by mechanization, now FAO's approach to food policy is including and accepting local originality and biodiversity, and in many ways is promoting the right to adequate food and as a basis for any sustainable food value chain system. Maintaining partnerships with new types of actors is challenging, but it is the key to maintaining the relevancy of the role of today's organization. As the global situation and needs are rapidly changing, so as the funding and human resources of the organization.

FAO clearly understands and recognizes the value of individual food skill, experience and knowledge as their projects and publications indicate. This is eventually aiming to change consumer behaviour and increase the value of food within the food value chain as a whole. It is perhaps ironic that the same institution which has helped to increase of the global production of food now has to contend with the consequences of the reduced social value and price of food. Now FAO is teaching not only farmers how to produce food but also teaching all consumers how to select food, plan and manage food sourcing, prepare food, and how to eat. In this effort, FAO's primary partner is no longer the familiar national ministries of agriculture but rather education ministries and other institutions that are better equipped to support nutritional education, hygiene education, and food waste reduction education. There is an advantage for FAO, in playing the role of a UN agency to lead the educational initiative, as it is generally not seen as having ulterior motives that might arise for other stakeholders such as producers or private sector actors. Education is therefore the FAO's way of communicating not with those connected to agriculture, but rather those who are increasingly disconnected with agriculture and the food system.

These food skills and knowledge have been discussed vigorously in academia for decades but have more recently coalesced under the banner of food literacy (Vidgen and Gallegos 2014). Many researchers study food literacy from different aspects such as nutrition education, food management, food miles, food scape, access to food, and of course FLW reduction. While these researchers conclude that food literacy benefits help resolve a wide range of challenges in the agri-food sector, food literacy is unlikely to become a formal part of a national education system, as only few of the relevant skills can be taught in a classroom setting (Cullen et al. 2015). This is because food literacy is largely performative and expansive unlike math or language which can be measured and tested in incremental and concrete ways (Amouzandeh et al. 2019).

Through the organizational ethnography of FAO, the author uncovered that the issue of food waste cannot be solved by one actor in the food value chain system, but requires an increase in mutual understanding among each actors and committed transdisciplinarity. In the current, linear food value chain system, all of the actors along the food value chain have the potential to generate FLW (see Figure3-3), and its loss/waste management is at their responsibility. Besides the regular market, there are no establishing pipes or routs to transport food surplus to where food is needed.

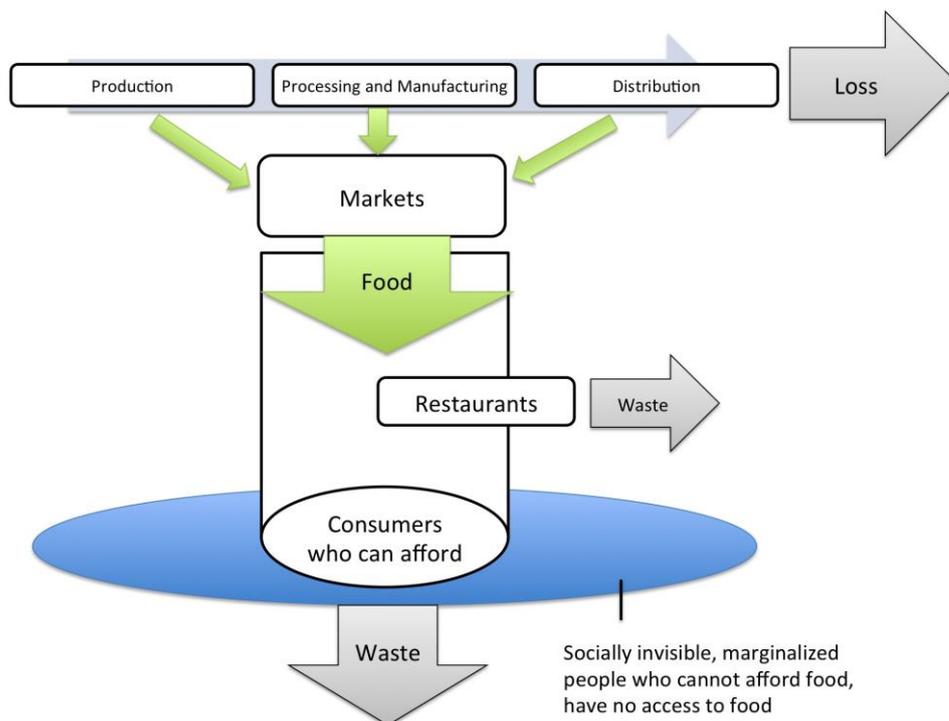


Figure 3-3. Chart of current linear food value chain system and food loss and waste

The next chapter continues the discussion of how top-down approaches to managing FLW are unlikely to succeed without recognition and empowerment of lower-level institutions and individuals. In particular, the chapter focuses on how food banks are becoming not only a space for averting food waste but also for shoring up food security, though their utility is incumbent on active and food literate participants. Since food (things) value is relative, rather than universal, each actor - whether farmers, manufacturers, retailers, consumers, donors or recipients, have their own unique perspectives and interaction with food. For instance, food which is lost for some reasons (packaging damage or cancelation of order etc) market-value is lost for manufacturers/retailers, but they believe the food still has use-value (consumption-value) for some people. Another factor is the possibility, and extent to which food waste can be “transformed” by acting on it to actualize its value. Ultimately, only when people cook with diverted food waste ingredients and then consume the result is food waste truly avoided. This intervention by individuals changes not only the form and shape of the food, but change the accessibility, consume-ability, and social, cultural acceptability, too. In the following chapters, the author examines how food literacy is leveraged to enhance this transformation. Chapter 4 examines how food bank recipients encounter the food assistance from food banks and how they work to transform with the ingredients. Chapter 5 describes how a new movement called Children’s Canteen consolidates food literacy at the institutional level and creates a unique food distribution network to achieve numerous social benefits beyond averting FLW. Finally, chapter 6 covers the author’s implementation of a FLW-reduction project designed for Kyoto University (KU) canteens and analyses how both food literacy (KU canteens’ and KU student’s) interface contribute to reduce food waste.

Chapter 4

The Shift of Food Value Through Food Banks: a Case Study in Kyoto, Japan

Food banks are functioning as a mediator of food donation delivering it to people who are in need. This activity is believed to reduce food waste while helping the recipients at the same time. In this chapter, the author discovers the food literacy the recipients have. She tracks the food donation from the food donors, via food banks, and to its recipients, and then she examines how the recipients are managing/treating the food they received. Through her participant observation, she reveals the transformation of added values of the food.

Using the case of Japan, this chapter argues that the burden of achieving social and environmental goals associated with reducing food waste – namely, alleviating food poverty with food donations – is disproportionately borne by final recipients, who are expected to be thankful for charity even as they are inconvenienced by mismatched food donations.

This chapter starts with the research methodology. The subsequent empirical section of the chapter presents ethnographic, questionnaire and food diary data collected through observation of food banks, food bank recipient organizations, and final recipients. The results are categorized by theme, demonstrating the various channels of utilization and waste along the chain of custody, and how food donations experienced by each actor. The final discussion section explores the differences in understanding of food donations as a gift or burden, and concludes about the potential for heightened awareness of the food donation experience to increase food waste reduction efficiency.

4.1 Methodology

As an empirical evaluation of the diversion of food waste for poverty alleviation, it is of primary importance to evaluate the range and scope of ways in which recipients manage food donations. In order to observe how people perceive food at each link in the chain of custody, the main methodology in this study is participant observation in and around food banks in Japan. The primary research period spanned nine months in 2016, in Kyoto. During this period, I conducted fieldwork at numerous organizations networked together to manage food donations. The case

studies presented in this chapter (see Figure 4-1) included two prominent food banks operating in the city and a purposive sampling of their respective network of recipient organizations, including children’s canteens. These organizations were chosen as case studies for this chapter due to their relevance to the topic and overall good representativeness for the sector of food assistance.

One prominent methodological approach that was used in a variety of settings was participant observation. In particular, I volunteered at Food Bank A, worked alongside other staff. A similar approach, although less embedded, was used to study Food Bank B; I spent considerable time to observe their work and sometimes help out. Figure 1 shows a portion of a typical network of each food bank for further distribution of donated food. The networks are of course much wider than visible in Figure 4-1, as there are many other partners as well as one-time-only recipients. Figure 1 covers the most significant channels for Food Banks A and B. Both food banks started only in 2016, with Food Bank A members comprised of a group leader and three staff members, including myself, as well as occasional volunteers.

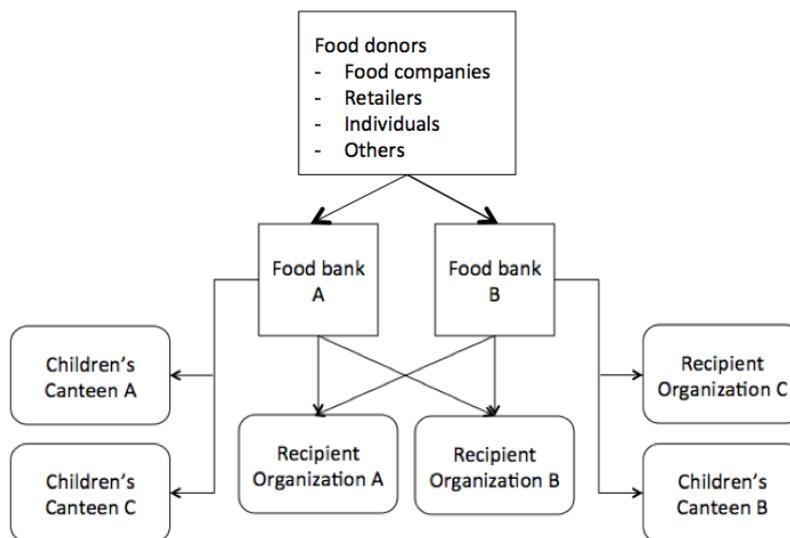


Figure 4-1. Food banks and the recipient organizations

Recipient organizations A and B are shelters for single mothers. Because these organizations have live-in residents, there is a constant need for food. Consequently, both organizations receive a constant supply of food assistance from both food banks. In contrast, Recipient Organization C, which is a soup kitchen, and the Children’s Canteens only serve food occasionally, and are generally not able to store food. Table 4-1 shows how each recipient organization operates and the scope of their beneficiaries.

Table 4-1. The list of recipient organizations and how they receive the assistance

Recipient Organizations	Receiving staff	Number of recipients	Timing of receiving	Operation date	How RO allocates the food assistance
Recipient Organization A	Staff	30 households and some neighbors	4–5 times a month	Everyday	Gather all the food assistance at the lobby and the recipients take it
Recipient Organization B	Staff	20 households and some neighbors	4–5 times a month	Everyday	Gather all the food assistance at the lobby and the recipients take it
Recipient Organization C	Volunteer	5–60 people	2 times a month	Twice a month	Volunteers use the food assistance to cook and eat with the recipients
Children’s Canteen A	Staff	50 people	Once a month	Once a month	Volunteers use the food assistance to cook and eat with the recipients
Children’s Canteen B	Volunteer	90–100 people	Once a week	Once a week	Volunteers use the food assistance to cook and eat with the recipients
Children’s Canteen C	Volunteer	20 people	Twice a month	Twice a month	Volunteers use the food assistance to cook and eat with the recipients

Broadly, the food banks and recipient organizations were studied using the approach of institutional analysis that used both qualitative and quantitative methods to evaluate not only their structure and operations, but also the perspectives of the staff members and beneficiaries. In addition to observation and helping the organization to sort and subdivide the food donations

at the locations of each organization, unstructured interviews were conducted with organization staff and a select group of five final recipients (all single mothers). Recipient Organization A facilitates 30 single mother households and 4 emergency short stay rooms. Recipient Organization B facilitates 20 single mother households and available 15 people for emergency short stay. A numerical questionnaire (26 household respondents) also provided concrete insight into the perceptions of final recipients about their recipient organizations and the usability of food assistance.

In addition to interview data, the capacity for final recipients to utilize donated food was evaluated using a self-report diary of cooking/consumption from final recipients of Recipient Organizations A and B. This diary, completed by 10 families with children, tracked how informants made use of the donated food during their routine life during the months of July and August 2016. Specifically, informants recording all the food they cooked and ate for a week after receiving food assistance from a food bank.

In order to complement and counteract the diary data, which is likely affected by observation bias, the sampling frame for the numerical questionnaire purposefully includes informants with a wide range of skill level in cooking. Particularly the responses to question 5 (Table 5) provide insight into the difficulties of using mismatched or old donated food.

4.2 Empirical Results

This section consolidates empirical data and initial reflections across a set of themes that demonstrate the capacity for recipients to transform donated food, their perceptions about the changing value and usability of donated food, and the barriers facing more comprehensive and efficient use of donated food.

4.2.1 Food Literacy

Food literacy, as an expansion of the terms ‘food skills’ and ‘food knowledge’ comprises the capability of people to plan, acquire, cook, and efficiently consume food (Vidgen and Gallegos 2014). Although it was apparent from the range of empirical data that cooking skills are critical (Caraher et al. 1999), it was also clear that overcoming barriers to utilizing donated food required capabilities in many other domains. In particular, both recipient organization staff and householders noted that they regularly needed to improvise with ingredients, research new recipes, preserve foods, and transform unlikely food combinations to be tasty and suitable for children and the elderly. The interviews in this subsection demonstrate how the recipients with

higher food literacy are better positioned to creatively utilize donated food through more careful planning, event/mealtime organization, innovative processing techniques, and an encouraging spirit.

The staff of Recipient Organization A, for example, exhibit numerous characteristics of high food literacy which enable them to efficiently use donated food. In this shelter, they often cook and eat together, which also creates space for resident children in the shelter to support each other with their homework. While food banks provide a constant source of food, they cannot cover everything so additional acquisition must constantly be planned. Over time, the staffs have learned how to adapt to the mismatched donations of food by searching for new recipes or independent experimentation. For example, when a food bank offered a lot of chestnut squash, which the staff had never heard of, they scooped out the flesh, stuff them with minced meat, and baked them. Such creative efforts are not only aimed at fully utilizing food but also ensuring that children, in particular, will be able to enjoy the food.

Recipient Organization C operates a soup kitchen for homeless people. Although the expectations of food quality are not high from soup kitchens, efficiently utilizing donations and achieving a minimum quality often require considerable effort. They organize events once or twice a week, and for this they often receive rice, sweets/snacks, and bread from a food bank. However, on one occasion they received very old brown rice with an unpleasant odor. Since Japanese consumers more widely prefer white rice, the staff at first tried to mill it but were unable to do so because of the rice's brittle quality. Subsequently, the organization brought fresh white rice, blended it with the old brown rice in a ratio 7:3, and cooked the rice with seaweed and rice wine in order to remove the particular smell and taste of the old rice. Moreover, in order to obscure the unappealing yellowness of the rice, the menu is often curry with rice or rice balls mixed with seasoning. Such initiatives allow them not only to efficiently use donations, but also to create food that is attractive to a wider audience.

The organizers of children's canteens, who confront not only nutritional challenges but also socially alienated children, must develop a broad profile of food literacy in order to effectively attract children, encourage healthy dining, and promote social eating. The aim of Children's Canteen A, for example, is not to focus on poverty but to reduce the number of children and elderly people eating alone. As the main organizer relates, he had a lonely childhood and does not want local children to experience the same. He organizes canteen events once a month in his day-care center with their permission. In order to attract many children in the community, they

aim to serve children's favorite dishes such as curry and rice, deep-fried chicken, or cream stew – all products that are likely to be available in food banks. For elderly people, they cut the meat and vegetables into small pieces and cook them until they are soft so they can swallow them easily. When they plan the menu changes for each month, the staff of Children's Canteen A corresponds with a food bank to try to find appropriate ingredients from their stock, but they must regularly improvise as the stock does not often cover the desired list of ingredients. Children's Canteen C, in contrast, does not rely on the selection available at food banks. Instead, the organizers solicit funding to buy essential ingredients and then complement this with food bank donations if available. The organizers know that many children who live in the neighboring city-run housing complex are left alone to eat and should develop independent cooking skills early in life. They locate their bimonthly events in the corner of a local supermarket, where they can provide opportunity for the children not only to eat, but also to learn about grocery shopping and cooking. In fact, the supermarket shopping is meant to encourage children to buy the ingredients they need, understand how much they cost, and confidently make tasty, nutritious meals.

Final recipients, who are single mothers, often provide evidence of the depth of their food literacy through ingenuity and valuable background experiences. Recipient A explains how she processes the mismatched food she received appropriately so she can preserve and better utilize the food: "In order to preserve the vegetables, I cut and cook them first, and then store them in the freezer." Data from the food diaries (see Table 4-2) provides examples of single mothers who were able to re-use excessive portions of the same food (e.g. pumpkin) through creative cooking and re-arrange. Recipient E, in contrast, relates how she acquired cooking skills as a survival strategy to cope after her mother's premature death: "I lost my mother when I was very young, so I have no memories of being taught how to cook by my mother, but later I could learned from my ex-husband's mother. She introduced me for example to use of long-pepper, which is a cheap local vegetable." Managing without ideal resources and support since childhood can often prepare householders for the challenges of utilizing unusual donated foods (Caraher et al. 1999).

Through these cases, I demonstrate several perspectives about how food literacy can be instrumental in dynamically responding to the uncertainties of donated food. With high food literacy, one can plan for and prepare food in many different variations, which provides soft skills for managing mismatched varieties of food and using up excess food. However, the other

side of this coin represents a considerable concern: final recipients with lower food literacy will not only be less capable of benefiting from food donations, they will be unable to use much of the food, which will then be wasted. Differences in the interviews bears out this concern, as do some of the comments from the questionnaire. In short, while final recipients can potentially make excellent use of food donations, this characteristic cannot be systematically expected to achieve comprehensive utilization of donated food.

Table 4-2. The food diary record using food bank supplies

	Meals	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Recipient food diary A	Breakfast	Bread	Bread	Bread	Bread	*	Bread	Bread
	Lunch	Boiled pumpkin	Baked pumpkin,	Pumpkin miso-soup	*	Pumpkin curry rice, Sweet pumpkin	*	*
	Dinner	*	Tomato spaghetti	Tempura pumpkin	Pumpkin curry rice	*	*	*
Recipient food diary B	Breakfast	*	*	*	*	Mulukiya Miso-soup	*	*

	Lunch	*	*	*	*	<u>Skip</u>	<u>Skip</u>	Cucumber and noodle
	Dinner	*	*	*	*	*	Potato and cucumber salad	*
Recipient food diary C	Breakfast	*	Tomato, cucumber, bread	Zucchini, tomato, cucumber	Bread, tomato, cucumber	Bread, tomato, cucumber	Bread, tomato, cucumber	Tomato, bread
	Lunch	*	Tomato, cucumber, barley rice	Rice	*	*	*	*
	Dinner	Tomato Barley, and rice	Tomato, cucumber	Rice, Okura miso-soup, tomato, cucumber	*	*	Cucumber and noodle	Tomato, mapo eggplant
Recipient food diary D	Breakfast	*	Bread, tomato	Tomato, cucumber	Bread,	Bread, cucumber	Bread, tomato	*

	Lunch	*	*	Tomato, cucumber noodle	Potato and cucumber salad	Boiled pumpkin	Beans and noodle	*
	Dinner	*	Onion miso-soup, Boiled Okura	Potato and cucumber salad	Boiled pumpkin	*	Boiled pumpkin	*
Recipe nt food diary E	Breakfast	Bread	Bread	Bread	Bread	Bread	*	*
	Lunch	*	*	*	*	*	*	Potato miso-soup
	Dinner	*	*	*	*	Onion soup	*	*
Recipe nt food diary F	Breakfast	Bread	*	*	*	*	*	Bread
	Lunch	*	<u>Skip</u>	<u>Skip</u>	<u>Skip</u>	<u>Skip</u>	<u>Skip</u>	*
	Dinner	*	Vegetable soup (Cabbage)	*	*	*	*	*
Recipe nt food diary G	Breakfast	*	*	Bread	Bread	*	Bread	Bread
	Lunch	*	*	*	*	*	*	*

	Dinner	*	Baked bitter goya	Tomato, baked radish leaves, boiled radish	Pumpkin salad	Steamed egg custard with beans	Beans and deep-fried tofu, cucumber side-dish	*
Recipe nt food diary H	Breakfast	*	*	Doughnuts	<u>Skip</u>	<u>Skip</u>	<u>Skip</u>	<u>Skip</u>
	Lunch	*	*	*	<u>Skip</u>	*	*	<u>Skip</u>
	Dinner	*	*	*	<u>Skip</u>	*	*	*
Recipe nt food diary I	Breakfast	Bread	Bread	Bread	Bread	Bread	Bread	Bread
	Lunch	*	*	*	*	*	*	*
	Dinner	<u>Skip</u>	*	Potato and cucumber salad	Potato and cucumber salad	*	*	<u>Skip</u>
Recipe nt food diary J	Breakfast	Bread	Bread	Snacks	Bread	Bread	*	*
	Lunch	*	<u>Skip</u>	<u>Skip</u>	*	*	*	*
	Dinner	*	*	*	*	*	*	*

* The asterisks indicate meals made without ingredients from food banks

4.2.2 Importance of social eating

While food literacy has the potential to rescue more donations from potential waste, the presence of co-diners can also facilitate or challenge the effective utilization of donated food.

On the one hand, co-diners can encourage the organizers or caretakers to prepare shared meals more often and potentially help consume foods not preferred by others. On the other hand, cooking for others requires one to take into consideration other preference, health conditions, and habits. This latter aspect is uniquely challenging as catering to others' needs is difficult enough without the uncertainty of food bank donations.

As discussed above, children are often some of the most difficult co-diners to please. Not only do they have idiosyncratic and narrow food preferences, but they are less able to cope with unfamiliar or adverse eating experiences. Children's Canteen A has adapted to this by seeking out commonly-donated foods that are also children's favorites, such as curry, deep-fried foods, and stews but to ensure interest from children, they often must acquire food from markets. Even more extreme, Children's Canteen C, which is more concerned to develop food shopping and cooking skills among children does not depend on the unstable donations of food banks. Children's Canteen B, which is a subsidiary initiative taking place in a church kitchen, similarly does not rely on food banks for their core dining organization but rather as a complementary benefit. The main dishes prepared for children are made from ingredients donated by community members or purchased with funds from charging people entry. Food bank products, often candy, snacks, and juice are collected at the entrance of the church kitchen for participants to take free. While this avoids waste, the poor nutritional content of many of these donations conflicts with the wholesome meals cooked for Children's Canteen B.

A different strategy is to embrace the unusual range of products provided by food banks as a fun challenge over which people can bond. One clear empirical example is the "secret codes" shared by participants of Children's Canteen C. The organizers and participants have a secret recipe only known to them that is composed of common food bank items, namely fruit salad. To maintain camaraderie they refer to the fruit salad indirectly as "that" and "it," often suggesting cheekily, "Today, let's have 'that' after the lunch!" An outsider would not know what they are talking about, which serves to enhance the sense of belonging to a group.

Final recipients, in managing the uncertain amount and composition of donated food, face the widest range of barriers to full utilization of all the actors in the transformation of food waste. All the interviewees commonly share their joy of sharing meal with their co-diners and yet there is also their insecurity about meet the expectations of their co-diners, particularly children going through different hormonal phases of their life.

[Recipient A] I did not like cooking when I was young. In fact, I did not need to cook because

my mother always cooked for us. I thought cooking was bothersome back then. But I believe if a child has grown up eating homemade meals, the child comes back to homemade meals, and this includes me. This is also true when I see other friends who are mothers, too. When children are in their adolescence, they eat junk food or fast food with their friends because they think these foods are “cool,” but when they become adults, they come back to homemade meals again. If their mothers have cooked for them, they believe it is right to cook. When I became a mother myself, I felt it was natural to cook, and did not feel obliged.

[Recipient B] I try to serve meat and fish every day in rotation. If my son eats up all I cooked for him, I feel happy. I want the food bank to bring more vegetables. The root vegetables, for example can last a long time. When I cannot serve him any vegetables in a meal, I feel very sorry for him. I even feel guilty if I serve him a ready meal.

[Recipient C] I am thankful for the food assistance from the food bank, but we get the same kind of bread all the time and my son finally got bored of the taste, and refuses to eat it.

Even without the uncertainties and limits of donated food, the peculiar challenges of child-raising complicate the full utilization of donated food. Recipients B and C is notably frustrated with the lack of products that she finds important for her son. Recipient A, in contrast, believes that the content of the food is less important than the social setting and so therefore it is less important to set strict guidelines for children’s food. This view of child-raising suggests that children are resilient and will eventually become more forgiving about donated food and its associated inconveniences.

Indeed, throughout the process of adapting to food bank uncertainties, actors such as mothers and children evolve to suit the new reality. In the food diary record (see Table 4-2), a free comment section for each day included incremental adaptation such as, “My son liked pumpkin tempura, he just wanted the pumpkin tempura to be a little harder,” or “my child was delighted to see the corn in food assistance because corn is her favorite,” or “I liked putting pumpkin into my miso-soup, but my son preferred potato over pumpkin.” In general, children’s preferences dominated the menu planning and management. All the mothers who participated in the diary keeping were very sensitive to how their children reacted and whether they liked their cooking or not, which in turn impacted their assessment of food bank donations. Social eating was also a strong impetus for accelerating efforts to cook wholesome meals. According to the food diary record table (see Table 4-2), when the final recipients have dinner together, there is a 90% chance that they will cook, whereas there is only a 10% chance that they would cook if they

were alone. During the observation period, 16 meals were skipped by five participants, and three informants regularly skipped meals. The skipping meals often happened when they ate alone. Skipping meals mostly happened at lunchtime, because the children were away at school/kindergarten, and they received school meals.

4.2.3 Reconciling skewed or impractical donations

When food banks redistribute donated food to people in need, the food is either provided as is or can be further processed or cooked. A typical scene at a food bank in Kyoto is the selection and packaging of food in bags or cardboard boxes according to recipient information provided by the municipal social welfare office. The final recipients are either in a dire situation such as homelessness or lacking household utilities — for which they typically will receive pouch meals, instant food or emergency rations – or are more chronically disadvantaged recipients with nutritional deficits. In the latter case, the final recipients may receive donated food from social welfare officers; the boxes, however, are packed without consideration of the specific beneficiaries. Another point of access to food bank assistance are social organizations such as soup kitchens, orphanages, shelters, etc. In these types of outlets, the organization staff will either cook the food (to the best of their ability, see 4.2.1) or redistribute it to the users of the organization. In this case also, food bank staff rarely see or hear about the final recipients. As such, even when further intermediaries are involved, such as the recipient organizations listed above, the food selected and distributed by the food bank is not tailored or customized to the audience to a high degree. Similar to other countries (Douglas et al. 2015), skewed donations with excessive amounts of one food type, or impractical donations, such as sweets and snacks, are a particular problem for many final recipients who are single mothers, as they usually have less time, space, budget, and infrastructure to cook.

A representative case was related by one of the interviewees concerning her recovery from the depression. She narrated that,

I had been depressed because of a long divorce mediation. At the time, I had no motivation to cook at all, but now, I am recovering and find cooking fun. And yet, I still have no choice but to serve ready meals to my child and I depend on them when my health is poor. [Recipient C]

This kind of story is not unique among recipients interviewed for this research. Many food bank recipients have some personal problems or difficulties, the least of which is food poverty. In this sense, many recipients have below average capacity for managing adversity arising from skewed or impractical food donations.

To some degree, recipient organizations can help manage this burden. In Recipient Organization A, the donated food is left in the lobby for residents to take as much as they want. The recipients' main dissatisfaction regarding the content of food bank assistance is that there was not much food they could use for cooking. Most of the food types were bread, flavored pastries, bagels, muffins, cakes, and some canned food, ready meals. Only occasionally would vegetables and rice appear. The typical durable foods may not only burden final recipients who wish to cook warm meals, but are often inherently unhealthy. As final recipients rarely encounter food bank staff in person, this questionnaire in this research elicited opinions concerning the utility of the food bank donations and their capacity to prepare healthy meals regularly. One result arising from Table 5 is notable in this respect: although the vast majority of respondents answered that the amount of food was appropriate, they were dissatisfied about the limited variety of food and struggled to integrate these foods into their cooking. As a consequence, half of the households (13 out of 26) answered that they experienced throwing away some of the food donations they received.

Food donations that are subsequently discarded arise from two different kinds of dilemmas facing recipients. In some cases, the food is spoiled and must be thrown away at the recipients' expense. Recipient A reported in her interview: "I got onions from the food bank, and almost half the onions were rotten inside when I cut them in half. But I did not complain about it, because it was free; it was lucky that the other half were safe." As Table 4-3 shows, discarded food is often associated with previous damage or decay. In other cases, the food cannot be used due to its misalignment with recipients' needs. In many cases, children rejected the food or the food contains too much sugar, salt, fat for children. In other cases, recipients' food literacy is not adequate to creatively repurpose skewed or impractical foods. Such cases are reflected briefly in Table 4-3 below, but also frequently narrated in person interviews with final recipients. Discarding donated food for any reason was often a source of embarrassment or guilt, even if the food was objectively skewed or impractical to begin with.

In the comment section of the questionnaire, the final recipients often expressed their appreciation for the food banks but felt guilty about wasting donated food. The eight participants who threw away bread in the past stated that they preferred rice over bread, acknowledging, for example, that "I can eat bread, but I appreciate rice more," and "rice would be never wasted." Although eating bread is now popular in Japan, rice is still the dominant cultural staple food and its shelf life and dynamic utility make it suitable for improvisation.

Soon-to-expire breads are often available every week, and even with freezer storage, there is typically more bread than they can store. Even though these final recipients could technically eat bread more often, they have to consider their children's needs, likes and dislikes, health, and social life, as well as their own. If the food assistance does not meet these conditions, bread may be viewed as a burden rather than a gift, especially if guilt is associated with discarding it.

Table 4-3, The Results of the Questionnaire

Q1 Was the amount of food assistance appropriate?	
Appropriate	15
A little less	6
Not enough	0
Too much	4
No answer	1
Q2 Was the expiry date on the food appropriate?	
Appropriate	13
A little less	6
Not enough	6
Too much	0
No answer	1
Q3 Were the contents of the food satisfactory?	
Satisfactory	4
Not very satisfactory	18
Unsatisfactory	0
Left some food	3
Q4 Have you discarded food from the food assistance?	

I ate it all	13
I have left some food	13
Q5 Which food have you discarded and why?	
Bread	The expiry date was too soon
Bread	I got the bread on the expiry date
Bread	It has gone bad because of the heat
Bread	No space to fit in the freezer to store it
Bread	The amount was too much for me
Bread	The amount was too much for two of us
Bread	The amount was too much and the expiry date was too soon
Bread	The expiry date had already passed
Bread	No answer
Rice	The color of the rice was strange and my children did not eat it
Broccoli	It smelled strange
Vegetable	It was too old
Potato	I already had potatoes at home and did not need the extra potatoes
Not specified	The food went bad too quickly
Not specified	My children refused to eat it
Not specified	The expiry date was too soon
Not specified	The expiry date had already passed
Not specified	The package was broken and the content was leaking so it went bad
Not specified	It was already rotten, moldy and had deteriorated when I got it

(26 respondents)

4.2.4 The shifting burden of donated food

A fundamental challenge of food aid distribution is that intermediaries are loathe to reject food donations. On the one hand, their operations rely on donations and they hope to receive continuous deliveries; on the other hand, if the food is not easy to valorize it may burden the food bank or final recipients, and anyway be discarded. One notable problem is the receipt of objectively unacceptable or unsafe food. Typically after collection, food bank staff sort it out by type and expiry date. If the staff find food that has expired and/or looks/smells rotten, the food is discarded. In this sense, perishable food is both welcome (desired by final recipients for cooking) and unwelcome (it is more frequently spoiled or difficult to transport/pack). Food bank offices have limited infrastructure and often do not have enough refrigeration for long-term distribution. Therefore, perishable foods must be quickly dispatched to recipients (usually organizations) who demonstrate a continuous need for fresh foods. However, even if the food has a long shelf life, there are many unwelcome foods (see 4.2.3). In particular, emergency food which is kept for times of disaster is frequently donated in bulk before its expiry date, leading to gluts of such foods during certain seasons. Yet, no matter the condition and type, food banks depend on donors for their continued operation and thus feel obliged to treat the food as a “well-intentioned” gift that “should be appreciated.”

As the questionnaire research result shows (see Table 4-3) many of the final recipients forced to discard food or generally found it difficult to use up all the donated food they received. An equivalent of this challenge arises in food banks as well, such as when the volunteer staff sort out food they think is appropriate to pass onto recipients or not. Recipient Organization A, a domestic-violence shelter for single mothers, that offers the donated food in its lobby. To avoid conflict, the staff sometimes separate food into small containers to prevent certain recipients from taking too much.

We take whatever the food bank gave us, and thank them. But if there is too much food, sometimes we have no choice but to throw it away. The amount of food assistance varies each time—sometimes it is too much, sometimes too little. If it is too little, not all residents can get what they want, and if it is too much, staff have to throw it away (Organization A staff, Oct 19th, 2016)

Similarly, Recipient Organization B, another shelter in the city, faced the same problems. They sometimes receive too much bread, so much so that the residents in the shelter cannot eat it all, and the staff have to think of other ways not to waste the excess. The bread often gets left, and

the staff have to pass it on to neighbors or eat it themselves or throw it away. In this case, assuming that sharing with neighbors is common practice when people receive an excess amount of food, the food assistance is given not only to the final recipients.

Sorting and considering food are critical because these processes mitigate the transfer of unnecessary negative feelings, such as burden to sort or guilt related to discarding food, to final recipients. Recipient Organization C is a good example in how it takes particular effort to sort and match food with appropriate recipients while creating new ways to divert potential food waste. Specifically, Recipient Organization C helps homeless people by providing both a social eating space as well as the possibility of food to take away. After the meal, they have teatime, including tea and sweets that they received from the food bank. There are boxes full of cookies that taste delicious. However, the cookie packaging suggests that these cookies were made as funeral gifts. Thus, the staff break all the boxes and rearrange the cookies on the plate so there is no hint to those in the soup kitchen that the cookies were in fact from a funeral. This recipient organization also passes on bread to homeless people who cannot join the soup kitchen event. Once a month, they also provide bread directly to homeless people at the main station. The bread is often delivered in bulk, so the staff have to repack it into small bags. For distribution to homeless and the elderly, the staff avoid hard bread such as baguettes because many recipients are unable to chew it effectively. They also use opaque bags so the recipients cannot see what is inside and have competitive feelings. Given the uneven availability of foods, this helps avoid recipients fighting over food or becoming unduly jealous of other food assistance beneficiaries. All these observations point to a post-donation reality in which significant labor, ingenuity, and new costs are involved in diverting food waste. Without these efforts, donations would not achieve their intended goals nor become valorized through creative re-use.

4.3 Conclusion

Broadly, the empirical evidence above provided important points about how to optimize food utilization. A general conclusion that can be drawn here is that motivated and skilled final recipients are the key; while many do have the important skills to repurpose skewed or impractical foods, others face barriers (time constraints, lack of knowledge, fussy children at home, etc.), which suggests that the corporation and contribution of final recipients cannot be taken for granted. In short, if recipients are the ones who ultimately to save food from wasted, donors should also be thankful that the downstream actors were actually able to use the donated

food. With higher food literacy, more there are possibilities the food donations to be utilized with joy; not only in the cooks but also co-diners as well.

However, not all the food assistance is necessarily nutritious or appreciated. Food that recipients could not utilize in cooking, or fails to appeal to their or their co-diners palates, will simply be discarded without much feedback. Those recipients who do not/cannot cook receive only food which they can handle and thus their diet choices remain constrained. Excess, unwanted or surplus food no longer has exchange value so donors are happy if other types of value can be created, such as use value by recipients, public relations value for their marketing, and environmental value (diverted waste, cost savings). Food Banks can often provide these value as a return gift to donors but in fact these new values are not realized until final recipients actually consume the food (according to Thompson 1979).

Almost all the recipient organizations and individuals focus not only on satisfying people's hunger and serving food, but they also focus on the connection between people who they care for during the meals. In order to make the connection and have a bonding experience, it must be clear who provides the food and who is receiving it. The cooking process makes who the provider is clear, and the experience of dining together creates memories of receiving it and a sense of belonging. Moreover, food literacy increases the variety of dishes and the chance of utilizing many kinds of food. The ability to organize a group meal, even within a family, enhances the chances of communication and therefore provides the chance to socialize. These skills and opportunities are often fundamental and people overlook the power of their skills. These skills not only prevent people from isolation or marginalization, but also empower people to connect, and participate in a community spontaneously. The policy could help people to raise awareness of the importance of cooking and dining skills. Consequently, supporting the delivery of the food would promote more raw and fresh food consumption, and healthy diet choices, and could also prevent people from falling into social exclusion.

When the recipients cook and personalize their food assistance, it is able to create social bonding among those who dine together. It is neither the food donors nor the food banks that create this social bonding. Food waste has lost its value as a commodity and yet it still holds its exchange value. Researchers have a higher standard than donors for attaching value, so it is our duty to measure the actual conditions affecting the ultimate utilization of excess or unwanted food.

Along with efficiency measures and cost in terms of food banks, more research is needed on the

status of food bank recipients so as to focus not only on the nutritious value or availability of the food, but also on the skills and knowledge of how to handle food so it can reveal the importance to the recipients and thus empower them. Although recipients should be thankful for food donations, food donors would be wise to be thankful and supportive of the actors who work hard to realize non-exchange value for donors, such as praise, respect, poverty alleviation and environmental credibility.

Chapter 5

Institutional food literacy in Japan's Children's Canteens: Leveraging food system skills to reduce food waste and food insecurity via new food distribution network

This chapter, analysing the forms and evolution of CCs throughout Japan, explores how food literacy is expressed and utilized by organizers as a matter of everyday practice, with a focus on its role in managing food waste. Although nominally CCs are understood as a food safety net by providing essential meals for children, their influence extends from managing donated food to providing supportive co-eating spaces for both elderly and children to socialize. While not explicitly operating for the sake of reducing food waste, their routine application of food literacy for the purpose of utilizing food donation can be studied in line with previous research about food waste reduction of domestic households. Therefore, this chapter's research question is, foremost, how food literacy interacts with the capacity for reducing food waste, and secondarily, how collective or institutionalized food literacy can be conceptualized outside of the usual household unit of analysis.

5.1 Research Sites and Methodology

The children's canteens movement is already prevalent in every prefecture in Japan. Although we conducted rapid ethnographies of CCs in mainland Japan, and cultivated a number of key informants for continued data gathering, a more in-depth and long-term organizational ethnography was conducted in Okinawa over 6 months in 2017-2018. Okinawa has the highest rate of the poverty and child poverty in Japan. In this environment, the range and intensity of challenges facing CC organizers is more visible than in most parts of the mainland of Japan, and therefore easier to capture in research.

Table 5-1 presents all 20 CCs where the authors conducted fieldwork, usually participating in the operation as a volunteer, including interacting with, interviewing, and observing the staff and children. The ethnographic scope often extended beyond the CCs to include semi-structured interviews with municipal officials, children's parents, donors, other NPO/NGO staff, local University professors, schoolteachers, and religious leaders. The CCs in mainland Japan were specifically in the prefectures of Osaka, Kyoto, Nara, Shizuoka, and Tokyo. These activities, in

addition to longer-term participant observation and recruitment of many more informants, were conducted in Okinawa. The list indicates the following elements:

- prefecture in which the CC is located
- frequency of operation
- labour system: unpaid volunteers, remunerated volunteers, or professionals
- restricted: whether the CCs are open to anyone to the public or some restriction is imposed, such as advance reservation or child-only admission
- price: shows how much the CCs charge, if at all, for adults and children

Table 5-1. List of Children's Canteens surveyed in this research

Children's Canteen	Frequency	Labour	Restriction	Price Adult/Child
Osaka				
A	1/w	Volunteer+	restricted	200/0
B	2/m	Volunteer	open	200/200
C	1/m	Volunteer	open	100/100
D	3/w	Volunteer	open	Free
E	1/w	Volunteer+	restricted	-/30
F	1/m	Volunteer	open	200/0
Kyoto				
G	2/m	Volunteer+	restricted	Free
H	1/m	Volunteer+	open	Free
I	3/w	-	-	-
J	1/w	Volunteer	open	300/0
K	1/m	Volunteer	open	300/0
Nara				
L	1/m	Volunteer	open	200/0
Shizuoka				
M	3/m	Volunteer	open	Free
Tokyo				

N	3/w	Professional	open	Free
Okinawa				
O	Daily	Volunteer+	restricted	Free
P	2/w	Volunteer	restricted	Free
Q	1/w	Volunteer	restricted	-/100
R	2/w	Volunteer	restricted	Free
S	Daily	Volunteer+	restricted	Free
T	1/w	Volunteer	restricted	100/0

+ Run by volunteers and paid staff of either NGOs or a private company

The fieldwork was not limited to the ethnographic research within CCs, but was also commonly expanded to include informants in the broader food waste sector, including donors, municipal officials, and relevant community members. We traced back who donated what food, as well as their reasoning and motivation. In this process, interviews were often conducted with city officials, companies, farmer/fishery unions, wholesalers, retailers, the US military base, and religious groups. These interviews occasionally took place ‘on the job’ (during interactions with CCs) or in specially separate interviews. Recipients (often children and their parents) are another group of informants that were sought out. These semi-structured interviews, which were mostly conducted on site at various CCs, focused on why they use the CC, what aspects determine their level of participation in the CC, and generally how they feel about the CCs – meals quality, utility in releasing burdens of parenting, chance for socialization for parents and their children, etc. After all, the contribution of CCs is determined by the scope of their use in the community and, specifically, the potential for diverting food waste is correlated their attendance and popularity.

During the long-term ethnographic fieldwork in 2017–2018, one of the authors was stationed at a children’s canteen in Naha city, Okinawa, which will hereinafter be referred to as Nahano CC to distinguish it from the others. Nahano CC is represented as Children’s Canteen O in Table 5-1. The Nahano CC was uniquely suited to intensive fieldwork because it operates every day, except Sunday morning. This regularity was an important research consideration as it permitted participant observation to be conducted in a limited time period.

The location of Nahano CC is also an important research consideration, as it is readily accessible (by foot or bicycle) for a wide demographic group, whose conditions could be observed. Most significantly, Nahano CC is close to many schools (see Table 5-2), which means

that children, even younger children, can access the CC independently. Elementary school A, Nursery school E and High school D are all located within walking distance of Nahano CC. Elementary school B and Junior high school C are a little farther from Nahano CC, but children could still access the CC either on foot or bicycle. Beyond schools, Nahano CC is walking distance from a big municipal-run housing complex, in which many of the residents are low-income families or elderly people. These residents, often refer can also be represented among the informants.

Table 5-2. Accessibility of Nahano CC from local schools

	Distance to Nahano CC	Means of transportation
Elementary school A	450 m	On foot
Elementary school B	1.2 km	On foot or bicycle
Junior high school C	1.2 km	On foot or bicycle
Nursery school E	300 m	On foot
High school D	270 m	On foot

The findings presented below focus primarily on the narrative and conditions of the Nahano CC, as understanding the impact of food literacy requires an in-depth understandings of the value chain and the vagaries of food preparation and serving. Nevertheless, it is clear that most, if not all, CCs that were visited in this research face the same conditions; in most cases, the challenges of operating the other CCs are matched against their structural differences in timing, fee, labour force and accessibility. Reflection on the relevance of these differences are mentioned throughout and revisited again in the conclusions.

5.2 Empirical Results

5.2.1 Emerging new food distribution network

Across Japan, CCs rely heavily on food donations to reduce the material cost of operation but doing so complicates their mission to provide attractive and accessible destinations for children or vulnerable people. While a homeless soup kitchen may be able to function even if the food is less presentable and atmosphere less friendly, the identity of CC as *ibasho* and the clientele demand a more congenial environment. As such, in addition to nutritional and hygiene

considerations, CCs must be creative in how and what food they source to ensure that children or elderly will consistently return. For regular CCs, such as Nahano, it is therefore unsurprising that food donations come from all sorts of organizations and individuals. Indeed, by being open every day and mobilizing a robust network, Nahano CC can function as a central hub of food distribution. The operation time is (after school) 15:00 – 18:00 from Monday to Friday, 10:00 - 18:30 on Saturday, and 14:00 – 18:30 on Sunday.² When there is a long vacation such as summer or winter vacation, Nahano CC opens from 10:00 – 18:30 throughout the holiday period. This regular schedule is an outlier among the CCs in Japan, many of which operate either once a week or month (this trend is visible in Table 1). This consistency is due to the ideology of Nahano CC's organizer who says, "children who are in need, need help everyday, not just a certain day of the week or month." For unorthodox donors, such as restaurants and farmer/fisher cooperatives who often have excess on a daily basis, the regularity of Nahano CC makes for a good partnership. Figure 5-1 illustrates Nahano CC's food distribution network; where, who, what is being donated, and what resources/characteristics of Nahano CC facilitate these donations. In addition to the Nahano CC itself, there are also 13 other affiliated CCs in Naha city for possible further distribution. This network is by now positioned to absorbing a wide range of varying quantities of potential food waste.

² Nahano CC has reduced their opening days slightly from May 2018 by closing Tuesdays.

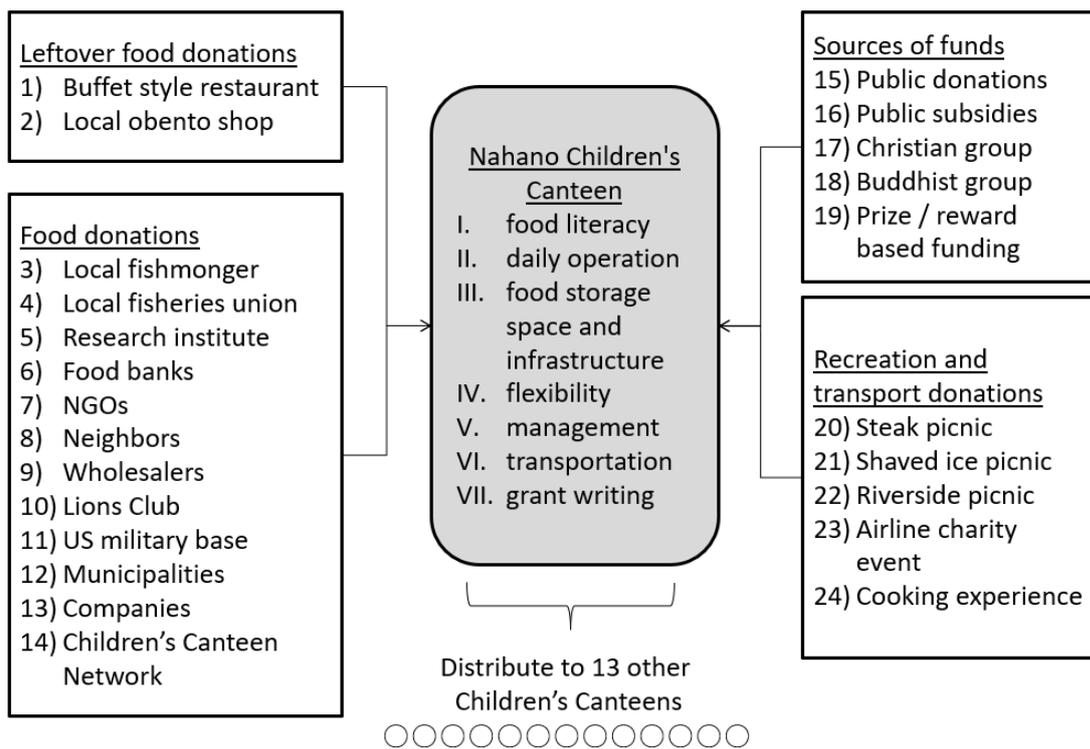


Figure 5-1. The food distribution network of Nahano Children’s Canteen and institutional resources facilitating distribution (in grey)

Being a donor recipient and distributor involves a considerable amount of managerial experience, with many of the necessary skills similar to those in four pillars of food literacy (Vidgen and Gallegos 2014). This is acutely visible in the daily interaction between Nahano CC and a restaurant owner who donates leftover food daily. The owner is a local entrepreneur who runs several businesses including the buffet style restaurant depicted in Figure 1. Daily donations started in May 2017 and proceed as follows: everyday at 15:00 the Nahano CC organizer makes a phone call to the restaurant to ask how much lunch leftovers are available that day. The restaurant staff describe the leftovers, after which the organizer decides whether it is enough for the children or otherwise worth coming to pick-up. If the leftover amount is sufficient, then the organizer drives to the restaurant to pick up. Even if the amount is a little short to feed everyone in the CC, they still accept it most of the time since they are confident that they can add something by cooking at the CC. Coordinating the logistics of this food connection, including transport, hygiene, and storage and making a decision about the suitability of the food mobilize the first two pillars of food literacy visible in Figure 5-2 (Plan and Manage; Select). Once the CC organizer brings back the leftovers, the staff judge how to re-arrange or

adjust the taste for children, depending on the amount, whether or not to add food to meet children’s needs for that day. This process further reflects the second pillar of food literacy (Select).

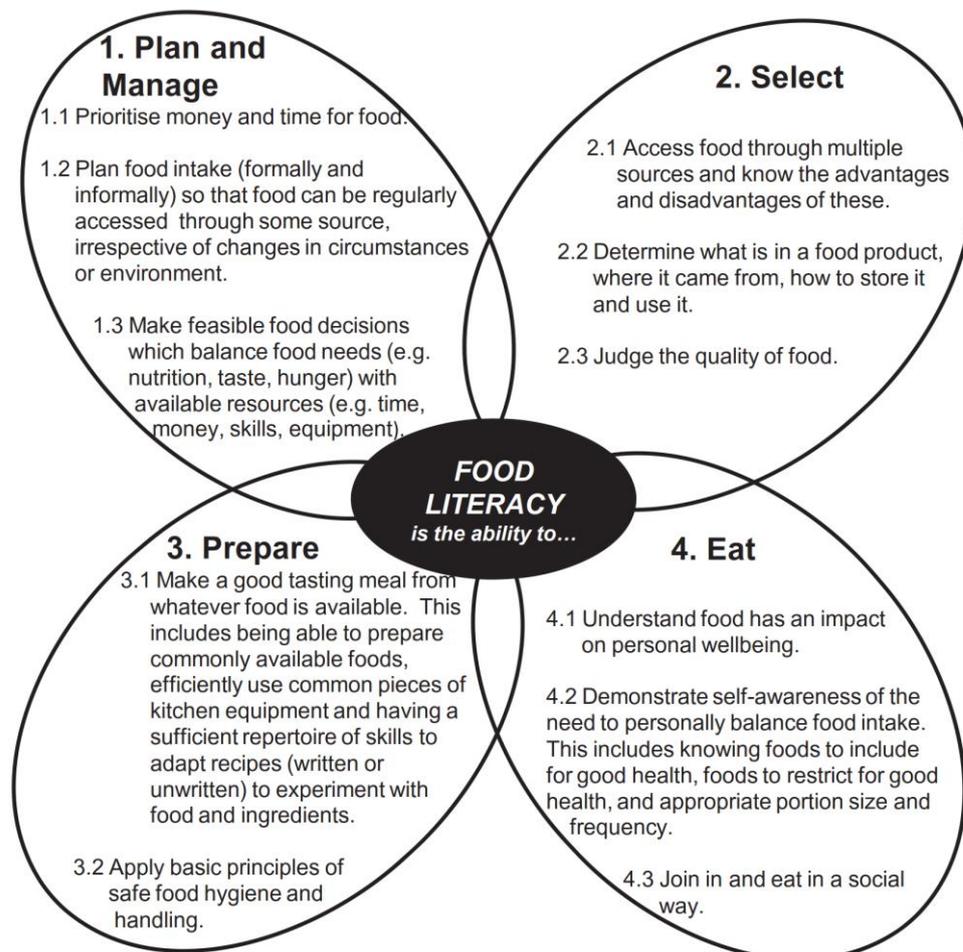


Figure 5-2. Food literacy pillars and components (Source: Vidgen and Gallegos 2014)

Carrying out these adjustments in response to unpredictable donations requires a high-level of food literacy, as it entails determining the right amount of food to make and serve, the appropriateness of the menu, and the need for any amendments. The CC staff have to adapt nimbly to the random leftovers by re-heating, adding missing food components (such as sauces, carbohydrates, or fiber), presenting the food appealingly, rendering vegetables appealing to children, and re-cooking to make the flavour more children-friendly. Sometimes, they deliberately (re)cook dishes that are suitable for using up unappealing vegetables or surplus processed food. These skills strongly reflect the third and fourth pillars of food literacy (Prepare; Eat).

Leftovers present a unique challenge in any household but in an institutional environment with

primarily children as recipients, the need to leverage all kinds of tricks and experience is significant. The challenge begins by understanding what is considered desirable to children of various ages and backgrounds and working to render the food acceptable. This can involve, variously, moistening or drying the food, or removing excess oil, re-processing morsel sizes, removing unappealing bits, and tinkering with the flavour in other ways. All the food is tasted and checked for quality before it is served to children. Typically, re-heated leftovers and newly created dishes are served in big plates/bowls and presented nicely on the table. The presentation is also an important factor to encourage children to eat all of the foods. The CC staff never serve food to children straight from the containers. Although the children in the CC technically know that some or most dishes are leftovers from a restaurant somewhere in the town, there are two key factors, which diminish the negative connotations of leftovers. Firstly, the presentation of the food and the fact that the CC staff are diligent in taking care of the food and, secondly, eating meals with peers and siblings.

Although the CC staff makes their best effort to use up all the food resources, waste is still generated. This arises by chance and through the idiosyncrasies of maintaining their robust food distribution network. For example, the CC organizer takes all the leftovers from the restaurant even when he knows that the amount cannot be consumed in one day. This is about maintaining good relations with the buffet restaurant by covering the transport/disposal costs for them in return for the regular donations. Indeed, leftovers are generated almost every day at the CC, usually when the amount of the donation is simply too much, or the taste is suitable neither for the children nor the staff. Some dishes can be stored for the next day, often to be integrated into new dishes, but otherwise excess food either goes to waste or can be donated to other CCs. In maintaining the food distribution network, Nahano CC leverages the first and second pillars of food literacy (Plan and Manage; Select) much like a complex household. They have regular sources of food but also receive specialty foods (such as fish or military rations) and other irregular one-off donations.

The variety of food donors is more versatile and numerous when it comes to food ingredient donations (see Figure 5-1), which regularly leverages skills from all four pillars of Food Literacy. For example, a local fishmonger donates frozen fish from time to time. He makes a phone call in advance and then brings surplus frozen fish. Similarly, the local fisheries union donates freshly caught fish, such as tuna and squid. Since overfishing is banned, the donations are nominally caught for Naha CCs, and are not considered excess catch. For both of these

unpredictable deliveries, Nahano CC can accept their offer because they operate everyday, the staff have learned how to effectively cook the fish for children, and they have large refrigerator capacity and freezers to store the raw fish, if necessary. Using the distribution network, these capacities allow Nahano CC to re-distribute to connected CCs which do not operate everyday. As a consequence, Nahano CC operates effectively as storage for other groups, with fresh or frozen products made available when they need it. Nahano CC works also as a storage management hub. This system is good for food donors as well as they can centralize their donations on behalf of 14 different CCs.

One-time donations, which usually involve extreme volumes of specific foods, demand considerable ingenuity to avoid generating waste. One day, a local agriculture research institute donated many boxes of lettuce. The lettuce was harvested for research purposes and could not be sold on the market, yet were completely edible. The research institute contacted Nahano CC hoping they could utilize the lettuce. Nahano CC was willing to accept the sudden influx of fresh vegetables not only because they run every day, but also because they have many possible connections through which the lettuce could be utilized. Their network is so effective that even local food banks, such as Second Harvest Okinawa, can redirect food if they receive donations beyond their capacity. A wholesaler visits Nahano CC from time to time whenever he finds cheap food items at wholesale auctions that he can bid on and donate to Nahano CC. Unlike a formal institution, the Nahano CC can leverage many numerous informal networks, such as the neighbouring housing estate and other food organizations and CCs, to help absorb potential food waste.

Various organizations, companies and individuals outside of the food sector can also be affiliated to Nahano CC (see Figure 5-1). One local NGO provides fresh vegetable donations since they are selling fresh vegetables as part of their employment training. Similarly, neighbours sometimes drop by Nahano CC to donate their home-grown garden vegetables or any food items that they believe would be beneficial for Nahano CC. A Lions Club member once coincidentally saw the sign outside Nahano CC while traveling on the national road, and contacted them to offer some food donations. There is a pachinko gambling parlour next to Nahano CC, which collects discarded or donated rewards such as snacks and candies, that are irregularly picked up by the Nahano CC organizer. When it comes to the amount of food donation, the US army base might be one of the biggest contributors. They occasionally make food donations either when they have excess food in the base, or if a group of non-military

residents make a collective food donation. Once, the base made a considerable donation of fresh milk donation, a contribution that might be considered unmanageable by many recipient organizations. However, Nahano CC mobilized quickly to re-distribute the milk, which could be utilized by the group of CCs. In general, the flexibility and improvisational capacity of the CC staff allow for a wide range of donors and stakeholders to contribute.

In order to enable and facilitate the primary mission of most CCs (provision of food), CCs must work to create fun and enjoyable spaces that are likely to attract children. Much as a household would do, CCs often seek out some form of entertainment or diversion to complement the social atmosphere they create. As a result, recreation and special activities are also relevant donations (see Figure 5-1). The Nahano CC organizer, working with another NGO dedicated to ex-prisoner rehabilitation, organized a steak picnic and shaved ice dessert picnic. Steak is an iconic and popular dish in Okinawa, and almost all children love to go to steakhouses. Shaved ice desserts are an all-time favourite for children in the hot climate in Okinawa. Low-income families are less likely to have the resources to provide these types of activities and events. Sometimes the events are simple, such as a riverside picnic that was organized simply by Nahano CC staff by creating a simple obento (lunch box) for children to experience an open air picnic. When the CC staff have extra energy aside from daily operations, they will often organize cooking activity experiences, for the children. This is one of children's favourite activities. They can play with food while they learn how to cut, bake, grill, mix, boil, peel, measure food, etc. Otherwise, donated charity picnic events occasionally provide free advertising for the restaurant, especially if the CC can mobilize to have a local newspaper cover the story. Airlines have also hosted charity events at Naha airport, which included a factory and aircraft tour.

Naturally, operating a CC also tests the financial management of the organizers, which is broadly in line with pillar one of food literacy (Plan and Manage). Some structure exists to support these organizations, such as the Children's Canteen Network, an online resource connecting CCs in all Japanese regions. The registered organizers receive e-mails about funding opportunities or food donations. But it is also important to generate locally embedded resources. In Nahano CC's case, they have cultivated a separate network for financial donations (see Figure 5-1). First, they have their own website and account that can public donations through money transfers. Second, they are receiving financial subsidies from the Naha municipality. They have been receiving 100,000 yen (USD 930) every month and, although 100,000 yen does

not cover all the expenses for the running of Nahano CC, this was the major financial source to cover their non-food expenses. Third, they have a strong connection with the Christian community, and thus they were receiving financial donations from a Christian group. But they were also receiving financial support from Buddhist groups, as well. Finally, they garner occasional funding by applying for grant and prize funding. Either information sent by Children's Canteen Support Network or through local information, Nahano CC organizers have a strong capacity to seek out and competitively apply for alternative funding.

So far, CCs have been described largely in institutional terms, with only occasional reference to the main organizer's unique contribution. There is, however, some awkwardness when the capacities of a CC are equated with food literacy, which is designed to measure skills of individual persons. The next section addresses this dilemma by breaking apart the individual contributions and associated food literacy of the CC staff and describing how the various people complement each other to engender a broader and more comprehensive "institutional food literacy".

5.2.2 Institutional Food Literacy

One of the weaknesses of the relatively new conceptualization of food literacy is our limited understanding of how food literacy operates at the meso- and macro levels. Even at the household level, there are no models seeking to explain how the differing levels of food literacy among family members interact to produce certain outcomes. In this section, we aim to make a first step in this direction by outlining how the food literacy of CC staff combine in ways that amplify the organization's capacities, much as two parents' combined skills complement each other in a household. This metaphor is somewhat limited, however, as no matter how hard CCs try to recreate a familial environment, they are still external actors with limited claims to legitimacy as guardians. Furthermore, the CC movement is unique, in that there is no unified definitions or operational styles, only a basic focus on food provision and co-eating. The CC organizers interpret the concept by themselves reflecting the needs of local children against their own childhood or against certain idealized visions of childhood. Therefore, the food literacy of the organizers is as important both as a skillset and as a prism through which they interpret youth health and happiness. In short, staff who come together to operate a CC are not only bringing their domestic management skills but also their normative model of care.

From interviews across Japan with CC founders, there is a common narrative that the

uniqueness of the CC movement arises from the managerial role of laypeople: nameless work-at-home mothers, retired men and women, and other community members who are empowered to establish organizations to combat food insecurity and social alienation. Interviewees talked about their experience and memories of their own difficulties raising their children, especially if they were single parents. Organizers often expressed sympathy for the current generation of child-raising mothers and fathers, and felt obliged to offer their help even though they do not consider themselves experts or professionals. In this context, however, lay experience arising from food literacy appears to not only be the basis for the grassroots surge of new CCs across Japan, but also for their inherent accessibility. Often lacking the peculiar experience in food service, CC founders mobilize their domestic skills with the consequent re-valuation of food literacy among staff.

In part, the CC movement made the improvisation dimension of cooking legitimate to the public by demonstrating that food literacy, manifested as collective food knowledge and domestic managerial skills of laypeople, can create functional grassroots organizations. In most of the CCs which were studied there emerged a natural division of labour based on personal skills and food literacy, which contributes to collective management capacity and efficiency. For example, in Nahano CC there were five volunteers who were in charge of cooking meals, including the participating author at the time. None of the volunteers were professional cooks, yet they naturally contributed to jobs in which they excelled. Ms. S, the chief figure in the group, admitted that she is not as good at cooking, but rather very good at shopping, sorting, and keeping track of food stocks. Ms. M was also not confident in meal preparation but enjoys clearing, washing up, and overseeing the food presentation for children. Ms. N and Ms. H were very good at cooking, particularly quick, child-friendly meals. They are also knowledgeable about the local food system and cuisine so can provide a distinctive Okinawa approach for the children. The author, who could contribute by cooking and serving as sous chef, was also indispensable in translating labels from foreign food labels that were donated by the US military base. The division of labour also sparked continuous brainstorming about food and management, created opportunity for upgrading one's food literacy, and for distributing the responsibilities in a fair way. Since most volunteers are good at taking care of children, they can usually revolve between the kitchen and play/eating area to help diversify their job. For many volunteers, who are, or were, the primary domestic figure in their household, this sharing of responsibility is a welcome mental respite.

The combined food literacy of CC staff also contributes to the reduction of food waste, which is an indicator of efficiency and point of pride for CCs. As an overview, Figure 5-3 illustrates how this ‘institutional food literacy’ is applied to optimizing food utilization and saving food from being wasted.

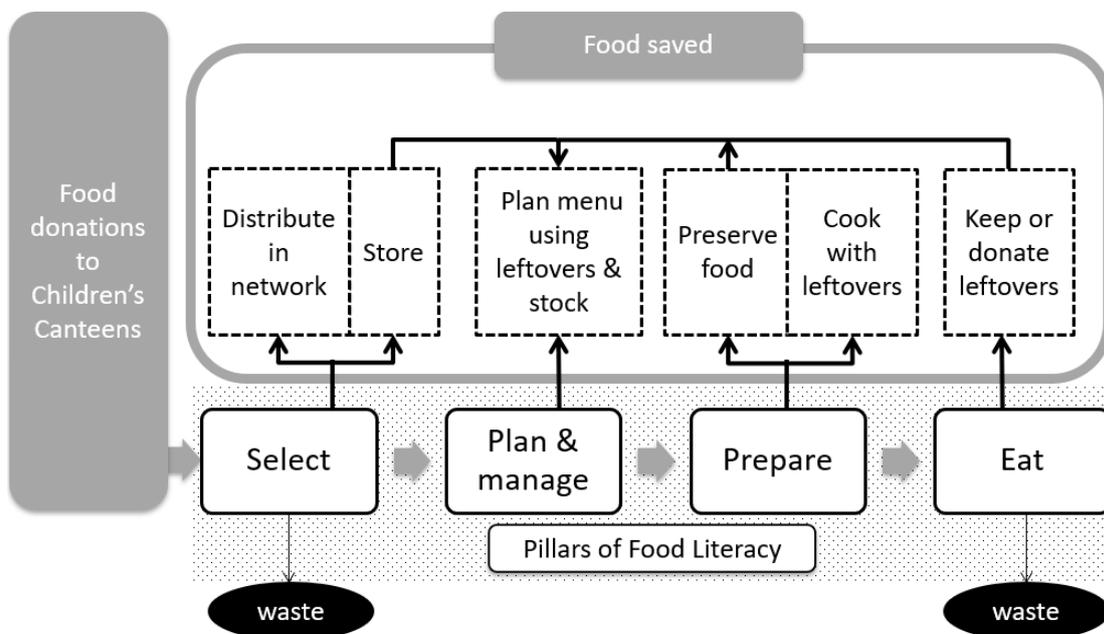


Figure 5-3. Institutional food literacy flowchart for Children's Canteens

Although there are numerous activities (funding, recreation, distribution network) for which food literacy can be relevant, we focus in this article primarily on food preparation. The numerous activities associated with feeding children, which include managerial activities before, and creative re-use afterward, combine to determine how efficient (i.e. how much waste can be diverted) the CC is in a collective sense. Typically, this process begins when the CC activates their network for food donations or receives spontaneous food donations, with none of these sources being predictable or controllable. To maintain the network and prevent waste upstream, the organizers often accept some food that may not readily be usable. The staff then use their skills to sort and select which foods should be prepared that same day, which foods should be kept in storage, and which food might be redistributed within their network. If the donation has a quality problem or the staff cannot figure out how to redistribute or cook the foods, then it may become waste. Second, they plan how to combine various leftovers, new ingredients and food from storage and manage the labour and logistics involved. Thirdly, staff prepare meals with a child-friendly taste and preserve perishable food by boiling, pickling, drying, or freezing.

Fourth, they create a suitable space for co-eating that is inviting for children. After the meal, some leftovers are eaten by the staff, some are given away if the children/parents or staff wish to bring home, some are kept for reuse the next day, and some becomes waste. Naturally, CCs are not waste free, but their existence as intermediary recipients of potential food waste, and their internal mechanisms, help to minimizing waste.

The relative institutional food literacy of different groups often determines how efficient they are in absorbing potential food waste. Disproportionate amounts, low quality, or unappealing flavour are common problems with donations that must be routinely managed by managerial and culinary competences. The divergence in performance between different organizations was illustrated in the case of an extremely large donation of *wakeari* (imperfect but edible) vacuum-packed corn that was received by the municipal welfare office in Naha. This office, which oversees and supports a variety of social support services, also pools donations for CCs. The city welfare official in this case re-distributed 924 boxes of 30 cobs of corn – with 6-months remaining until expiration – to a variety of institutions (see Table 5-3), without determining the nature of the defect and warning the recipients. After she distributed them, she began receiving complaints from recipients that the corn's colour was dull, and it both tasted and smelled unpleasant. As recipients began to return the corn, the official evaluated the corn herself and sent letters to inform remaining recipients suggesting that the corn might be better cooked rather than eaten directly. She also confirmed that the dull colour of was harmless. Nevertheless, as she could not persuade various partners to take the corn, she finally donated the rest to the zoo to be used as animal feed. Upon review of her experience with various recipient organizations, she official remarked that, “Of course, there are people who would still take it to use it in their cooking, but I would be more careful next time and I will inform all the recipients that this is *wakeari*.” Meanwhile, Nahano CC, which received many of these boxes, was readily able to utilize the corn by integrating it into soups, baked dishes, and other creative arrangements in ways that even children were not disturbed by the unusual colour and smell. Their more expansive institutional food literacy enabled Nahano CC to revitalize foods that other organizations and individuals struggled with.

Table 5-3. Distribution of *wakeari* vacuum packed corn in Naha city area

Recipient of vacuum-packed corn	unit: box of 30 corn cobs
Children’s Canteens	411
Nursery schools	75
Local welfare commissioners	248
Social workers group for single parents	41
Nursery day-care service	82
Zoo	67
Total	924

Most of the institutional food literacy that enables the operation of CCs derives from the interaction between the regular staff and volunteers but food literacy, as a lay skill, can also inform the actions of many actors associated with the CC, such as parents, neighbours, and donors. For example, community members often bring food surpluses or garden produce and suggest to CC volunteers how to cook the various foods. The fact that food literacy ‘accumulates’ in spaces such as CCs make them welcoming to others with food literacy – a kind of ‘club’ effect. This phenomenon was seen almost all CCs where the authors conducted the fieldwork. Within the CC, there are the more common bonds between compatriots and opportunities from mutual learning, but this is not exclusionary. The case of Ms. H illustrates how ‘external’ food literacy can be readily absorbed and institutionalized. Ms. H is a single mother of three children in Naha city. She was divorced due to domestic violence, was not working because of a sickness, was living in the housing complex run by the city, and was receiving social welfare assistance. She encountered Nahano CC through her youngest daughter. During one visit, a staff member started talking about the difficulties of dealing with so many donated winter melons. Because Ms. H was good at cooking and familiar with winter melons, she suggested what dishes could be made with it. Thereafter, she developed a steady relationship with Nahano CC such that every time she visited, the staff asked what could be done with food they had at the time.

With so many potential contributors and donors, institutional food literacy can also be a resource for promoting alternative food system values. Donations not only comprise excess food but also food that various actors believe children should eat, for nutritional or cultural reasons.

In one case, the fisheries union in Naha decided to donate fresh, highly perishable raw fish, to Nahano CC despite the potential logistical difficulties. The motivation was, on top of the providing food aid to children, to combat the contemporary decline in fish consumption and generalized lack of interest in fisheries by young people. The union leader managed to persuade municipal officials to allow him to donate fresh fish to CCs in Okinawa, but they did not have the resources to deliver and coordinate with all 14 CCs, particularly as the caught fish had to be delivered and consumed promptly. By agreeing to the normative goal of the fisheries union, the Nahano CC could mobilize its network and social capital to store, re-distribute and create a special event out of this fresh fish so that disadvantaged children could appreciate fresh fish while minimizing waste. An important aspect of minimizing waste is offering both a warm environment and food that are attractive to children, while also balancing the need to use up erratic donations and fulfilling the various normative expectations of donors to providing normative learning about food systems.

5.3 Conclusion

Past research suggests that high individual food literacy contributes to reduce food waste in households (Quested et al. 2013, Farr-Wharton et al. 2014, Stanc et al., 2015, Romani et al., 2017, Nomura 2020). This chapter tests and extends this assertion by asking whether food literacy, institutionalized at the meso level in the form of organizations, such as Children's Canteens, can reduce food loss and food waste that originate outside the household. This is an important consideration, as the food (waste) sector, due to numerous institutional rigidities found in food banks, municipal nutrition support systems, and other food aid services, cannot or will not ensure that donated food is actually consumed. Often, these institutions rely on the food literacy of end recipients to effectively transform erratic donations into consumed food (Nomura, 2020). Other producers of food waste, such as restaurants, farmer and fisher corporatives, army bases, wholesalers, and others non-mainstream donors, cannot even deliver to individual people and therefore rely on intermediary organizations such as CCs. While soup kitchens, as intermediary organizations, are well known for transforming donations into food for needy people, CCs must accomplish the same feat while maintaining an attractive atmosphere and food for children and other vulnerable demographics. This chapter argues that CCs, which usually comprise laypeople with generally high food literacy, are able to combine and mobilize their collective domestic skills to create effective spaces for nutritious co-eating, while

absorbing and minimizing waste from erratic food donations.

In this chapter, we refer to the expression of shared food literacy in CCs as ‘institutional food literacy’ – combining, complementing and creating synergies between the individual skills, knowledge and experience of both staff and participants. While staff of CCs are usually credited with transforming food donations into meals, contributions of food literacy can come from multiple source, including children’s’ parents and some donors. The soft or passive skills underlying food literacy, which include not only food preparation but also planning, management, selection, and eating (Vidgen and Gallegos 2014), enable CCs to not only transform potential food waste into nutritious food, but also to establish a nimble food distribution network that is able to dynamically absorb and redirect donated food among the broader informal or lay network (including other CCs, neighbours, and other charities). In this way, CCs collectively utilize food literacy and contribute to the public by giving opportunity to people with high food literacy to mobilize their skills outside of the household sphere. The collective, institutional food literacy enables CCs to operate at a meso level, absorbing food donations and transforming them into accessible for children and space for pro-social co-eating. As a lay form of knowledge, food literacy is widespread in society but relatively unrecognized. Through the efforts of CCs, which have demonstrated how such lay knowledge can be applied to solving social issues (food insecurity) and environmental issues (food waste) at a scale above the household, more recognition should be given to this knowledge system, and food literacy should be promoted within subsequent generations through passive and active educational means. Although there is enthusiastic promotion of *shokuiku* (food education) by the national government in Japan, this formal knowledge-based education cannot on its own engender food literacy. CCs, which are spaces that render the value of food literacy more transparent, are a potentially suitable context for broader *shokuiku*. In Kagoshima, a local NGO working on children’s recreation with nature used a CC as a venue (Yoshioka and Saito 2019). Kamiya (2019) reports that she sees an opportunity for CCs to do extra activities, particularly food-based recreation which schools normally cannot provide to children within their curriculum. To enhance poverty alleviation, Yamano (2018) suggests that CCs and local schools should take more collaborative action by, for example, allowing CCs to operate within schools. In general, the value of food literacy in diverting potential food waste is being recognized through the institutional form of grassroots food organizations such as Children’s Canteens.

Chapter 6

The importance of food literacy interface and the public education

As discussed in Chapter 3, FAO's intergovernmental nature and lack of systematic engagement to the right to adequate food means that its promotion and contribution depends of the partnership and corporation with sub-national actors, cities, private companies, civil society organizations. The recognition of FLW issue by the actors is crucial for both data collection and solving the issue. Chapters 4 and 5 discuss how individual food literacy as well as institutional food literacy found in the households and civil organizations is mobilized to reduce food waste, and to feed themselves/members/users with dignity at the same time. In this chapter, it explains not only how food literacy combines within groups (such as households or organizations) but how food literacy is "performed" at the interfaces of different actors – in this case between diners and a university canteen, and between a multilateral organization (FAO) and a university. This chapter is divided into two sections. The first section (6.1) describes the implementation of a collaborative project between FAO and KU to evaluate an awareness raising campaign about food waste in KU canteens, with a focus on food literacy interfaces. The second section (6.2) describes a project to encourage KU students to be become aware of their food literacy and food morality through the activity of teaching young children about food waste reduction. The findings in first section (6.1) suggest that the degree of food literacy on both sides of an interface – KU canteens and the students – determines how much food waste can be prevented. The producer side (KU Co-op) food literacy encourages dynamic response to students' dietary behavior and preferences the student side ultimately determine how much food waste will be generated. The finding from this section suggests that awareness raising campaigns which draw attention to hidden performative behaviors should reveal concrete outcomes of food literacy that foster higher food morality, rather than stimulating untargeted guilt through blunt messages such as "Do not generate food waste". The second section (6.2) reveals that students' food literacy and morality can be overtly observed during teaching and transmission. Since performative capacities such as food literacy are uncomfortably observed in oneself, indirect expressions through teaching can empower people to recognize these skills. This empowerment, in addition to direct teaching outcomes, are two tiers of influence garnered by the utilization of FAO's educational material. The grassroots use of educational material is also FAO's way of bypassing national agencies that are not able to readily implement global trends in food-related education and reach directly to sub-national organizations and even individuals.

6.1 Food waste reduction campaign impact research at KU canteens

6.1.1 Institutional food literacy of KU Campus Canteen

For any actors in food supply chain; farmers, manufactures, corporations, retailers or restaurants, food waste means pure loss. The food waste prevention and reduction is an important part of their daily management, and yet food waste management is often not visible to the public, even in the CSR. It is a taboo to publicize the amount of polluted, contaminated waste (Douglas 1978) to the customer/users; 1) waste indicates bad management of food, unpopularity, 2) food waste management is too obvious as a part of daily management thus no necessity felt to evaluate or to be evaluated. At first, when the author asked Seikyo (University Co-op who runs KU canteens) to conduct the KU-FAO food waste reduction project, it seemed that the importance of conducting the project was not felt by them. First of all, KU Co-op has been operating a good food management, and the students have not being generating the food waste very much in the first place. The author emphasized and convinced KU Co-op that KU-Co-op's food management is admirable and the operation should be shared so the other restaurants can learn from them. Sharing the operation of daily food management to the other restaurants was also something they did not think of. This good-practice idea was from the Community of Practice of Food Waste Reduction (CoP FWR), sharing the good practice of food management benefits the other restaurants who would like to take lessons from them, while the good-practice restaurant/canteen/organization can get recognized and praised by the public³.

Before the research conducted, the author conducted an interview for Mr. Haruhisa Maeda who is the general manager of all the KU campus canteens, and Ms. Naoko Mabuchi who is a nutritionist manager in KU for how they are already making effort and practice on food waste prevention/reduction. Not only they are great cooks and chefs who knows how to cook tasty meals, but the management of prevention/reduction of food waste also an essential skill and knowledge of food literacy which practiced in institutional level. KU canteen is under the whole Consumer Cooperative (CO-OP), thus the food is bought from the same organization. The amount of food ordered and provided is carefully calculated and planned, comparing the data from the last year, last month, last week, and the day before. The weather also affects consumer behavior; therefore weather information is also considered for the amount of food the canteen

³ This research was later made an article on the FAO website of CoP of FWR:

<http://www.fao.org/food-loss-reduction/news/detail/en/c/1258044/>

orders. The food delivery is already pre-determined by CO-OP headquarters. They provide available food lists for their managing canteens to order. Yet, managing canteens are not only KU, but also women's colleges and high school canteens. The KU canteen manager Mr. Maeda considers KU customer's characteristics and chooses which food to order and the amount for each ingredient. Factors that go into these decisions include the fact that KU has mostly male students, some students are not financially well off, etc.

Although HQ offers the available food ingredients, the menu can be designed and altered by the KU manager. The menu range is categorized as A, B, and C. Menu A dishes are the most popular dishes, which means the ones most students love, such as deep fried chicken, curry rice, ramen etc. 75% of the menu on campus is categorized as A menu in order to serve the needs of the major canteen users; students. Category B occupies 20% of the entire KU canteen menu. It is not popular as A menu, but these are dishes that are in the menu rotation. Menu C is only 5% of the entire menu. But these dishes are often unique and entertaining to give the regular A and B menus more variety. Therefore, the C menu is constantly changing in order to keep the students entertained as loyal customers. As for the main staple food, KU Co-op offers bowl of rice, the users of canteen can choose the size of rice in five levels (SS size, S size, M size, L size, LL size). KU canteen hardly generates any leftover rice in their operation because they reuse the left rice for donburi menu in the next day. Likewise, the unused vegetables are utilized for the next day.

In Co-op food management employee training, they are taught the "9 and 1 method." If there are 9 rice balls and they know 9 rice balls would be sold it is recommended to order 10 rice balls. The one extra rice ball is a necessary loss that allows the last consumers to still have a range of food choices. The general value of food management on the campus canteen is about 5 – 10 % of food waste and this waste is necessary in order to keep the canteen running. However, KU canteens do not generate any rice waste in their operation. The excess rice is used for the next day. The rice is served donburi-style. This means the rice is served with some kind of topping. Also, KU is active in promoting less-popular kinds of food or food that is bought less but has micro nutrition. For example, they organize a fish eating promotion, and offer local production for local consumption. This promotion does not necessarily link to sales increase, but they do it for their food literacy promotion commitment.



Figure 6-1. These posters are the promotion posters for the local, unfamiliar fish

KU canteen also collaborates with local fisheries, asking them to stock frozen fish until they have enough for the KU canteens to use. Since the fish comes frozen, they can defrost only the amount they need. In this way KU canteens contribute not only their own food waste reduction, but support local fisheries by raising awareness of food literacy of students and promote unpopular fish which is in season, nutritious, and contribute optimizing natural local resources (see figure 6-1).

The KU canteen food management is well managed, from the manager’s detailed calculation and planning, to the smooth communication between staff and the managers. The staff serves food for its customers, and can see how well or not-so-well the food is received. If they find out a customer left a big portion of their meal (which is rare in the case of KU canteen), they communicate this problem with the cooks and manager and examine their menu, if the taste or other problems should be fixed. This smooth communication enables KU canteen to spot and act quickly to solve problems. As a result, further generation of food waste can be avoided.

6.1.2 Research design and first attempt

Although it was well understood both by KU canteens and students that they generate little food waste/leftover, there has not been a quantitative research done to proof the fact. The first research was conducted in May and July to measure the impact of the raise awareness campaign on food waste reduction. This project is based on the previous project conducted at Mar Fah Luang University, in Thailand (Manomaivibool 2016). Food waste data was collected according to the previous data. As table 6-1 shows, food plates at university canteens were filmed and categorized into 0 to 5 scales. The visual scales are presented in figure 6-2. In order

to measure the impact of the food waste reduction campaign, the data was collected before the launching event and after the event.

Table 6-1. Rating scales of food waste quantity and examples

Scale	0	1	2	3	4	5
Description	No food waste	Very small quantity	Small quantity	Considerable quantity	Large quantity	Very large Quantity
Residue	0%	1-20 %	21-40 %	41-60 %	61-80%	81-100%

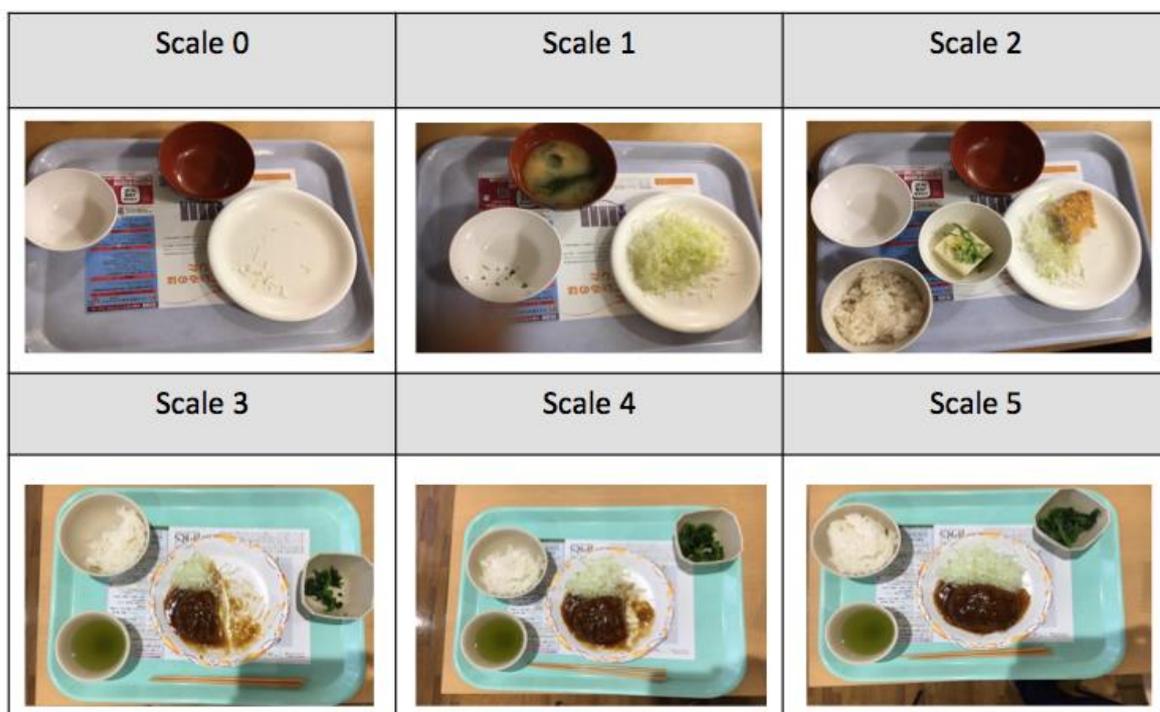


Figure 6-2. Food Waste Scale sample images

The base data was collected on between May 25th and 29th in 2019. Kyoto University main campus has five canteens, Lune, Central, North Agriculture Department (North A), Yoshida Minami, and South. The food tray return at each of the canteens was filmed during the peak lunch time; 12:30 to 14:00. The International symposium of Food Waste Reduction and Education was held on June 3rd, the posters and works made by the participating students were exhibited in all five KU canteens. The works were exhibited for the whole month of June. Only the South canteen was not included, it has been omitted from the research this time. In order to consider the pattern of the canteen users on a weekly basis, collection of the base data and result data were conducted on the same week day in each canteen.

The collection of result data was conducted from July 1st to 11th, after the kick start of the

symposium and one month of exhibiting the students artworks (The detail of the artworks are in 6.1.3). The filming at Lune and Yoshida was interrupted and failed during the first attempt; the two canteens were filmed again in the following week. However, Yoshida canteen filming failed again due to an unexpected accident, therefore the results were only shown in the base data.

6.1.3 Sharing food morality from each actor's perspectives

On June 3rd, the author organized the International Symposium on Food Waste and Education which was as a start ceremony of the food waste raise awareness campaign. The author invited speakers from all the food supply chain systems; FAO officer, farmers' representative, retails, restaurant/canteen, and the audience students as consumers. The speakers share their perspective on food morality and their knowledge of food waste, and all the participants were surprised how little we know about the sheer amount of food wasted, and again, how little we know about each institution's invisible effort to reduce food waste. The students learned where, how and why FLW is generated, and what the consequence is.

FAO officer gave a lecture about the state of food waste in the world. The participating students learned that one-third of world food production is currently thrown away globally, if food waste was a country, the GHG emissions would be the third biggest country in the world. Furthermore, food is being thrown away and yet there are more children who suffer malnutrition than children who suffer from disease. Along with the factual data, he introduced 9 tips for reducing food waste: 1) ask for smaller portions, 2) love your leftovers, 3) shop smart, 4) buy imperfectly fruits and vegetables, 5) check your fridge, 6) practice FIFO: first in, first out, 7) understand the dates on your food, 8) turn waste into compost, 9) sharing is caring, give to help.

Secondly, from the farmer's perspective, the beauty/size standard of vegetables is a problem, yet shipping less-standard produce to the market is not profitable compared to the labour and energy used. There is a fear of reducing the market price of standard products if less-standard products are in the market. Moreover, producers have their own pride, a spirit to grow and send their consumers better, quality food, which is also a motivation for them.

Thirdly, the retail sectors manager told us how the marketing at a supermarket works and knows the consumer psychology: retails make reduce a specific product to sell more. Sometimes it results the consumer buying more than their capacity to utilize, but assume they buy them anyways to stock, hoping to use it someday, someday. They also acknowledge the consumer's tendency to keep and stock food; but sometimes they unnecessarily spoil the product because some consumer do not know how to store/keep/preserve each food properly. On the issue of food packaging, the manager explained that there is a regulation to display each food where the product comes from, therefore, the plastic packaging is needed to follow the rule. The retail sector is well-aware that if the food can be sold by weight as the customers want, not the packaged portion, it would adjust customer's need. Yet, the rule of label prevents them to do so.

The message from the retail sectors to consumers is: encouraging to plan in advance and avoid buying unnecessary food or more than they need.

General Manager of KU canteen, CO-OP shared the restaurant management perspective on food literacy to prevent food waste at canteens. In Kyoto University CO-OP canteens, there is a detailed calculation that tries to predict the amount of food they offer in a day. The data that is used to predict the amount food consists of the amount sold in the previous week, previous day, the weather, etc. Also, they take into account student preferences and needs as well as necessary nutrition, so t students willingly eat all the food on their plate. All these efforts seem natural to the students who use the canteens every day, but these small details lead to reduced food waste on campus.

After the lectures and panel discussion, the participants utilized the knowledge they gained to create artwork to raise awareness about food waste reduction using watercolors, crayons (see figure 6-3). The posters are displayed in the canteens as the project campaign. .



Figure 6-3. The students making their own artwork utilizing the knowledge they gained throughout the symposium

6.1.4 The campaign result of first attempts

The table of baseline data shows more than 80 % of students of the canteen users did not generate any food waste, even before the campaign was launched (see table 6-2). This shows how the users could control their food orders, not to make leftovers.

Table 6-2. The baseline data of each food waste scale in percentage

Base	0	1-20%	21-40%	41-61%	61-80%	81-100%
Lune	84%	15%	1%	0%	0%	0%
Central	82%	17%	1%	0%	0%	0%
North A	86%	14%	1%	0%	0%	0%

However, when considered as a raise awareness campaign, table 6-3 shows that the campaign impact was only a slight improvement, and the impact varies in each location. The most impacted canteen was North Agriculture Department canteen. This could be because many of

the participants in the symposium were from that department, and the campaign was well accepted and understood by the students and faculty there, as well as having a general interest in food and agriculture.

Table 6-3. The result data of each food waste scale after the campaign in percentage

Result	0	1-20%	21-40%	41-61%	61-80%	81-100%
Lune	84%	13%	1%	1%	0%	0%
Central	85%	15%	1%	0%	0%	0%
North A	92%	8%	0%	0%	0%	0%

However, from the observation of returned tray film helped identify the type of food that are often being left on the plates/trays at KU canteens. This findings leads to the next raise awareness campaign (6.2.3). Figure 6-4 shows the types of food residue that was often found on the returned canteen plates/bowls. The most dominant food type in food leftover is extra soup. This includes leftover miso-soup and noodle dishes such as ramen, udon, soba noodles. Noodle dishes served in a soup broth is a popular style in Asian cuisine. A lot of Japanese people do not drink all the excess soup in these dishes due to the high sodium content, something that has been recommended by Japanese doctors. Therefore, although the soup is the dominant food waste type in KU canteen, and the previous research included it as a food waste (2016), we decided not to include it in the information material to encourage people to reduce it (nor does it prevent people from drinking it up). (see Appendix A-)

The second highest wasted food type were vegetables, following rice/noodles, fish skin, and pickles. In KU canteens, the side vegetable, especially shredded plain cabbage is served with the main meat/fish dish for free, regardless if the customer wants it or not. This is for dietary balance reasons, as well as to make the food look appetizing. Since the canteen is a buffet style, some customers would not choose any vegetables at all, therefore, the free side-vegetables are provided as extra fiber intake for those customers who do not often spontaneously take salad or vegetable dishes.

Next, occasionally rice and noodles were left unfinished. In this research, fish bones were excluded; yet fish skin is included because it is edible. Pickles are often put on the side with curry rice in Japan. The curry rice dish and these pickles – fukujinzuke, are almost always served as a set. The list of food types often wasted in KU canteens as follows:

- Soup contents such as extra soup for ramen, udon, soba noodle dishes as well as miso soup.
- Vegetable contents paid for vegetable dishes, vegetables left in soups, as well as free cabbage salad.
- Rice and noodles are the leftovers found on/in the plate/bowls.
- Fish skins are counted as food waste in this research.

- Main meat/fish leftovers are found unfinished on/in the plate/bowls.
- Pickles, in this case is fukujinzuke.
- Others can be a sub-main dish such as fried eggs or deserts etc.

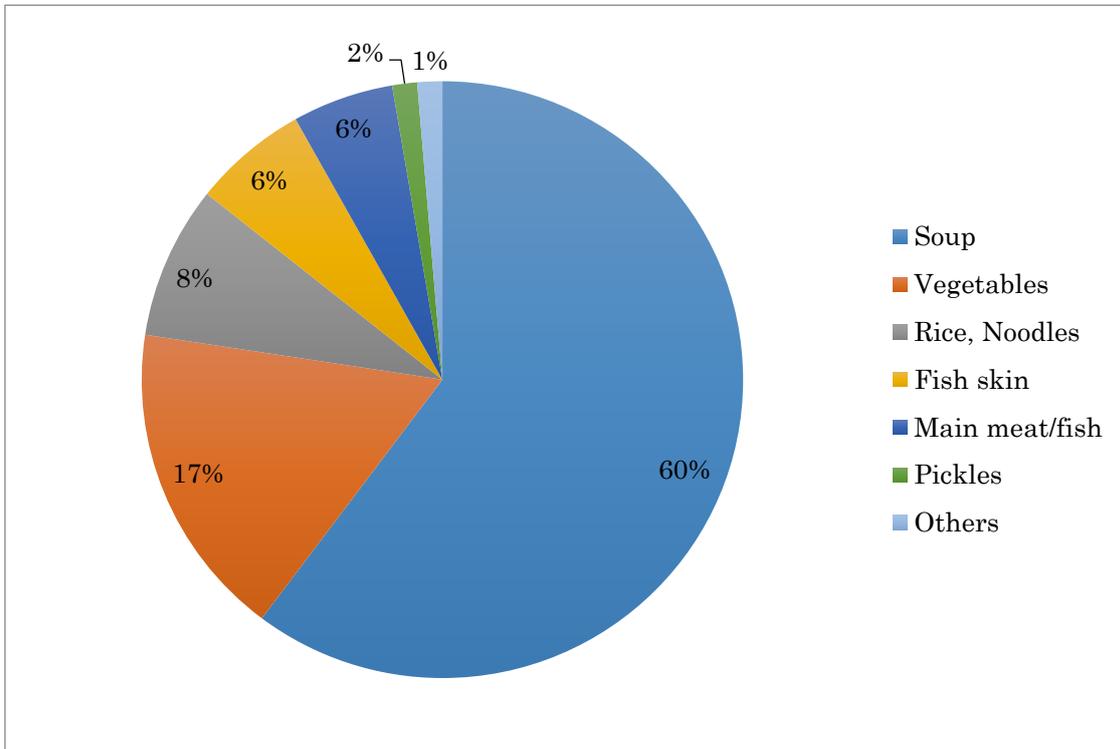


Figure 6-4. A pie chart of food types wasted in KU canteens

These research findings include the quantity data of food waste on the plates, as well as participant observation data. In order to raise awareness about the food waste reduction campaign, students made posters that were to be exhibited, yet some staff of canteens were not willing to, or doubtful of the outcome to exhibit the posters, due to the amateur look of the posters. Most of the messages on the poster was stimulating the guilt or general message to evoke one's food morality such as "Do not generate food waste." Moreover, from the observation at KU canteens, there are not only Japanese customers but also foreigners at the canteens as well as outside visitors. Therefore, the next campaign must take the language barrier into a consideration. The actual calculated numbers and detailed analysis of the first campaign are presented in **Appendix A**

6.1.5 Users/Student's Food Literacy

The result of more than 80% of the students do not generate food waste is already noteworthy. This result is assumed with number of reasons: for instance KU canteens are repeatedly visited by students and they gain both knowledge about the menu (plan and manage), refine their preferences (select) and learn to calibrate their appetite to select suitable portions (eat). The food literacy practiced here by students is obviously not preparation of food, but knowing one's condition of appetite, and memorizing the general taste of KU canteens, as well as selecting the right amount of food help preventing food from being wasted. The interface of KU canteen food literacy and student food literacy resulted the high potential of prevention/reduction of food waste. However, there is still food waste generated, and the author found out the tendency of food types which were often left on the returned plates as discovered in the previous campaign impact research. Therefore there is a chance of reducing more food waste.

The strategies were; 1) to exhibit the types of food waste often wasted in the canteen, 2) the exhibition material must be multi-lingual to take foreigners and visitors from outside into consideration, 3) the exhibition material visibility must be increased. The exhibition material form is changed from a poster to triangular prism pop-stands in order to put on many tables at the canteens (see figure 6-5), 4) the exhibition material quality must be improved to convey clear message of the acknowledgement of low food waste generation at canteens as well as the identified food types often being wasted (see figure 6-6). There are more opportunities for the canteen users to see the pop-stands than just a poster hung on a bulletin board at the entrance.



Figure 6-5. Two images above showing how the triangular prism pop-stands were presented



Figure 6-6. The Infographic Triangular Prism pop-stand English version
 Japanese and Traditional Chinese versions are included in Appendix B

The exhibition materials are displayed Nov 14 – 29th. Table 6-4 shows the numbers of pop-stands installed in each canteen; each canteen differs in size/scale. Thus the number of pop-stands installed accordingly.

Table 6-4. The numbers of pop-stands installed in each canteen

Lune		
JPN	ENG	CHI
6	4	4
Central		
JPN	ENG	CHI
15	6	6
North. A		
JPN	ENG	CHI
9	2	2

The video filming data collection for the re-examination campaign is conducted on Nov 26th Tues. at Central, 27th Wed. at North. A, 28th Thurs. at Yoshida and Nov 29th Fri. at Lune.

Table 6-5. The Re-examination Result Data of Each Food Waste Level Percentage

	0	1-20%	21-40%	41-61%	61-80%	81-100%
Lune	92%	8%	1%	0%	0%	0%
Centro	87%	12%	0%	0%	0%	0%
North A	91%	0%	0%	0%	0%	0%
Yoshida	84%	15%	0%	1%	0%	0%

Table 6-5 shows the percentage of food waste scales in each canteen. In this final research, the base line data were used as t1 and this Re-examination result as t3 (see Table 6-6). To see if there is any significant difference, Pearson’s Chi-square test and Fisher’s exact test are applied for the analysis (See Appendix B).

The result of the Pearson’s Chi-square test of May(t1) and November(t3); at Lune, Pearson Chi Square = 25.107, $df = 5$, $p\text{-value} = 0.00$, at Central, Pearson Chi Square = 12.975, $df = 3$, $p\text{-value} = 0.00$, at North Agriculture campus canteen, Pearson Chi Square = 14.535, $df = 2$, $p\text{-value} = 0.00$, at Yoshida, Pearson Chi Square = 11.732, $df = 4$, $p\text{-value} = 0.02$. In all the canteens, there is significant difference found (significance level = 5%).

Although there are significant differences proved in all the canteens as a result of the Pearson’s

Chi-square test, the next analysis is to identify if the campaign is the cause of the difference, and how much the impact is. To investigate the cause, Yoshida canteen is set as a control. This means there is no exhibition materials set at Yoshida but collected the data in the same manner as the other canteens. In order to examine if our campaign treatment actually had a positive impact on reducing food waste on canteens, the probit model analysis⁴ is applied. The result is shown in the table 6-6.

Table 6-6. the result of probit model analysis

	Limit effect	Standard error	P value	
Time	0.058	0.018	0.001	***
Treatment	0.054	0.012	0.000	***
Time*Treatment	0.096	0.017	0.000	***

注) ***, **, *印は 1%,5%,10%水準で有意であることを示す

From the above analysis results, the pop-stands campaign reduced the number of KU canteen users who had generated food waste (leftover) by **9.6%** (The details of analysis are presented in Appendix B). This proves that the consumers can better contribute to FW reduction when more specific information of food wasted is provided, and the issue is relevant for them. The positive side effect for KU Co-op is also evident by the fact that several canteen managers showed willingness to keep some of the exhibition materials even after the campaign.

6.1.6 Food literacy interface: unspoken collaboration for food system efficiency

In observing the important synergistic effect of food literacy expressed at the institutional level, it also becomes apparent that food literacy can also be enhanced through interactions of separate parties. In this chapter, which covers actors across a wider swathe of the food value chain, I conceptualize these interactions using the concept of ‘interfaces’. In section 6.1, there are basically three food supply chain actors involved: food providers (Co-op headquarters and local fisheries), food manufacturers/servers (KU Co-op), and consumers (students). In between these actors, food literacy interfaces exist that imply a degree of mutual understanding and unspoken

⁴ probit model analysis, https://en.wikipedia.org/wiki/Probit_model

collaboration. The relevant interfaces are exhibited in figure 6-7.

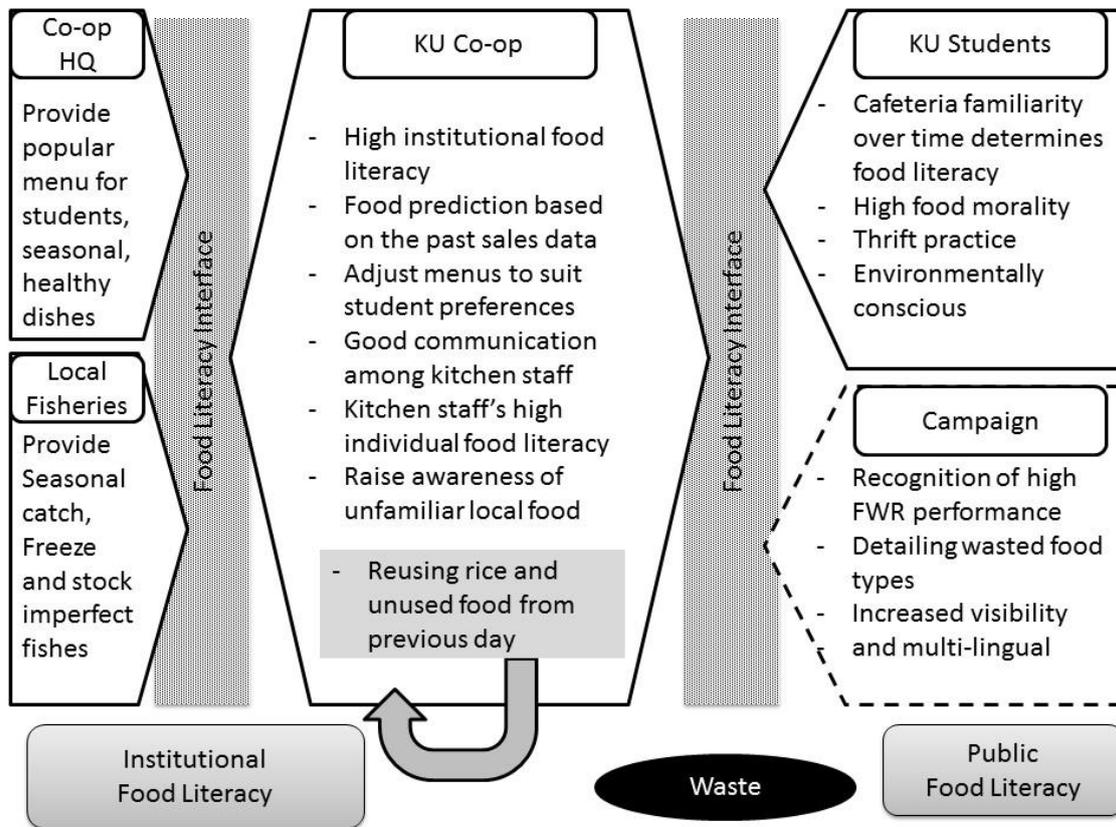


Figure 6-7. The food literacy interfaces between various actors

The idea of interface can readily be represented within a family context, in which the parents and children understand and adapt to each other's demands and constraints (Cappellini and Parsons 2013). In the similar manner, the interface between retailers and consumers is discussed by Audet R and Brisebois É (2019). In this metaphor, a parent's recognition of the dietary preferences of children, and the children's recognition of the parent's budget and nutritional goals, lead to shared efficiency-seeking. The concept of a shared interface between parents and children can be applied to numerous other settings. For example, the Co-op HQ provides an approximate, suitable menu for all university Co-ops based on past experience, but is unable to adjust to the small preferences of each university consumers/students. The Co-op HQ knows how to order seasonal, nutritional food in bulk so the cost could be saved (select, Plan & Manage). In turn, each co-op manager who is in the field and directly facing the customers every day can adjust the details to suit consumer taste preferences using past sales data and ongoing observations (Plan & Manage). Local fisheries are also working at this interface, using their knowledge of sustainability of fisheries to optimize the seasonal catch and

propose the utilization of imperfect fish. They appreciate KU Co-op's corporation with the effort of promoting local unfamiliar fish and using up imperfect shaped/sized fish. This proactive diversion of potential food waste is made possible through mutual understanding at the fishery/Co-op interface as well as interface at the Co-op/student interface. The interface between KU Co-op and students, which includes the interaction between kitchen staff and students happens daily. Not only from the analysis of the past sales data but also the manager highly values reports/feedback from the kitchen staff. The kitchen staff know how much food was sold and left each day, and if some staff hear negative comment/feedback from the students, they immediately report and share it, so the taste improves (Prepare). In the KU Co-op, the menu (Plan & Manage) is often the manager's work, but the preparation is mostly done by the kitchen staff. From the student food literacy, the appetite communication and feedback of their taste preference is happening at the interface. The better the students recognize their appetite and choose the right amount, the lower the chance of food waste generation. The environment fosters unspoken communication between Co-op kitchen staff, whereby the students indirectly express their preference/feedback about Co-op food through purchase patterns or provide direct commentary (Eat). Their natural thrift practice at canteens are always plus for food waste reduction. As more students are conscious of environmental issues, more students would be careful about their daily consumption as well as they would be conscious of locally grown food (Eat). The degree of mutual understanding between each actors' food literacy interface would be defined by the degree of their good communication.

The interactions explained above happen daily but largely without direct personal exchanges. However, the most important goal of the campaign intervention was making the actors aware of their food literacy and morality, and their impact on food waste reduction (see Figure 6-7). Despite the physical evidence of food waste minimization evident by fully eaten meals, actors do not consciously "use" their food literacy for the purpose of FWR. In this sense, food literacy is mostly 'performative,' not a mindful knowledge/skill, but rather one that is usually unconsciously applied through regular actions.

In conclusion for this campaign research, 1) KU Co-op had not generated much food waste from the beginning. After this campaign project, the low food waste generation is proven in quantity. 2) Informing what is the cause and what food is actually left on the plates to the students is effective. 3) when it comes to visitors from outside of KU, or even from foreign countries, the customers have less clue on what taste or suitable portions. The divergence in

food waste reduction between long-term students and temporary visitors demonstrates how food literacy is aligned with practical, every-day learning and knowledge that can be disrupted if the context is changed. 4) Appropriate messaging is the key to convey the right message for the customers; converting the guilt-incentive message “Do not waste food etc.,” to encouraging messages such as “Good job reducing food waste and here’s what you can do more.” 5) Material and concept announcements visible to all customers will provide clear results in reducing food waste.

Although there are some prevention efforts by the KU canteen management, there is hesitation in revealing their “good-practice” of using the leftover rice from the day before - even though there is no hygiene issues. Despite the admirable effort to prevent food to be wasted, the manager’s fear that the idea of recycling the food from yesterday may cause the consumer/students to harbour negative feelings – as the idea of serving/reusing waste: waste/dirt is polluted, contaminated, thus a matter of out of place (Douglas 1978). In the more domestic environment, (often in a household or could extend to CCs), where preparation is seen, demonstrated at the site, reusing, recycling the food is naturally accepted by both the preparation side and consumer side. Whereas in the public environment, where the preparation is not seen, further distanced from the consumer, the idea of reusing, recycling the food is perceived as unacceptable. When it comes to *public* food literacy, the pillar of preparation is outsourced and de-activated, thus the idea of reusing/recycling unused food is alienated. In this regard, how the pillar of ‘preparation’ could link closely with the consumer in the public context is the key to make more acceptable for reusing/recycling old food and unsold/unused food.

Therefore, strengthening the interface between the serving side and the consumer side is crucial. It is possible by bringing usually performative, unconscious practice of food waste reduction as mindful, conscious knowledge/skill, then, the public discourse would embrace, encourage those reuse/recycling practice may be the norm in the future.

On the contrary, however, there is still a business-as-usual aspect in the Co-op operation. In the current practice of business, either in KU canteens or anywhere else, some food waste generation is dismissed or tolerated, because selling more food is considered more important than generating some waste. In order to make a change in these current business practices, the student/consumer’s heightened food literacy and morality, combined with the visibility of these efforts may increase the chance for the business to improve. For example, the high food literacy of KU Co-op (Plan & Manage; Preparation) contributes to the possibility of encouraging the

unfamiliar/imperfect fish to be adequately consumed by consumers/students. A further step would be to campaign to increase acceptance of some empty shelves or sold-out options which would create a safe ground for the business side to shift their practice food waste practices.

The contribution of this campaign is bringing the performative practice of food literacy into more immediate consciousness. This campaign made KU Co-op and the students realize not only they have high morality in regards to food waste, but also that they are reducing waste by exhibiting food-related skills and knowledge. Without a campaign to render these skills and morals visible, the KU Co-op/students would be unlikely to interpret their thriftiness as an important personal factor in food waste reduction. Recognition by a third party revealed how these everyday food skills can be valorized for their contribution to an important global effort.

Food waste is a socially constructed phenomenon (Audet R, Brisebois É 2019) which could be reduced and improved. The critical waste point (FAOa 2019) is not necessarily identified at a single sector in the food value chain system, but many times the critical waste points happen at the interfaces of each sector. As described in figure 6-7, each actor (Co-Op, KU Co-Op, KU students) has their own role in the sector and operating/practicing valuable food literacy (Select, Plan & Manage, Prepare, Eat), which contributes FWR. This raise awareness campaign embossed the interface between KU Co-op and KU students by informing KU students of their current contribution and what could they do further by identifying the critical waste point at the canteens. In other words, this campaign enhanced the mutual understanding of each role. Raising the mutual communication and understanding of their role in the food value chain system – includes consumers – will allow each sector to review their daily performative operation/practice, hence it leads to FWR at each interface. It is unlikely to succeed to enhance the interface mutual understanding with a single sector's effort. To raise the communication between sectors, there is a deliberate, third party intervention that is necessary until FWR practice (food literacy) becomes conscious and norm.

6.2 Citizens' food morality and food literacy empowerment

The findings in the first section (6.1) indicate that the students/customer food literacy interface enhances individual and institutional-level food waste reduction. Besides nudging food morality and making food literacy more visible, there are more direct ways of making people critically reflect on their level of food literacy. FAO has developed their own food educational materials to teach young people about food waste, but to the extent that food literacy is performative, it is not readily adapted to formal curriculum. In order to fill the gap and strengthen the consumer side food literacy, the second section (6.2) analyzes how the food literacy education empower the citizens through education. As Paolo Freire (1970)'s concept of "conscientization" as the key to analyze this section, it examines how education on FWR conducted by university students at an elementary school serves to more comprehensively encourage critical self-reflection. Not only for the purpose of building food morality, such activities are also useful for empowering KU student-teachers to unmask and act more consciously about their own food literacy. The research methodology in this section (6.2) is fieldwork observation (6.2.1) and intervention research (6.2.2). The fieldwork observations and interviews were conducted at Kyoto Municipal Kinrin elementary school on Nov 1st 2019, as part of an observational study to examine how food morality is developed at a young age. The observed pupils are in the second grade, ages 7-8. The latter (6.2.2) covers an intervention project research on FWR education by KU students. The motivated KU students worked to translate FAO's FWR educational material, and subsequently organized a workshop to teach elementary school children using this material. The workshop was held on Nov. 2nd, 2019. This project examined how the FWR education effects on spokespersons through "conscientization" of their performative food literacy.

6.2.1 Food morality development at elementary schools

As in individual households, the parents or guardians who know the children well who cook for them. There is less mismatch in what meal is served and what the children want to eat (chapter 4). In the case of Children's Canteens, the institutional food literacy enables the staffs to observe and check whether the participating children enjoys the meals or not, and they have a capacity to adjust the menu, but not to the extent the parents/guardians have at individual households (chapter 5). The anonymity of the recipients/users/consumers grew as the institution scales up to canteens, and yet canteens are still semi-public as the majority of consumer groups are more or

less identifiable therefore relatively easy to predict what popular taste/seasoning would be, and to choose the right amount of food to cook (chapter 6, section 6.1). According to the results in first section (6.1), even if the motivation comes from thrift, KU students seemed already have the high food morality, and the food literacy enabled them to order the just right amount.

Food morality is developed through every stage of human's lives; but most particularly at the stage of elementary schools. School meals – in Japanese *Kyushoku*, is specific, and unique for Japanese people to experience as an eating experience and environment. Almost all Japanese citizens go through the experience of this *Kyushoku* and learn their eating manners, moral, behavior, social norms in the public sphere.



Figure 6-8. The school lunch at Kinrin elementary school

Kinrin elementary school lunch is cooked by its own kitchen staff, the kitchen is located on the first floor. When it is at lunch time, the students on duty will visit the school kitchen to pick up the lunches and to bring them back to their own classrooms. The menu on Nov 1st is: deep-fried fish as the main course, a bowl of rice, a vegetable side dish, and a pack of milk.

The students on duty also serves the food for the peer class roommates. Then the students say “Itadakimasu,” this phrase means “an appreciation for taking plants/animal lives for us,” and this phrase is always used before a meal is begun. If the students find the served meal portion is too much for him/her, the student can come up front to ask teachers to reduce the amount. The returned food will be eaten by other students who can and want to eat the extra food. The meal portions for absent students are also treated as returned food. However the portions size control is not free for the students. The teacher asks and encourages the students to eat more and hopefully the students eat everything. It is only a little that the students physically can reduce

the amount: this is more like a ritual rather than a practical procedure.

The reason why the students can only reduce the food amount so little even if they are asking for it. According to the school teacher of the class, there are four reasons: 1) food morality, 2) nutritional value, 3) the issue of *Kyushoku* cost and 4) food taste experiment. First and foremost, not easily allowing children to reduce food is to teach children food is valuable, and should not be negligently thrown away. While it is true, some children experiences detention or penalty-like experience because the children who cannot eat up within lunch time cannot go out freely to play for their lunch break until they finish the meal up. Second, *Kyushoku* is always designed by professional nutritionist thus eating everything will benefit nutritionally for children. It is sometimes the only wholesome, complete nutritional meal available for some children who are unprivileged. Third, *Kyushoku* cost is payed monthly by the parents and guardians of the children; everyone covers the same cost. Therefore, teachers cannot discriminate noticeably in *Kyushoku* distribution since the school lunch fee is set the same for every children.

Finally, *Kyushoku* is an opportunity for children to explore new tastes as some households serve only particular food genres or types. The author encountered a child who is eating *Kyushoku* even after the lunch time is over. She informed the author that she does not like Japanese food (*washoku*) very much as her family only serves Italian cuisine at home. She likes pasta dish, olives and prociutto rather than rice and fish, therefore she is slow to finish many *Kyushoku* meals. Although this case might appear extreme, *Kyushoku* can often be an opportunity to explore new taste for young children , especially for children with family conditions that limit food choice, such as budget, or/and poor food literacy.

The general discourse at elementary school is in line with food morality: demonstrate your appreciation for food by eating everything. Food morality is certainly important to be harnessed; nevertheless, the teachers are aware that this ‘eat-up’ experience sometimes traumatizes children. Of course, schools accept parent’s request if a child has a particular allergy or food they need to avoid, but otherwise the teachers encourage children to try to eat many different kinds of food. The principal of Kinrin elementary school gives special awards for classes that made effort to reduce food waste.

The description of the fieldwork above is the typical experience and foundation for many Japanese citizens – include the author, to foster the food morality – sometimes with guilt driven. As children grow and explore the taste and develop their preference/dislike and control of their

appetite, their public food literacy will grow.



Figure 6-9. The award cards sent from the school Dean for not generating any food waste as a class, and a photo of the children who are serving lunch.

Here in this section, the author would like to emphasize that distinguishing between food morality and food literacy is important. Food morality is the understanding of food value. It is often taught using the banner phrase ‘*mottainai*⁵.’ Food literacy, in turn, is the knowledge of preferences, and control of the appetite that help people to practice their morals (in relation to food waste): choosing suitable food and the right portion size. With this food morality and food literacy skills and knowledge, one can sufficiently prevent/reduce food waste even in public environmenta.

6.2.2 Empowering KU students through conscious recognition of food literacy

KU students most likely have gone through elementary school *kyushoku* experience some years prior. In parallel, they have developed their own food morality and literacy throughout their lives; naturally some students developed high degree of food literacy, and some may not. But everyone is performing it at every meal unconsciously whether in private or public.

When it comes to the issues of FW, people recognize that throwing edible food is immoral, but this feeling of guilt does not necessarily translate into conscious actions. And yet people are already contributing to FWR in their daily lives. The author has highlighted people’s daily performative food literacy practice either as individual food literacy (chapter 4), institutional

⁵ *mottainai* translates as “what a waste!” This phrase is used to express reduce, reuse, and recycle. (source: <https://en.wikipedia.org/wiki/Mottainai>)

food literacy (chapter 5), or public food literacy (chapter 6 section 6.1). The goal of the research conducted for this section (6.2) is to examine how teaching experience on FWR affect the KU students of their own food literacy.

The project is also a part of KU-FAO collaboration project. This project is to train and empower KU students to be spokespersons of FLW issue through teaching it to young children. The training intervention included translation of the FWR educational material, *Do Good Save Food* (FAO 2018d), and independent organization of a workshop for young children. The workshop titled “Let’s be food savers!” was held on Nov. 2nd 2019 by inviting Kinrin elementary school children, dean, and teachers, and the neighboring residents of KU. The participating KU students are interested in the issue of FLW reduction. Most of them belonged a student group called “Deco-Vege” who help farmers in harvest, and cook using imperfect vegetables; this sometimes included selling the cooked products at a local market/temporary café to raise awareness of FLW.

The feedback from KU students/educators are collected at two stages. First, 1) the prep-gathering was organized by the author for KU students to study the material, and the lecture given by a professional nursery teacher, Ms. Nahoko Katano, how to interact with children effectively. The prep-gathering was held on July 28th, at this point, the students had a chance to play exercises in the material and try it out by themselves. 2) Right after the workshop on Nov. 2nd, the author organized a meeting with the KU students to hear their feedback, how they felt, reflect on the teaching experience. The empirical data listed below were collected through these two meetings. The tasks of translation of the material was distributed evenly to the KU student members, and it was conducted individually.

1) Recognition and evaluating one’s food literacy

Through the translation experience, the students discovered what is taught in the material and what practices and skills are associated with the material. In other words, they could pin specific practices (that they do or try to do) to FWR outcomes. This new awareness helped student-educators to realize that their daily habitual food practice (which is an expression of their food literacy) is already contributing in specific ways to reducing food waste, such as using cooking creatively with leftovers, understanding the meaning of labels (best before, best by...), how to preserve surplus food, shop smart etc. This recognition through the translation made clear and affirm their daily activity as a concrete contribution of FWR.

Only after the realization and association between food waste reduction and food literacy contribution is clear, the student's food literacy become their confidence and competency.

2) Food literacy expansion never ends

It would sound odd if someone announced that they are food literate, because there is no theoretical end-point to the cultivation of food literacy, and there are numerous new contexts in which food literacy can be augmented. Rather, food literacy is a lifelong skill with many related facets that increases and evolve over various phases and in different contexts in one's life. Even with the highly skilled, motivated KU students, they still find new knowledge and skills associated with FWR in the textbook. At the pre-gathering, the students tested the exercises in the educational material by themselves. They come up with questions inspired by the test out; such as where is proper/best locations for specific food to be stored. Not only the food items in the textbook, but their curiosity made them research themselves how to store their favorite food in the best way. This way of thinking would not be occur daily unless the students did these exercises. Furthermore, the realization of proper locations to store food in fridge makes the students surprised because they have no clue there are temperature difference in the fridge system. This awareness can lead students to inspire the collaboration with refrigerator manufacturer in the future.

3) Cultural adaptation of the material

The food preservation game exercise is included in the material. By this exercise, sharing the preservation skills and brainstorming occurs. The discussion went beyond the researching proper ways of storing/preserving food, but adjusting the food types in to Japanese context. Because the educational material was developed by FAO HQ and was initially meant to be utilized by European citizens, the food items in the exercise are not necessarily familiar food types for Japanese citizens. Moreover, the climate, humidity, weather, seasons matter when it comes to proper storing for food, thus even with the same food, the proper way of storing differ from country to country. Therefore, the food was swapped into more suitable items for Japanese audience, Japanese climate. This highlighted the contextual nature of food literacy.

4) Food morality enhancement

As the SDG goals are advocated by so many UN agencies and other global actors, the knowledge of climate change, eradication of poverty, environmental degradation are intensively taught in our school curriculum. The issue of FLW and deprivation of our

natural resource is one of the urgent issue to solve. The topic is usually too broad, too huge to grasp for individuals: how come our leftover on the plate connect to the hungry children somewhere else in the world? It seems there is a huge gap in between.

The workshop on Nov 2nd begin with the FWR voice-over drama performed by KU students; the story lesson is directly about the food morality and consequence of immoral food behavior. In the bingo game, the participating children were excited not only to play bingo, but also to win prizes. The bingo game is the most popular activity in the workshop. Each time there is a difficult word in the game such as “greenhouse gas” or “climate change,” KU students took some time to explain the meaning using easy, everyday words. This was a good learning experience not only for the children, but also for KU students to review their understanding of these concepts and creating the linkage of their textbook knowledge and actual food literacy practices.



Figure 6-10. KU students are facilitating the event using *Do Good Save Food* materials

The educational material covers both food morality and food literacy (practice). The food morality rationalize the food literacy practice, and food literacy practice physically help solving the issue. Table 6-7 is the workshop program that was organized on Nov 2nd. The contents could be distinguished whether the contents represented more of food morality or food literacy. Food literacy refers to the moral discipline on food and waste generation, food literacy refers to the practical actions and knowledge/skills to prevent/reduce food waste.

Table 6-7. The program contents of the *Do Good Save Food* workshop on Nov. 2nd

1	Do Good Save Food (voice-over acting)	Food morality
2	Bingo game about FLW	Food morality & literacy
3	Lecture on the FWR 9 tips (see 6.2.1)	Food literacy
4	food preservation game	Food literacy
5	The refraction/reviewing time	(Free discussion)

Ultimately, student-educators were empowered through two pathways: from the translation and exercising the text contents at the workshop. The material *Do Good Save Food* is not only useful for the targeted young children to learn about FLW, but it also benefits the adults that they could review their food literacy and food morality as they are put into a position of spokesperson of FWR. Their performative food literacy which was silently contributing FWR can be revealed and make sense through this process. As it follows Freire's educational pedagogy (1970), the clear consciousness of food literacy empowers the spokespersons through the teaching experience.

The participated teachers from Kinrin elementary school informed us that there is a brief mention about food waste in the home economics textbook, but they do not go into the detail in the class due to time constraints. The KU student led workshop went well and was perceived positive since the teachers asked us to organize a class on FLW for them. A questionnaire is conducted to collect the feedback from the adult participants. The participants find some new facts and gained the confident in the topic. The overall tendency in the feedback is "how little they knew about the issue of FLW" and "little action (e.g. cook with leftovers) can actually contribute to FWR."

The issue of food waste tends to be dismissed or overlooked because people believe they already know about it, "it is immoral to waste food." But in reality, many adults do not know as much as they think they do, and cannot confidently teach anyone about this. This event proved that 1) this material gives expert information and confidence to those who teach it by making linkage between what is happening in the world and their daily food literacy, 2) the event was an opportunity to discuss food waste, which often does not get much attention, although it is very important. 3) Discussing this issue at a community level empowers local adults because it makes them realize that they can do or act on something, as well as important lessons for children.

Although the way the workshop organized was unable to teach or empower so much in regards

to the food literacy pillar - Preparation, it certainly enhanced the deep understanding and performance competency of public food literacy – Select, Plan & Manage, and Eat - such as making a shopping list in advance, proper ways to food storing both out and in fridge, the importance of communication of the appetite, recognize the taste preference etc. The performance effect evident was spotted after the workshop, the author and an organizing team member visited the local supermarket, there were mother and daughter who participated in the workshop. The daughter informed us that she had already made her first shopping list as showing it to us in her hand, and helping her mother shop well.

6.3 Conclusion and discussion

This FAO-KU joint project has made many contributions; project connected many key actors in our food supply chain: providers, canteens, schools and students/consumers. As it is proved through the project, the citizens/consumers are powerful actors who can contribute so much on the issue of FLW. They are not a mere receivers of food, but rather actors who can *adequately* feed themselves *in dignity* despite a variety of constraints, learn and teach the issue of FWR to promote through their high food literacy and morality. With this finding, the relation between food literacy and morality, and food waste reduction could be shown a matrix (see figure 6-11).

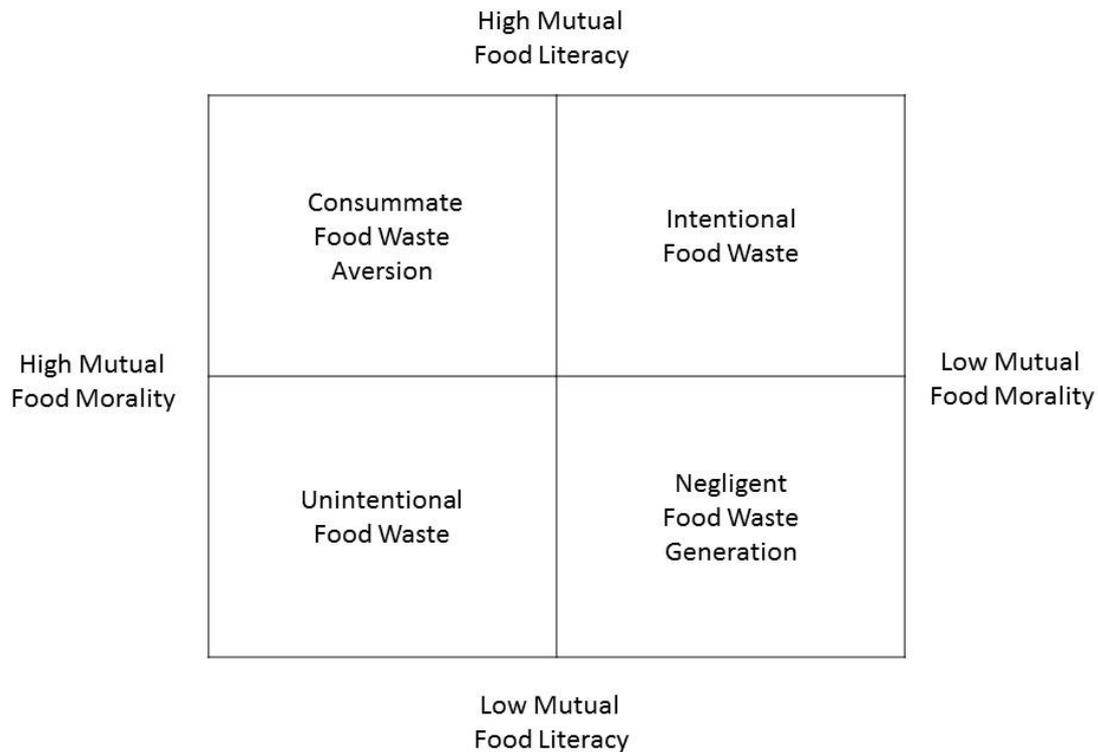


Figure 6-11. Mutual food literacy, morality and waste reduction matrix

The first section (6.1) discusses the existence of interface between each actors of food value chain system. The pop-stand campaign research focused mainly the food literacy interface between KU Co-op and the students/users (see figure 6-7). If there are good food morality and food literacy in the both side, the food waste generation would be minimized due to the aversion of FLW from the both sides. In the matrix (see figure 6-11), the interaction at the food literacy interface is referred as mutual food/moral literacy; well communicated, well understood food morality/literacy from the both side. On the contrary, if the mutual food morality and literacy are both low, parties neither care nor have the ability to reduce food waste, leading to negligent food waste generation.

- High mutual food literacy: serving side sufficiently knows who is eating, what is their preferred taste, timing, and general food literacy (Select, Plan & Manage, Prepare), use local, seasonal ingredients, thrift management etc. The public consumer side recognizes their appetite and able to communicate/demonstrate clearly. The consumers also know

what they want to eat, what the provider's taste/seasoning is like, what food is in season, locally grown etc. (Plan & Manage; Eat)

- High mutual food morality: the serving side knows food is valuable and finite resource. Wasting food damages our natural resource and is not thrifty. The public consumer side knows food is valuable and finite resource. Wasting food damages our natural resource is not thrifty.
- Low mutual food literacy: serving side does not consider the customer's preference; do not consider where food comes from, proper amounts, timing, etc. Low food literacy in public consumer side is do not consider their appetite, no consideration in the balance of menu choice, order/buy/stock more than they can eat, no knowledge on how to preserve food etc.
- Low mutual food morality: serving side perceives food waste generation is primarily a customer's fault. The cost is paid by the customers so food waste is accepted. It is a business-as-usual to generate food waste. The public consumer side thinks once it is paid, it is up to them what to do with the food. Public side think the issue of food waste is primarily the food industry's fault because they believe public/consumers do not generate food waste as much as the industry does. (the fact that statistics shows about half the food waste is generated by households)

In the first section (6.1), the institutional food literacy practiced by KU canteens are revealed. Their thrift, economic management of food based on the past sales data analysis, good understanding of their customers, and well developed communication between managers and kitchen staff, easy environment for students to communicate their preference and feedback to the canteen. Although the students' goal might be economic or thrift, their public food literacy and food morality contributes to reduce food waste generation at KU canteens in an unspoken way. In the second section (6.2), KU students were empowered by realizing their daily, performative food literacy was, actually contributing to reduce food waste. This realization empowered and gave competency to the KU students who can stand as a spokesperson in front of young children.

This chapter explored the impact of KU-FAO partnership project intervention. The aim of the intervention is to encourage positive behavioral change in individual consumers through raise awareness campaign (6.1) and education (6.2). The lessons could draw from the intervention is to make FLW issue relate to their everyday life. Food morality is high in Japan, and people know wasting food is wrong, but people could consciously work on to solve the problem when they informed what, when and how food is wasted (*critical waste point*) in the context of their

daily lives (6.1-3). The deliberate intervention - to make an opportunity for consumers (KU students) to be spokespersons of FLW issue, it connects their daily food practice and its contribution to FWR (6.4-5). In line with Freire's conscientization (1970), the realization of their positive contribution empowers them while they gain competency on the issue at the same time. There is certainly potential for the individual consumers to be agents of positive social change. However, this project is sadly only one-time intervention. The continuous interventions would benefit for all actors (FAO, KU, Elementary school), and yet the sustainable intervention and implementation need a systematic management, organization, resource, and supervisor/managerial personnel who has high competency on the FLW subject.

As more and more consumers develop their public food literacy, the interface with food corporations, manufacturers, restaurants could be shifted towards more understanding and accepting the food waste reuse/recycle. Although the practice of utilizing leftover rice from the previous day is a good practice from the perspective of generating less food waste, KU canteen is hesitant to inform the public due to the fear of the negative image of reutilizing/serving *waste*. The label of *waste* does not mean it is harmful or detrimental to human health, as more consumers gain conscious public food literacy and morality, the perception of *waste* can change. The current business practice of tolerating food waste to serve all customers all menu choices. It is still perpetuated and seen as a normal business practice from both canteens and students/consumer sides. Again, this problem can also be solved by increasing the mutual understanding at their food literacy interface. If consumers recognize the public food literacy and morality, then accept the finite stock of providers (e.g. empty shelves at supermarket or convenience store, sold out menus at restaurants and canteen), the current wasteful business practice can be abolished. As for servers and also for decision makers, institutional food literacy and morality should be recognized and fostered so they recognize the value of food, and optimally transform it into real use value.

Chapter 7

GENERAL CONCLUSION

7.1 Summary of findings

As long as humans eat and thrive on this planet, the issue of food loss and waste is as important as the issue of food production and distribution. FLW issue should be acknowledged and work for the better food supply chain. Although the challenge on FLW is the difficulty of monitoring and quantifying the accurate data: as it compares to calculating yields. Despite the difficulty in measuring and analysing the cause of food loss and waste, FAO is making constant effort both in quantifying data and raising awareness of its issue. The recently published FAO report *The State of Food and Agriculture (2019)* features the food loss and waste, providing the updated data from the previous report in 2011, as well as analysis on the *critical loss/waste point* in the food supply chain. The accurate number and statistics help influence the decision-makers and policymakers, this technical contribution is indeed FAO's core mission.

Sadly, unlike policies on land reform or increasing the national yields, informing national policy and decision-makers does not and could not solve its problem. Yet, simply shifting the surplus food left from the market to unprivileged people does not solve its problem nor respect, protect, fulfill the human right to adequate food. If the FAO's mission is to increase the yield, the mission had already achieved thus the institution could be dissolved years ago as it fulfills the purpose. However, their mandate is not too simple as increasing the yields but eradicate poverty as to be free from hunger. Promoting the human right to adequate food through education is the present approach of FAO: in order to fulfill the mandate, partnership with not only state actors but also all dimensions of sub-nationals, as well as all actors in the food supply chain, include individual consumers. As the dimension goes to the smallest, an individual consumer, may not have decision making power as in the politicians, the collective, conscious power of individual power is as powerful, even stronger than those who are in policymakers (chapter 3).

The most simplistic and linear solution of FLW is to give surplus food to someone who lacks their food. The work of food bank is increasing its necessity thus increasing the presence of them everywhere in the world as income gaps are widening. There is no question about the food bank organizations' well intention, the recipients of the food assistance are not necessarily appreciating if the food does not match with their preference and needs. Hidden behind the beautiful aspects of charity, the destiny of delivered food assistance – whether it is saved or wasted - is left with the recipients. Here, if the recipients have high food literacy, Select, Plan & Manage, Prepare, and Eat, the food assistance is likely consumed with joy and indignity. Although one's incentive for utilizing food assistance might be economic and thrift

reason, through the food literacy intervention of the well-skilled, thoughtful care of the recipients, the sense of waste fades away, and the sense of care and love is attached with the cooked food. On the contrary, if the recipients have poor food literacy, there are many barriers for them to access food because they have limited food literacy to transform the food into a more accessible, more enjoyable food form. On top of their daily effort of putting bread on the table, one has to come up with the ways to utilize the random, unrespectable food kind; almost no access to request what food they want to eat. But receiving food assistance often means the recipients have to accept the assistance regardless of their preference. If all food literacy they have and failing to utilize the food assistance, it is nothing more than a waste, indeed. The labour and cost of disposing of the waste have just simply shifted from food banks to recipients (chapter 4).

The findings from the food bank research led the author to continue research on Children's Canteens. As the movement of Children's Canteen has dramatically spread all over Japan, the surplus food is rapidly absorbed into them. The name Children's Canteen clearly communicates their mandate and mission, more and more people began to donate and support the movement, the support conduit is not limited to go through food banks. In addition to the clear naming, CCs have spread because many people find it relatively easy to start and within their ability to run. The organizers and staff are varying, but the uniqueness is even stay-at-home-mothers or retired men and women are the ones to successfully running it. The donation is the biggest resource for them to run, and it comes both financially and in the form of food. CCs clearly demonstrates the ability to accept all kinds of food in all shape, size, quantity; the high individual food literacy in organizers and staff forms institutional food literacy. It expands individual food literacy by sharing, learning the literacy each other in the daily operation, as well as dividing the tasks and labour effectively among them. This increases the knowledge and skill of food literacy and surpasses the capacity of individual food literacy. Having this as enabling foundation as a receiving organization, the donors can donate food in any sort and even at any time.

Another positive aspect of CCs is not limiting the service users. In order to receive food bank assistance, the recipients have to be proven that they are economically or physically suffering. But in most CCs, they welcome all the community members, thus CCs do not stigmatize the users as poor citizens.

Institutional food literacy is undoubtedly more capable to manage food than in each household. CC operation needs good planning and management, sorting and selecting random food donation, preserve and prepare tasty meals, and observing the children/users' likes and dislikes as they have a commensality together. The institutional food literacy is enabling CCs to create new, unique food distribution that could not be existed without CCs. Food donation is called for, and many farmers, corporations, institutions, organizations, and individuals are motivated to donate food, and CCs are capable of receiving and optimizing them in the best use.

Many other actors in the food supply chain have hopes to connect to CCs because they see CCs not only place to donate but also an opportunity to raise awareness of food literacy: in their own terms. For instance, the Ministry of Agriculture and Fisheries sees a potential in CCs to be a place for children to

learn how to cook, eat and select a healthy diet, and enjoy commensality for their physical and mental wellbeing. Farmers and fisheries see CCs as an opportunity to teach where food comes from, how it is grown/caught, and how those food are cooked in the community as regional cuisine. While high hopes for CCs, it is questionable how much CCs have the capacity to achieve all these with the current way of operation and budgeting. It all depends on CC's willingness and resource availability (Chapter 5).

As institution size scales up, the size of FLW will be bigger as well as the issue of FLW will be more complicated. The research focus in chapters 4 and 5 is more to the surplus food left out from the regular food supply chain; chapter 6 focuses on the food in the regular food supply chain and what could be done to solve the FLW. Through the research in both food bank recipients and children's canteens, the finding in common is the practitioners of food literacy are not aware of the fact that they have food literacy and performing it. They were unconsciously, intuitively performing it in every meal: whether the motivation and goals are their thrift, cost-efficiency reasons or charity based reasons, their food literacy *IS* contributing to the reduction of FLW. Much previous research informs that the food literacy is the contributing factor to reducing food waste in households (Cappellini and Parsons 2012, Quedsted et al. 2013, Farr-Wharton et al. 2014, Stanc et al. 2015, Romani et al. 2017), then why not it is applied to the public?

Chapter 6 is to seek ways to apply the usefulness of food literacy and foster it in public. The FAO-KU collaboration project was designed and implemented by the author. The first section (6.1) is an FLW raise awareness campaign at KU canteens and evaluating its impact. As a matter of fact, KU canteens generate food waste so little in the first place. The project was not perceived as keenly as much since the KU canteen managers did not see the necessity of the campaign. The first campaign with the general message of "Do not waste food" did not impact so much in the reduction of food waste, but this first attempt allows the author to design more effective ways to raise awareness. The improved campaign message was recognizing and praising the present result of KU canteen and students by the third party, but also informing what food is often left based on the data collected in the previous attempt. The method of conveying the message is also improved by not only displaying the posters with one language - Japanese but made pop-stands with multi-languages and installed directly on the canteen tables, thus it increased its visibility. The second campaign has made reduced the number of people who had food waste left over by 9.6%. With this result, the author argues the importance of acknowledging the food literacy interface, in this case, between KU canteen and students. KU canteen's food management has already sufficient by its well-established institutional food literacy. The manager meticulously Plan & Manage the order of food, understands the preference of the customer/students, be flexible and open to change/ulster the menu according to the feedback from the customer/students. Needless to emphasize that the highly skilled kitchen staff with food literacy is making the foundation for the KU canteen operation to be efficient. KU students, who are only seen as a passive eater in the canteen, are actually powerful contributors to reduce FLW. On top of their high food morality, their ability to sense the appetite, and choose the right amount, a decent knowledge of KU canteen food taste prevents students to generate FLW. Food literacy from both

institutions and the public determines the amount of FLW. Again, the reason and motivation of their practice are based on thrifty, the mismatch of goal and deed makes their contribution to FWR with their food literacy unnoticeable.

In the second section (6.2), the author designed a project to make a linkage between consumers' public food literacy practice and the issue of FWR. Consumers outside their households, they participate in the food supply chain not so much with cooking (preparation), but with selecting, planning & managing, and eating. A group of motivated KU students is formed to be spokespersons on the issue of FLW using FAO's educational material: *Do Good Save Food* (FAO 2018d). The team of KU students can recognize and aware of their food literacy is actually contributing FWR by reviewing and studying the educational material. The teaching project benefits not only the targeted young children but also empowers the spokespersons. Without the experience of translation and learning the educational material, their performative food literacy remained unconscious. Through educational intervention, the students recognized and value their actions. It gives a sense of pride and accomplishment in regards to FWR.

Empowering consumers means increasing the number of consumers who have high food literacy and morality. The foundation of this food literacy empowerment is to change our current wasteful business practice; such profit over wastage, but also unrecognition of industry's effort of FWR. The effort must be made from both sides to further enhance their food literacy interface to achieve the mutual goal; reduce food waste. If the consumer side does not tolerate the unnecessary wastage over some inconvenience of empty shelves, the business practice would be soon changed. The food industries and institutions also do not want to generate food waste, there are rigorous planning/prediction and management, hygiene regulations to follow, thus they invest in the prevention of food waste generation, yet the aspects are barely recognized nor complemented as it is taken for granted most of the time. The producer side will benefit if other actors in the food supply chain recognize their value of work and lower the beauty standard of food size and shape, but come up with a way of the farmer's economic sustainability at the same time. After all, the obligation of respect, protect, fulfill the right to adequate food cannot be ensured only by the states, but the holistic effort and mutual understanding of their food literacy and morality among the actors of food supply chain are necessary to practice and enjoy the human right to adequate food. The further research on food literacy interfaces would be beneficial to achieve our SDG goals.

The first step towards the solution is to recognize "how much food is lost or wasted, and where and why this happens (FAO 2019a)." Then the second step is to recognize how much supply chains and consumers already prevent and reduce food wastage, and where and why it is saved. The realization of their food literacy and linking it with the goal of food waste reduction, it helps the next step to identify critical waste points be clearer where and how food supply chain and consumers could tackle the issue to reduce food waste.

7.2 The implications for policy making

The series of the findings support the fact that the knowledge and skills of food literacy can be applied in almost all types of foods, in all actors of the food value chain system. The mutual understanding of each food literacy interface determines whether the chain increasing usage and lowering wastage or increase the wastage. This study is significant in shedding light on the largely ignored, silent contribution of food literacy; the contribution in waste reduction, and also making food more accessible and adequate culinary, and nutritionally. Of course, the author acknowledges the contributions both FBs and CCs make to alleviate the relative poverty, closing the social gaps, community development, and inclusion through social eating. The conscious practice of food literacy in food waste reduction does not oppose nor breach human rights.

Giving random food surplus to people who are in need neither fed adequately nor in dignity, but the intervention of food literacy could transform food adequately and eat in dignity. The power of food literacy does not necessarily give by charity but is attainable as individuals that increase the ability of self-food safety net.

Today the visibility of food literacy performance in public is increasing through FBs, the recipients, and CC organizers/staff, yet the contribution of the food literacy has not been recognized. Although the rapid expansion of these charity organizations is a reflection of many social inequalities; such as the income gap, shrunk size of families, and urbanization. Any people who have food morality realize it is immoral on the fact that the huge quantity of food waste and the existence of food poverty is immoral.

Figure 7-1 shows how the current, regular food supply chain works (also see Figure 3-3). Produced food is sold in the market, often through the retails, but some go to restaurants/canteens. The supply chain (see Figure 7-1) begins with the producers, wholesalers, processors, manufacturers, retail, restaurateurs, and consumers. The food is accessible and available only for those consumers who have the financial means, or who grow their own food.

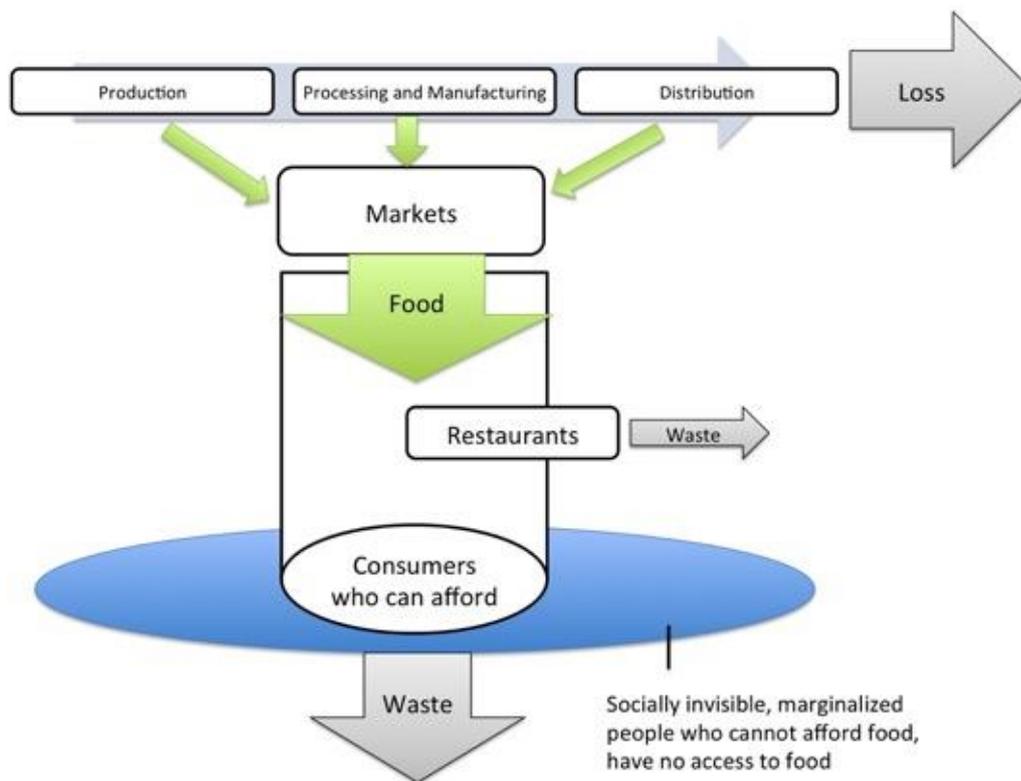


Figure 7-1. Regular food value chain system

Figure 7-2 shows the food literacy conscious food supply chain. This supply chain is more likely to be sustainable than the current system, as food literacy functions as a safety-net for food from being wasted, and thus consumed adequately. Food banks, of course, their mission is to deliver food donation to the recipients. CCs can receive food donation more flexible and have the ability to transform food to fit the users with their institutional food literacy. When it comes to individuals in public, they can perform their food literacy by Select, Plan & Manage their grocery shopping or eating out at restaurants with appropriate orders. They also would not generate leftovers with the Eating food literacy at public. The current private sectors are already making effort on FWR, but there is no ways to be evaluated or recognized because it is taken for granted. As more consumers become aware and understands the issue, more discussions can be hold between the interfaces. The active discussion can lead to improve the current wasteful business practices through those discussions.

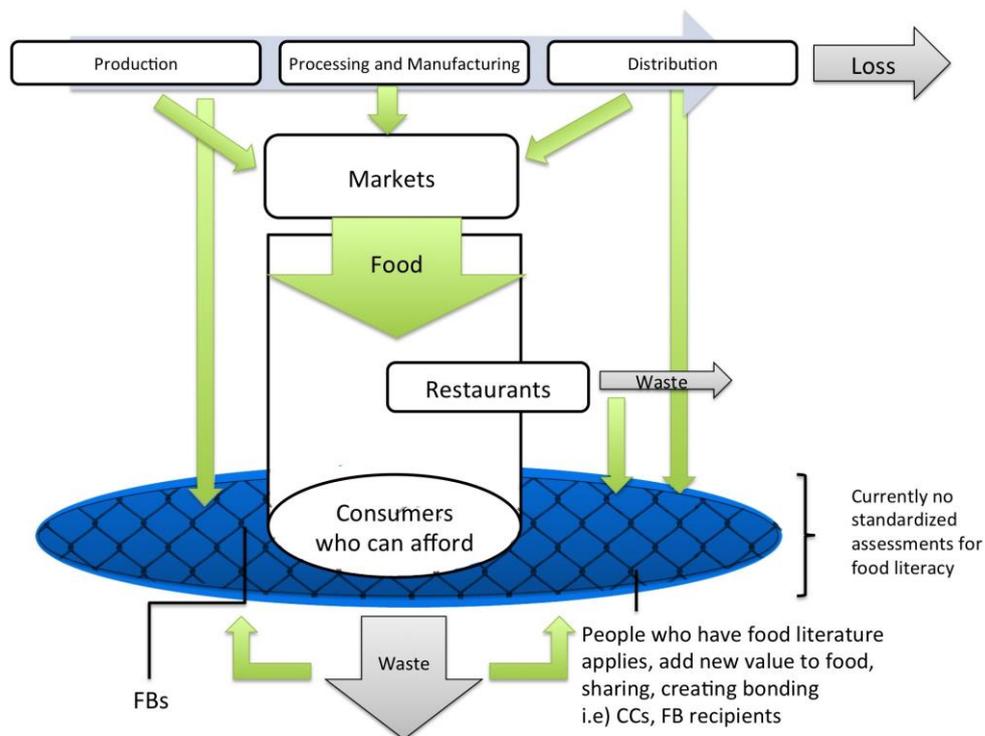


Figure 7-2. Food literacy conscious food supply chain and conduits of food

With the conscious food literacy in place in our food supply chain, the chain will reduce the food waste generation. In order to make conscious food literacy food supply chain in reality, the evaluation and education are ways to associate their performative food literacy with the solution of food loss and waste reduction.

Despite the contribution of FBs and CCs works, the national governments or municipalities cannot, and should not, only rely on charity activities to maintain food security, and reduce food waste. Investment has to be made, not only for the alleviation of poverty by giving people surplus food but the more direct investment for food literacy education. Investment in food literacy education would lead to the alleviation of food poverty in the long run. More consumers attain conscious food literacy, performing it deliberately not only their thrift reason but also for the contribution of FWR. Development of conscious food literacy in all the actors in the food supply chain makes it easier to cooperate with each other to achieve the mutual goal; reducing food loss and waste. The enforcement of the human right to food is one way to approach, but mutual understanding and therefore corporation can be also fostered through food literacy education.

Another way of bringing food literacy into consciousness, the quantifying the literacy might be helpful. In order to make the contribution visible, a unified index or measurement system to assess/evaluate food literacy, its contribution, needs to be developed. The invisibility of food literacy prevents from being evaluated and redognized: all those glories and visible practices should be valued and cherished in our society for the sustainable food supply chain. Yet, there are no assessments or benchmarks to evaluate their contributions, yet.

The agenda for further research is to develop the ways to assess people's food literacy either through quantitative or qualitative methods, or indeed a combination approach. Too often the creation of a unified code, or evaluative benchmark system tends to be too standardized and ignores diversity. However, food literacy assessment reveals diversity as a positive quality, which must be counted. This localized food literacy can bring resiliency, adaptability, and empowerment. Therefore food literacy education opportunities and activities must be supported financially and socially to be sustainably supplied.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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Report of the 125th Session of the Programme Committee (Rome, 12–16 November 2018)

Appendix A

The data collection are conducted in total three times:

- The baseline data collection conducted in May 25-29, 2019 (t1).
- The result data collection of the first campaign conducted in July 1-11, 2019 (t2).
- The result data collection of the second campaign conducted in Nov. 26-29, 2019 (t3).

Table A-1 shows the physical numbers of food waste counted in each scale, and its percentage is shown in table A-2.

Table A-1. The baseline data

		Base data								
Scale of Food Waste		0	1	2	3	4	5	Count total	miss total	All total
Percentage (%)		0%	1-20%	21-40%	41-61%	61-80%	81-100%			
MON	Lune	670	117	8	4	1	1	801	56	857
TUE	Central	843	174	7	4	0	0	1028	71	1099
WED	North.A	945	153	6	0	0	0	1104	78	1182
THU	Yoshida	774	86	2	2	1	0	865	13	878
FRI	South									

Table A-2. The Baseline data of each food waste scale in percentage

Base	0	1-20%	21-40%	41-61%	61-80%	81-100%
Lune	84%	15%	1%	0%	0%	0%
Central	82%	17%	1%	0%	0%	0%
North A	86%	14%	1%	0%	0%	0%

According to the collected baseline data, it is found that is more than 80 % of the canteen users did not generate any food waste either in Lune, Central, or North Agriculture department canteens.

The first raise awareness campaign of FLW is launched in June 3rd, organizing a ceremonial symposium on July 3rd,(see figure A-2). The campaign posters are displayed at each canteen.

After the one month period of its campaign, the result data collection is conducted. Table A-3 shows the physical numbers of food waste counted in each scale, and its percentage is shown in table A-4.

Table A-3. The result data of the first campaign

Result data										
Scale of Food Waste		0	1	2	3	4	5	Count total	miss total	All total
Percentage (%)		0%	1-20%	21-40%	41-61%	61-80%	81-100%			
MON	Lune	538	86	6	6	3	1	640	58	698
TUE	Central	829	143	5	3	0	0	980	17	997
WED	North.A	919	82	0	0	0	0	1001	31	1032
THU	Yoshida									
FRI	South.M									

Table A-4. The result data of the first campaign in percentage

Result	0	1-20%	21-40%	41-61%	61-80%	81-100%
Lune	84%	13%	1%	1%	0%	0%
Central	85%	15%	1%	0%	0%	0%
North A	92%	8%	0%	0%	0%	0%

The percentage is converted into pie charts (see figure A-1). Although it is noteworthy to recognize in number that more than 80% of students are not generating the FW, the impact of the campaign is not significant nor this simple comparison cannot identify whether the campaign did impact the student behavior or not.

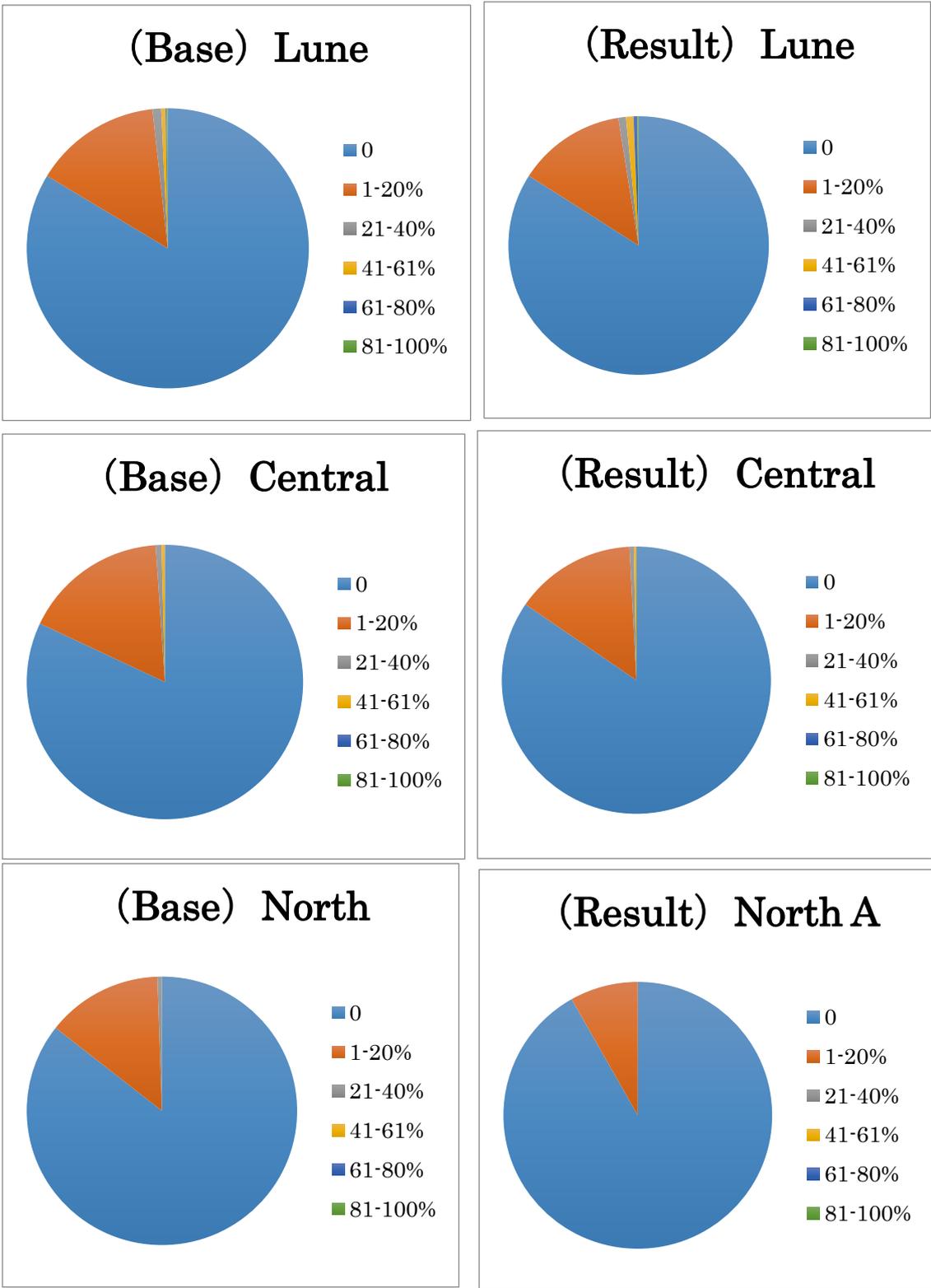


Figure A-1. The Comparison of the first campaign between the baseline data and result data

However, this first campaign research leads to the improvement of the campaign. First, on top of the recognition of admirable result of low FW generation, second, the research identifies what food types are still wasted. Table A-5 shows the types of food residue that was often found on the returned canteen plates/bowls. The food type analysis is shown below:

- Soup contents such as extra soup for ramen, udon, soba noodle dishes as well as miso soup.
- Vegetable contents paid for vegetable dishes, vegetables left in soups, as well as free cabbage salad.
- Rice and noodles are the leftovers found on/in the plate/bowls.
- Fish skins are counted as food waste in this research.
- Main meat/fish leftovers are found unfinished on/in the plate/bowls.
- Pickles, in this case is fukujinzuke.
- Others can be a sub-main dish such as fried eggs or deserts etc..

Table A-5. The Types of Food Waste Often Generated on KU Campus Canteens

	Lune	Central	North A	total
Soup	223	266	231	720
Vegetable	97	62	46	205
Rice, Noodles	40	42	17	99
Fish skin	12	36	26	74
Main meat/fish	22	29	14	65
Pickle	4	10	2	16
Others	6	7	2	15

* The numbers on the tables are the sum of the food waste counted in all the research.

Although the dominant wasted food type is a leftover soup, drinking up the soup is not recommended for the health reason in Japan, this food type is omitted in the next pop-stand campaign (see Appendix B).

International
Symposium of
Food Waste
Reduction
and
Education

食品ロスについて学ぼう！

あまりもの
de
コラージュ

場所：東一条館
時間：12:15~16:00
費用：無料
軽食あり（数量限定）



6月 June
3日 3rd
(月) Mon
2019



Food and Agriculture
Organization of the
United Nations

Figure A-2. The poster of International Symposium of Food Waste Reduction and Education

Appendix B

From the previous research in May - July, these implications were drawn in order to make an improvement on Food Waste Reduction on campus. The strategies were; 1) to exhibit the types of food waste often wasted in the canteen, 2) to exhibit foreign posters or cards to inform the foreign customers, 3) to exhibit improved quality material that would be more acceptable for the canteen owners. 4) to exhibit material that considers and adopts the canteen style and is more visible to the users.

The campaign material is improved according to implications above. The contents are more informative and specific. The author created and designed the infographics (Figure B-1 and B-2) to inform the canteen users. The exhibition material form was changed from a poster to triangular prism pop-stands in order to put on many tables at the canteens. There were more opportunities for its users to see the stands than just a poster hung on a bulletin board.

As for the content on the pop up stands, it first and foremost informs how little food is wasted at KU canteens. More than 80% of consumers do not generate any food waste, even before this campaign began. This was meant to officially inform the good-practice of both the canteen management, as well as the consumer's morality. Second, it informs what kinds of food were actually wasted according to the previous research. As explained previously, the excess soup is excluded in this infographic. Therefore, the most wasted food type was side vegetables, such as shredded cabbage or small salads served next to the main meat or fish. In Japan, people also tend to leave the vegetables in the soup. The second most wasted food type was staple foods such as rice and noodles. There was no waste of bread because KU canteens do not provide bread. Although people can choose the size of rice in five levels (SS size, S size, M size, L size, LL size), people still waste rice. The third most wasted food type was parts of fish, especially fish skins. It seems people have difficulty eating the skin if it was not cooked in a favorable way. If fish were covered with butter and deep-fried, then there would be more of a chance that people would eat it as a whole, compared to boiled or baked fish. This is an aspect that the KU canteen can consider for change, although it must be balanced with realities and ethics of sourcing appropriate types of fish. The fourth most wasted food were pickles that are served on the side of curry rice. In Japan, curry-rice is very popular and available all year round. For some reason, a certain kind of pickle "fukujin-zuke" is always provided with the dish regardless of whether the customer want it or not. Since it is a custom, some customers orders curry-rice without questioning the existence of pickles even if they know they do not eat it. The English pop-stand material is shown figure 6-, pop-stands in Japanese and traditional Chinese are shown below (see figure B-1, B-2). The other key phrases for FWR are also translated into 11 languages by volunteers.

食品ロス削減 調査結果

調査期間：2019年5月27日～7月11日

食品ロス削減強化月間の
結果約**8割**の食堂利用者が
食品ロスを発生させず
全て完食！

80%

12

つくる責任
つかる責任

生協食堂の高いマネジメントと利用者の食への意識の高さの結果です。持続可能な開発目標（SDGs 12）つくる責任つかる責任に大変貢献しています。

それでも残ってしまった食品も…

残りやすい食品種類

1位 野菜

メインの付け合せサラダや小鉢、味噌汁の具など

2位 主食類 ご飯・麺

3位 魚の皮

4位 福神漬け・漬け物

野菜も魚の皮も、ごはんも、ほんの少しの意識で食品ロスになることを防げます！

魚の皮は食品ロスだと感じますか？どんな調理法なら食べられますか？

自分が食べたい分量だけお皿に盛るように伝えるましょう

食品ロス削減にご協力ください

FAO・京都大学共同調査プロジェクト
京都大学大学院総合生活学専攻 野村亜矢希 山崎麻晃
本調査は、京畿大学生活共同組合の皆様にご協力していただき実施することができました。

Figure B-1. The campaign pop-stand in Japanese version

减少食物浪费的调查报告

调查时间：2019年5月27日 - 7月11日

减少食物浪费活动月期间，**大约八成**在食堂用餐的人没有浪费任何食物。

80%

12 つくる責任 つかう責任

这样的结果来自于生协食堂高明的管理技巧以及食客们良好的食品素养。对于可持续发展目标(SDGs)的实现做出了重要的贡献。

尽管如此...
最容易被剩下的食物类别

第一名 蔬菜类
主菜盘中附赠的沙拉，以及小菜，以及味噌汤里的蔬菜等等

第二名 主食类 米饭，面条

第三名 鱼皮

第四名 腌菜

无论是蔬菜，鱼皮，还是米饭，只需要您的一点留心就可以防止造成食物浪费!

您认为鱼皮也算是食物浪费吗? 怎样的烹调方法能让您乐于享用它呢?

向盛菜的师傅说明自己想要的分量，不要盛太多。

请为减少食物浪费贡献您的一份力量

FAO・京都大学协同调查项目组
京都大学大学院综合生存学部 野村亚矢香 山崎唯亮
本次调查在京都大学生生活共同组合的积极配合下得以实施。

Figure B-2. The campaign pop-stand in Traditional Chinese version

The pop-stand installation is conducted in Nov 14th, and it displayed during Nov 14 – 29th.

The video filming data collection was conducted on Nov 26th Tues. at Central, 27th Wed. at North. A, 28th Thurs. at Yoshida and Nov 29th Fri. at Lune. This is due to the University annual festival was held in Nov 22nd – 24th , and 25th Mon. was a cleaning day. Therefore 25th Mon. was avoided for the data collection due to the irregularity. Instead, both data at Lune was collected on 29th Fri.

Table B-1 shows the physical numbers of food waste counted in each scale, and its percentage is shown in table B-2.

Table B-1. Re-examination Result

		Re-examination data						Count total	miss total	All total
Scale of Food Waste		0	1	2	3	4	5			
Percentage (%)		0%	1-20%	21-40%	41-61%	61-80%	81-100%			
MON	Lune									
TUE	Central	913	131	5	0	0	0	1049	46	1095
WED	North.A	893	87	2	0	0	0	982	62	1044
THU	Yoshida	561	101	2	4	0	0	668	4	672
FRI	Lune	625	51	4	0	0	0	680	20	700

Table B-2, The Re-examination Result Data of Each Food Waste Level Percentage

	0	1-20%	21-40%	41-61%	61-80%	81-100%
Lune	92%	8%	1%	0%	0%	0%
Centro	87%	12%	0%	0%	0%	0%
North A	91%	0%	0%	0%	0%	0%
Yoshida	84%	15%	0%	1%	0%	0%

In this second campaign research, the base line data is used (see Table A-1) as t1 and this Re-examination result as t3 (see table B-1), Pearson’s Chi-square test is applied to see if there is any significant difference.

Table B-3. The result of Pearson’s Chi-square test

	df	Chi-square	p-value
Lune	5	25.107	0.00
Central	3	12.975	0.00
North A	2	14.535	0.00
Yoshida	4	11.732	0.02

Table B-3 shows the result of the Pearson's Chi-square test of May(t1) and November(t3); at Lune, Pearson Chi Square = 25.107, $df = 5$, $p\text{-value} = 0.00$, at Central, Pearson Chi Square = 12.975, $df = 3$, $p\text{-value} = 0.00$, at North Agriculture campus canteen, Pearson Chi Square = 14.535, $df = 2$, $p\text{-value} = 0.00$, at Yoshida, Pearson Chi Square = 11.732, $df = 4$, $p\text{-value} = 0.02$. In all the canteens, the significant difference is found (significance level = 5%).

Since our collected results contain 0, the df is difference in each of the canteens. In order to confirm the results, Fisher's exact test was also used to re-confirm our Pearson's Chi-square result. Table B-4 shows the $p\text{-value}$ result of each canteen.

Table B-4. The result of Fisher's exact test

	p-value
Lune	0.00
Central	0.00
North A	0.00
Yoshida	0.01

Although there were significant differences in all the canteens as a result of the Pearson's Chi-square test, it has to be analyzed whether the significance is caused by the campaign. To do so, Yoshida canteen is set as a control. This means there are no exhibition materials set at Yoshida. First, a regression test is conducted. Using Yoshida's data as a control base line, it is analyzed the difference in time (Coef. = time) and each canteen's treatment effect. Table B-5 shows the difference in time became .0599, and this suggests more food waste was generated in November (t3) than in May (t1). Moreover, the analyzed data in Lune, Central, North A all show negative results compare to Yoshida, therefore, it can be concluded that the food waste campaign treatment reduced a positive impact on reducing food waste in all the three canteens with significance level of 1 %.

Table B-5. The result of Regression Analysis

	Coef.	$P > t $
time	.0599	0.004
North_t	-.116	0.000
Lune_t	-.109	0.001
Central_t	-.120	0.000

However, upon reflection, the author found there was a problem with the previous analysis;

Ranks 1 to 5 and Rank 0 are not continuous in this count (because 0% → 1% and 10% → 30% are counted as the same 1 rank increase). In an attempt to compensate, Rank 1-5 with replaced with % (Rank 1 → 10%, Rank 2 → 30%, etc.), but because of non-uniform distribution it was difficult to apply (Rank 2-5 was less observed compared to Rank 0,1). Since the number of samples for food waste analysis is small (Rank 0: 5938, Rank 1: 901, Rank 2 to 5:51), if Rank 2 to 5 is included, chances will greatly affect the measurement of food waste, Since most of the Rank 1 sample is observed in the range of 1-5% rather than 5-10%, the effect of the treatment might be overestimated. Accordingly, based on the current measurement results, it will be difficult to obtain an accurate result.

New analysis performed at this time; therefore, paying attention to the increase / decrease of food waste (Rank0 = 0, Rank1 ~ 5 = 1) and estimating using the probit model instead of the Ordinary Least Square method (OLS), the results were as follows.

https://en.wikipedia.org/wiki/Probit_model

Table B-6. The result of probit model analysis

	Limit effect	Standard error	P value	
Time	0.058	0.018	0.001	***
Treatment	0.054	0.012	0.000	***
Time*Treatment	-0.096	0.017	0.000	***

Note) ***, ** and * indicate significance at 1%, 5% and 10% levels.

From the above analysis results (see table B-6), it is estimated that this treatment reduced the number of people who had food waste left over by 9.6%.