

Fighting Food Loss and Food Waste in Japan

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Abstract:

Japan discards approximately 18 million tonnes of food annually, an amount that accounts for 40% of national food production. In recent years, a number of measures have been adopted at the institutional level to tackle this issue, showing increasing commitment of the government and other organizations. Along with the aim of environmental sustainability, food waste recycling, food loss prevention and consumer awareness raising in Japan are clearly pursuing another common objective. Although food loss and waste problems have been publicly acknowledged only very recently, strong implications arise from the economic and cultural history of the Japanese food system. Specific national concerns over food security have accompanied the formulation of current national strategies whose underlying causes and objectives add a unique facet to Japan's efforts with respect to those of other developed countries'.

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Abbreviations and Acronyms

2HJ	Second Harvest Japan
3KH	3R Knowledge Hub
3Rs	Reduce, Reuse, Recycle
CAA	Consumer Affairs Agency
DEIJ	Distribution Economics Institute of Japan
DSRI	Distribution Systems Research Institute
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
FY	Fiscal Year
GEC	Global Environment Centre Foundation
INTERFAIS	International Food Aid Information System
JIN	Japan Information Network
JORA	Japan Organic Recycling Association
JSWME	Japanese Society of Waste Management Experts
JW	Japan Industrial Waste Information Center
MAFF	Ministry of Agriculture, Forestry and Fisheries
METI	Ministry of Economy, Trade and Industry
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MHLW	Ministry of Health, Labour and Welfare
MIAC	Ministry of Internal Affairs and Communications
MoE	Ministry of Environment
NGO	Non-Governmental Organization
NPO	Non-Profit Organization
OECD	Organisation for Economic Co-operation and Development
UN	United Nations
UNEP	United Nations Environment Project

Introduction

The issue of food losses and waste has recently been given high visibility in the worldwide context due to their direct role in threatening environmental, social and economic sustainability.¹ According to the United Nations' Food and Agricultural Organization (FAO) (2011), almost one-third of the food produced for human consumption worldwide is lost or wasted, corresponding to approximately 1.3 billion tonnes per year. Food losses and waste reflect food systems and food value chains that function poorly and cause a decrease in overall food availability. They therefore have important implications for poverty, nutrition and economic growth. Moreover, their impact on the environment and the climate is dramatic, considering the energy, biodiversity, greenhouse gases, water, soil and other resources embedded in food that are not ultimately eaten. The fight against food losses and waste is presented as essential for reducing the environmental footprint of food systems and improving global food security (UNEP 2012).²

As a consequence of globalization, traded commodities that are wasted in one part of the world could affect food availability and prices elsewhere, making the consequences of food losses and waste far from localized. Nevertheless, the circumstances under which food losses and waste occur are strongly dependent on the specific food and waste-related conditions in a given country—each country having its own production, processing, distribution and consumption practices. Low-income countries experience food losses and waste mainly during the early and middle stages of the food supply chain. This happens as a result of managerial and technical limitations in the harvesting, storage, transportation, processing and cooling stages, each of these stages being affected by flaws in infrastructure, packaging and marketing systems. On the other hand, medium- and high-income countries waste food mainly during later stages of the food supply chain since consumption and post-consumption food waste account for the majority of the losses. The main causes of this food waste are policies and regulations (i.e. quality standards, management regulations, and poor environmental conditions during display) and consumer behaviour (i.e. excessive purchase,

¹ Food losses refer to the decrease in the quantity or quality of edible food mass available for human consumption that can occur at early stages of the food supply chain (i.e. production, postharvest and processing). Food waste refers instead to food discarded at the end of the food chain (i.e. retail and final consumption), resulting from decisions to discard food that is still valuable (FAO 2012a).

² "Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life." (FAO 2003, 29).

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lack of planning, misunderstanding of best-before dates, and leftovers) (Parfitt, Barthel and Macnaughton 2010).

Japan, together with the United States and Great Britain are the three advanced economies at the top of the global food waste list, each discarding 30-40% of their annual food produce (Melikoglu, Lin, and Webb 2013). In 2010 it was estimated that Japan discarded approximately 18 million tonnes of food annually, of which 5 to 8 million tonnes were considered edible at the moment they were disposed of. This amount was virtually equivalent to the amount of the country's annual rice production (8.39 million tonnes). 3 to 4 million tonnes came from the food industry and another 2 to 4 million from individual households; this is comparable to the total amount of food aid distributed worldwide (about 4 million tonnes). Since Japan's domestic food supply accounts for 39% of its total food consumption, this volume of wasted food is indeed a critical issue (MAFF 2013a). A number of measures have been adopted at the institutional level with the greatest achievements in the treatment of food waste as a renewable resource. However, commercial practices and consumer behaviour are still generating an elevated amount of food losses and waste. Recently, a number of new initiatives have been launched to promote a systematic approach whose effective impact is yet to be assessed. Until now no study has been conducted that considers national policy and waste stream logistics in relation to Japan's social and cultural history.

The main goal of this thesis is to examine the strategies and measures against food loss and food waste in Japan undertaken by the Japanese government and other organizations in recent years, and to uncover the underlying causes and objectives of the growing commitment to the fight against food losses and waste. By synchronically and diachronically analysing the development of current initiatives, the historical and cultural determinants that play a key role in shaping their objectives will become clearer. Despite the assumption that all developed countries share similar circumstances in their food system, this thesis will demonstrate how Japan's food regime is distinctively influenced by specific national concerns and how these have played a decisive role in shaping national initiatives against food losses and waste.

This study relies primarily on official statistics and research reports released by government organizations, such as the Ministry of Agriculture, Forestry and Fisheries, the Ministry of Environment and the Consumer Affairs Agency. This data is supplemented by fieldwork conducted in Japan from April 2012 to January 2013, and includes the participant's observation at food recycling and distribution facilities, as well as interviews with a variety of individuals involved in different capacities in the food losses and waste problems.

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The thesis consists of four chapters. The first three explore Japanese food loss and waste fighting initiatives in three main settings. Chapter one provides an overview of the achievements in food recycling, and looks at how environmental policy was developed to address food waste. This chapter also examines the functional significance of promoting animal feed as the most successful final product of food recycling. Chapter two describes how fighting food waste has evolved since 2008 to include food loss, and traces the origins of commercial practices back to the changes in the distribution sector. It also discusses the economic advantages of improving the current system. Chapter three addresses the raising of awareness among the consumers toward wasting food, by analysing the aims of the socio-political aspects of food-waste related activism. Following the three chapters focussing on measures against food loss and food waste, chapter four moves on to the issue of food security and the relationship between the two problems. It then compares the concept of food security within Japan to the one originally addressed by the international community in the fight against food losses and waste. In the conclusions, I will integrate the final part of the first three chapters with the analysis carried out in the fourth, evaluating the relevance of food security issues with regard to the fight against food losses and waste in Japan.

Chapter 1 – Combating Waste

In the last few decades, Japan has achieved considerable success in building a “Sound Material-Cycle Society” based on the 3Rs (Reduce, Reuse, Recycle). The Law for the Promotion of Effective Utilization of Resources allowed the country to reach significant quantitative targets for recycling, streamlining waste management, and strengthening health protection (OECD 2010; Koizumi 2008; JSWME 2007; MoE 2013a). Food waste recycling received careful attention in Japan, as it accounts for one-fourth of recovered municipal solid waste and has important implications for the environment (Melikoglu, Lin, and Webb 2013; OECD 2010). The Promotion of Utilization of Recyclable Food Waste Act (or Food Recycling Law) was enacted in 2001 to build a recycling-based society that promotes the reutilization of food resources and reduces the volume of food waste generated. It encouraged food-related businesses (i.e. those engaged in manufacturing and distributing food products or providing catering and restaurant services) to reduce the generation of food waste during production in order to implement recycling methods (e.g. animal feed, fertilizer, methane), and to promote heat recovery and weight reduction (i.e. dehydration). The most successful implementation is represented by Eco-towns, an accumulation of recycling facilities working to form a symbiotic relationship between industrial and urban areas (OECD 2010; UNEP 2005). As part of the Tokyo Super Eco-Town Project, Alfo Ltd. uses cooking oil to deep-fry business-related food waste, sterilize it and dry the output in order to produce raw ingredients for mixed feed.³ Similarly, Bio Energy Ltd. produces 24,000 kilowatt-hour electric energy and 2,400 m³ of methane per day out of food waste that is difficult to separate and re-use otherwise.⁴

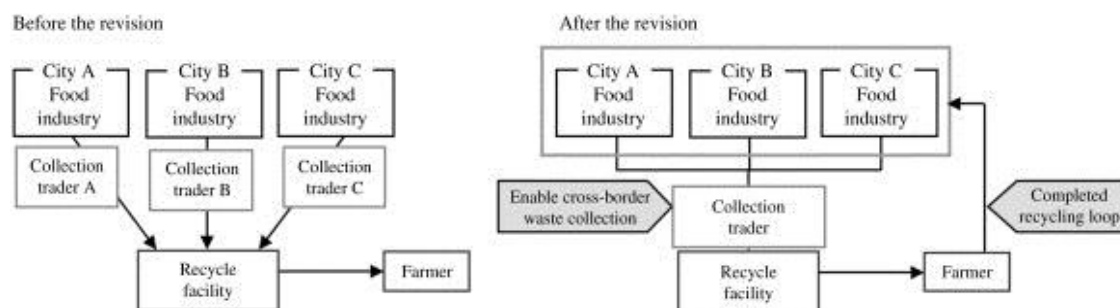
The objective of the Food Recycling Law— namely, to increase the recycling rate of commercial and industrial food waste to 48% by 2006—had already been surpassed by the noteworthy performance of the industry in 2003 (49%). It then reached 59% by 2005 and 60% by 2006 (MAFF 2007; MAFF 2008a; MoE 2013b). The revision of the same law in 2007 further promoted the process of food waste into feed or fertilizer and introduced the term “heat recovery” (MAFF 2008a; Tanimura 2008). The amendment also included the legal obligation for food businesses producing more than a hundred tonnes of waste per year to report the amount of generated waste and its recycling status to the Ministry of Agriculture,

³ www.alfoco.jp.

⁴ www.bio-energy.co.jp.

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Forestry and Fisheries (MAFF). Registered recycling and collecting facilities received the permission to transport waste across municipal borders and waste emitters were required to purchase food grown with food waste-derived products from farmers (e.g. with compost and animal feed). This resulted in the formulation of “recycling loops”—improved recycling systems that create a complete circulation of resources. They feature lower Green House Gasses emissions and higher economic effectiveness with respect to previous waste disposal solutions; they also benefit all stakeholders (MoE 2013c; MAFF 2013b; Takata et al. 2012). The Recycling Business Plans increased considerably from 117 in 2007 to 180 in 2013, mainly due to the establishment of clear and secure sale destinations for waste-derived products (Takata et al. 2012; MAFF 2013c).



Food Recycling Law outline: before and after the revision (Takata et al. 2012).

One of the best examples of recycling loops can be found in the supermarket chain Uny Co. Ltd., whose food waste is collected by the recycling business Sanko Ltd. The latter manufactures fertilizer that in turn is bought by an agriculture/forestry/fishery operator and used to produce vegetables, fruit, rice, soybeans and flowers. Parts of these are then purchased back by Uny for selling both at branch stores and online (MoE 2013d).⁵ The Eco Farm initiative of Co-operative Kobe is a similar project involving local residents, Non-Governmental Organizations, businesses and governments that composts organic waste from Co-op Kobe stores (i.e. vegetable scraps and processing residues) and recycles it into organic fertilizer which is then used to cultivate crops for retail stores (GEC 2013).⁶ Aya town in Miyazaki prefecture claims one of the tightest recycling and composting constitution in Japan: it creates a local nutrient circulation system where the compost produced from household

⁵ www.uny.co.jp.

⁶ www.kobe.coop.or.jp.

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organic waste is cheaply sold as “Aya's Natural Fertilizer” to local farmers, who in turn supply their products to local consumers (3RKH 2013).⁷ As far as animal feed is concerned, instead, within the Odakyu group food residue is collected by different companies and transformed into liquefied feed by Odakyu Building Service Co. Ltd. This is then used to raise pigs whose meat products will be sold in the separate businesses of the Odakyu Group again (JW 2009; MAFF 2013m).⁸ Some other food service businesses and retailers that adopted loop or waste reduction strategies are Yoshinoya Holdings Co. and Mister Donut. In the first case, food leftovers from the restaurant are turned into the fertilizer that is used by farmers in Yokohama to grow the onions for making the famous beef bowls in Kanagawa prefecture branches.⁹ Mister Donut, on the other hand, recycles cooking oil and the leftover donuts from daily sales in 35% of their shops into feed for livestock. The oil is also used as raw material for industrial use, as fuel for the boilers to wash and reuse mops and mats, and as a liquid soap detergent in the shops.¹⁰

During the decades that followed the end of World War II, Japan witnessed a period of national reconstruction that soon led to steady and remarkable economic growth. Affluent private and public lives represented the new driving force behind the boost of large-scale production and consumption. Social priority was given to corporate profits and personal convenience, with little public awareness regarding the issue of waste. During the fast economic growth of the 1960s, creating a need for better ways of managing its disposal and dealing with the problem of water and air pollution. Illegal dumping and other forms of improper waste treatment caused pest and vermin issues which were then prevented by adopting incineration as a pre-treatment for municipal solid waste.

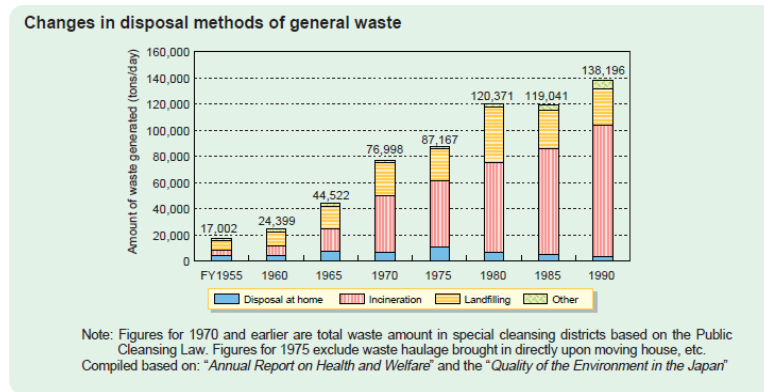
⁷ www.town.aya.miyazaki.jp.

⁸ www.odakyu-bs.co.jp.

⁹ www.yoshinoya.com.

¹⁰ www.misterdonut.jp.

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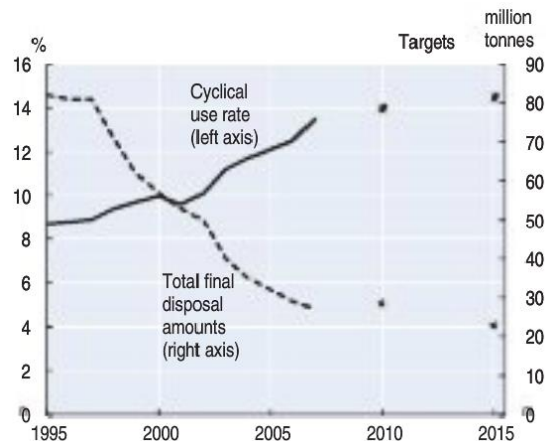
(MoE 2006)

Nevertheless, the enormous amount of waste generated (6% per person daily in the late 1960s) exacerbated the problem of the shortage of space available for landfills (Tanaka, Tojo, and Matsuto 2005; MoE 2006). Subsequently, environmental pollution concerns and the need for alternative solutions for waste management became an increasingly critical social problem: a series of pollution incidents in the 1960s, together with the complications of the Oil Shock and the War of Garbage in the early 1970s, determined the immediate priority to rethink the entire system anew. As waste entered the wider environmental discourse, the objective was to achieve a higher efficiency by improving management from a scientific point of view (JSWME 2007). After further strengthening the regulations, national subsidies, low-interest financing and special tax measures, the waste scenario in Japan faced a new high material affluence brought by the bubble economy in 1985. Commodity production was adapted to ensure frequent delivery-based distribution in order to guarantee variety and convenience, resulting in a huge amount of waste generated every day, and the authorities “had little choice but to deal with the problem in an after-the-fact and stopgap manner” (MoE 2006, 9).

The 1990s saw an unprecedented acknowledgement of global environmental problems due to increasing attention to climate change. Under the slogan “Think Globally, Act Locally,” Japan took a closer and renewed look into its own waste problems, further reinforcing its policy measures by encouraging resource recycling and promoting advancement in infrastructure and technology. The intention was to shift from a linear production-consumption-waste process to a circulatory system, minimizing the consumption of natural resources and turning waste into valuable resources to be exploited. The Japanese waste management policy was then transformed into an integrated waste and material

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management approach; this fresh emphasis on efficiency resulted in successful changes in the areas of both recycling and final disposal amounts (OECD 2010; MoE 2006).



Waste cyclical use rate and total final disposal amount (OECD 2010).

When the issue of food waste entered the political agenda, it represented one of the many aspects of the national environmental policy aimed at solving the garbage problem. The numerous pieces of recycling-oriented legislation enacted at the end of the twentieth century formulated national objectives of waste management around the problems of increased waste generation and shortage of landfills. In fact, as proven by Eco-Towns and food recycling loop systems, the Food Waste Recycling Law reduced the pressure on landfills and increased energy recovery. This law made the first significant contribution to food waste reduction and to the reutilization of resources within Japan (UNEP 2005; Stuart 2009). Its success allowed the Japanese food industry to reduce, reuse and recycle an average of 82% of its food waste in 2010. This percentage included the amount of controlled waste generation (about 9%), dehydrated waste (about 9%), heat recovery from incineration (2%) and the amount of food waste effectively recycled into new products (62%). Of these, methane, oil and fat products, carbonized fuels and ethanol accounted for 7%, fertilizer for 17%, and animal feed for 76%—animal feed being the primary recycling final product (MAFF 2012a; MoEc).

A key driving force behind the government's promotion of food waste recycling has been the country's high dependency on natural resource imports (OECD 2010). Japan's self-sufficiency in feed for livestock was as low as 26% in 2011, implying that the vast majority was actually imported from abroad. With its Basic Plan for Food, Agriculture and Rural Areas, the Japanese government set the objective of raising feed self-sufficiency to 38% by 2020 through the production of eco-feed via the implementation of recycling loops (MAFF 2008c;

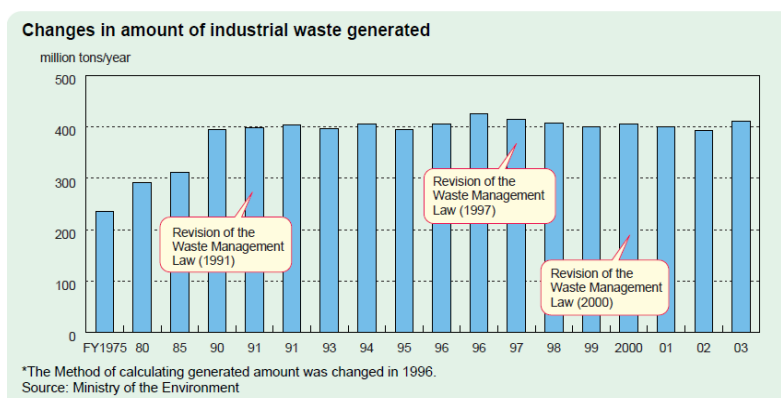
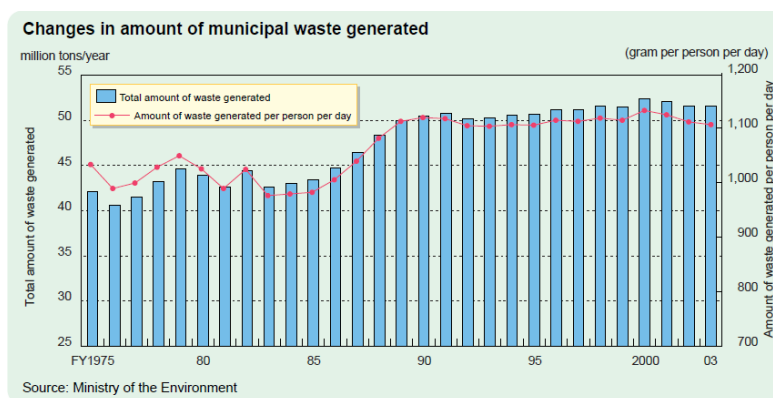
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MAFF 2013d). The global rise in prices for fuel, corn and soy meal made imported agricultural products intended for livestock as much as 50% more expensive, thus boosting the popularity of locally recycled feed (Ogino et al. 2007; Tanimura 2008; MAFF 2012b; Maeda 2008). Moreover, since domestically raised livestock fed on imported feed do not count as domestic in origin, the high imports of feed also caused a decline in the rate of self-sufficiency in livestock products (Nagata 2008; Kako 2009). This, in turn, was being subtracted from the domestic food supply capacity, resulting in a decreased national self-sufficiency in food. In fact, higher rates of self-sufficiency in both feed and livestock products would reduce the need for imports and subsequently boost the rate of food self-sufficiency on a calorie supply basis (Haga et al. 2008; Sudou and Hishida 2010; Ikeda 2008; Ogino et al. 2007; Kawashima 2002).¹¹ This explains the establishment in 2008 of the National Committee of Action for the Transformation of Food Leftovers into Feed to act as a bridge between the Committee for Strategies for the Enhancement of Feed Self-sufficiency and the Assembly for the Enhancement of Food Self-sufficiency (MAFF 2008d). In this way, while also reducing the environmental burden, the new business models, infrastructures, technologies and policies in support of food waste recycling had the clear objective of improving domestic production and stable food supply (MAFF 2009).

¹¹ The food self-sufficiency rate on a calorie supply basis is defined as “the ratio of domestic calorie supply to total calorie supply. For livestock products, imported feeds are taken into account.” (MAFF 2011b).

Chapter 2 – Improving the System

The Food Recycling Law has led to a substantial reduction in non-recycled food waste, but the amount of waste produced has remained at roughly the same high rate from the 1990s (MoE 2006).



(MoE 2006)

Although waste prevention has been prioritized both by national and local governments, as has been repeatedly pointed out in the revisions of various recycling acts, among the 3Rs, reduction and reuse have lagged significantly behind recycling (Tasaki, Yamakawa, and Numata 2011; MAFF 2007; OECD 2010; Barrett and Smith 2009). The reduction of waste generation has therefore been the focus of further recent attention; the analysis of its extent and dynamics constitute the aim of new institutional initiatives aimed at improving the national food system by reducing food loss.

The first attempt by MAFF was represented by the Research Committee for the Reduction of Food Loss established in 2008 and aimed at developing solution policies to food loss, but it failed to lead to actual results (MAFF 2008b; CAA, pers. comm.). Instead, the following

action taken by both MAFF and the Ministry of Environment (MoE) in March 2012 referred directly to the Food Recycling Law and had a much more practical character. Food businesses now have the legal obligation to report the actual weight of the amount of food waste they generate from both their manufacturing and distribution processes, a further attempt to raise awareness about the extent of food loss caused by their own practices. A provisional target value of reduction was also established from April as a non-binding objective for sixteen large businesses producing a large amount of edible waste; their achievements will be assessed in two years. Each target value is assessed with consideration for each firms' achievement of a determinate percentage of recycling (through the production of feed, fertilizer and methane). If a business operator already achieved its target value, it will either need to maintain it or further reduce the amount of waste generated. In 2014 the number of participating firms will increase to at least twenty one to include food service businesses. The achievement of the new 2014 target values will be mandatory (Hanzawa 2013; MAFF 2013a; MAFF 2013e).

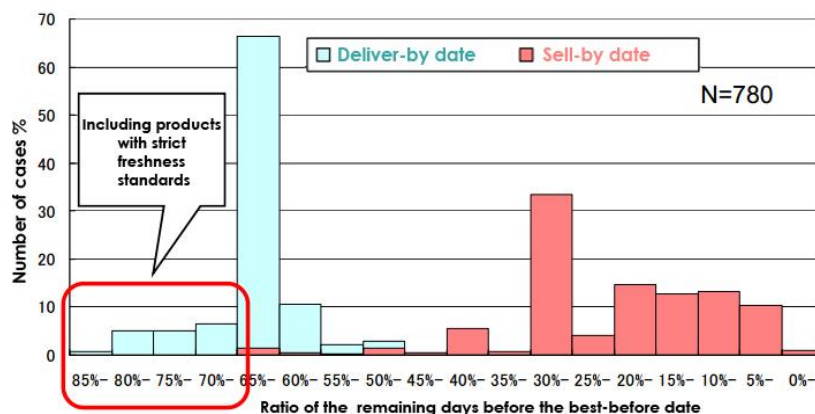
The Distribution Economics Institute of Japan and The Distribution Systems Research Institute—Non-Profit Organizations operating under the Ministry of Economy, Trade and Industry (METI)—started an Investigative Council in 2010 aimed at food waste reduction and reuse in the distribution sector; it was constituted by a cooperation of forty major manufacturers, distributors and retailers. Initially, studies on the problems of returned goods, delivery and distribution standards were commissioned to three working groups. In 2011 new topics were decided and since then these groups are researching into the issues of digital infrastructures, barcode generation and multilateral information exchange. By combining their findings, the Council intends to formulate a plan for the elimination of food losses and for the improvement of the efficiency in the food supply chain (DSRI 2013).

Food loss in Japan has several contributing factors. These include out-of-specification or out-of-standard goods (e.g. defective products, mislabelling of expiration dates and/or mistakes in legally stipulated label information) or unsold goods (e.g. over production and unanticipated bumper crops; excess inventory, often after bargains sales or campaigns; products for which distribution is discontinued, namely seasonal and limited edition products, as well as, emergency food supplies that have not expired; samples from exhibitions and special events; and products approaching the expiration dates that have to be withdrawn from shop shelves) (CAA 2012a; MAFF 2013f).¹² A large proportion of discarded food products is

¹² www.2hj.org.

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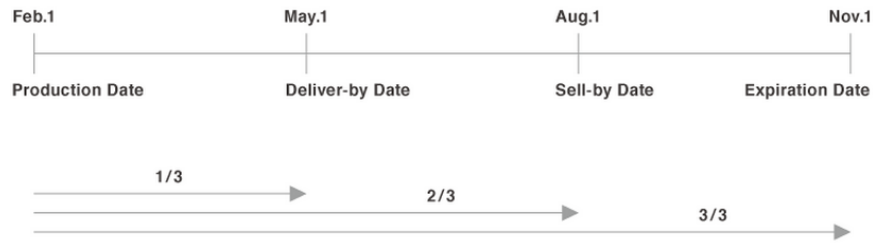
made up of food that is returned from downstream businesses in the food supply chain back to upstream wholesalers and manufacturers. According to an investigation conducted in 2010 within the entire food chain of processed foods, an estimate of 1,12% (almost 114 billion yen) of the entire product flow represents returned items from big wholesalers to manufacturers, while 0,37% (almost 42 billion yen) is from retailers to wholesalers (*Mainichi Shinbun*, November 19, 2012). Apart from damaged content and packaging issues, the main reasons for returned items are standard cuts (i.e. food rejected for new product sales or a change in standards), the expiration of the deliver-by date (i.e. the day by which a product should be purchased by the retailer from a wholesaler) and the expiration of the sell-by date (i.e. the day by which a product should be purchased by the consumer). Taking into account the shelf life of a product (i.e. from production to best-before date), the average deliver-by and sell-by dates in Japan are conventionally set at 65-70% and 30-35% of the remaining days before expiration (examples falling both before 75% and 25% are not uncommon) (DEIJ 2013).



Structure of the distribution of delivery-by and sell-by dates at different stages of a product's shelf life (DEIJ 2013).

Deliver-by and sell-by dates therefore divide shelf life into three: roughly when two-thirds and one-third of the total days are left before expiration. This is part of what is commonly known in Japan as the “one-third rule” which mandates that the delivery of a food product (to the retailer) has to be made within the first one-third of the shelf life and that the sales period be limited to the first two-thirds of its shelf life.

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Conceptual diagram of the one-third rule (based on a product with a 9-month shelf life) (2HJ 2013a).

Products that have passed either of these dates are considered old and are therefore withdrawn from the shop and sent back to the supplier (*Mainichi Shinbun*, November 19, 2012). An investigation among distribution businesses between 2011 and 2012 showed that the number of returned items is extremely high; the two most common reasons for failed shipments were inaccuracies in the estimate/prediction of the shipment dates and expiration of the deliver-by date (followed by security storage for preventing shortages and damage to the package or content). Of the products returned by retailers to wholesalers, 21% are directly disposed of and 64% are sent back to the manufacturer. Of those returned by wholesalers to manufacturers, as much as 74% are disposed of directly. This also happens for the items that are not shipped in the first place (DEIJ 2013). Therefore, as has been demonstrated, the one-third rule is closely related to the generation of large amounts of food loss (Souma 2013).

Given that the one-third rule is not clearly regulated by any piece of legislation, a climate of distrust prevails between businesses in the production and distribution sectors. In order to create an impartial policy-based solution, in October 2012 a working team was established comprising of sixteen representatives of the manufacturing, wholesaling and retailing sectors (e.g. among all Itō Yokadō, Aeon, Nisshin Shokuhin and Family Mart), two scholars from Meiji and Senshū University and a representative of the research nonprofit organization (NPO) Distribution Economics Institute of Japan as the secretariat (MAFF granted project). As a collaboration between the national authorities engaged in food waste fighting (Cabinet Office, Consumer Affairs Agency or CAA, MAFF, Ministry of Economy, Trade and Industry or METI, and MoE), and seeking cooperation with private enterprises (METI's Council for Cooperation Between Manufacturers, Distributors and Retailers, the Committee of Business and Consumer Organizations for the Life of People or Kokumin Seikatsu Sangyō Shōhisha Dantai Rengōkai or SEIDANREN, and The Consumer Goods Forum Japan), it represents the first cross-institution to adopt a holistic approach to the entire system (Souma 2013; *Mainichi Shinbun*, November 19, 2012; DEIJ 2013). The Team's first duty was to investigate distribution businesses in depth by collecting hearings and questionnaires and exchanging

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information on excessive storage and returned items issues. During 2013 the team will review previous measures and implement new practical solutions to make these rules more elastic and the whole system more efficient. Firstly, a pilot project will try to ease delivery-by and sell-by dates for those products with less strict freshness requirements. Secondly, new scientific tests on safety coefficients will be done to extend some best-before dates. Finally, for the products with a long shelf life (beyond three months), each firm will test the effectiveness of removing the indication of the day from the expiry date on the product label (and leaving just the year and month) in order to facilitate consumer understandings. If these measures prove effective, they will then be applied to the category of daily food items (DEIJ 2013; *Mainichi Shinbun*, November 19, 2012).

For the unavoidable returned items, MAFF is actively promoting the activity of those NPOs engaged in finding practical answers to food loss reduction in the distribution sector (CAA 2012b; DEIJ 2013; MAFF 2013e).¹³ Among these, food banks collect surplus edible food (e.g. close to the best-before date or with labelling errors or package damage, but with no quality issues) as donations from farmers, manufacturers, distributors, supermarkets, importers and individuals, and redistribute it among people in need or welfare agencies, NPOs and faith-based groups (MAFF 2011a; MAFF 2010b). Since its incorporation in 2002, the largest food bank Second Harvest Japan saw a dramatic increase in the food saved from being discarded, from the original value of 35 tonnes up to the present 3,152 tonnes saved. The Cabinet Office will vet the Second Harvest Japan Alliance, a “public-interest corporation” with the mission of promoting food banking and food security on a national level. It will work more closely with various national and local government agencies, local food banks, and food companies, while making donations tax deductible (MAFF 2013a; 2HJ 2013b).

The one-third rule appears to date back to the 1990s, when Itō Yokadō and other major Japanese supermarket chains (i.e. Aeon, Daiei, and Seiyu) arbitrarily formulated and applied this commercial convention to the entire distribution sector, greatly affecting food producers and wholesalers. While not actually rooted in or stipulated by any official law, the one-third rule rapidly became established as a widespread custom in the entire national food system. Its intention was to manage the flow of products from production to expiry date in the most convenient and efficient way possible in order to guarantee freshness to the consumer. Such a collective and organized decision reshaped dynamics within the whole distribution sector,

¹³ Nevertheless, this initiative is still under request for budgetary appropriations for the FY 2013 (CAA 2012b).

granting considerable power to retailers' decisions. Subsequently, retailers started to adopt a successful business model that catered directly and actively to consumer needs, giving them the authority to impose their own conditions on manufacturers and wholesalers (*Mainichi Shinbun*, November 19, 2012; Furusawa 2012; 2HJ, pers. comm.).

The shift of control over marketing from upstream to downstream businesses in the food supply chain results from the modernization of the distribution system at the end of the twentieth century in Japan. The economic recession that followed the burst of the economic bubble in the 1990s brought a sharp fall in expenditure on food (Larke and Causton 2005; Haghirian 2010). Significant demographical changes (i.e. overall delay in marriages and parenthood, increased participation of women in the work force and progressive social aging) influenced lifestyles and consumption patterns, that became more cautious and centred around efficiency, economy and convenience (Haghirian 2010; Francks 2009; Assmann 2010a; Larke 1994). This was the first time in Japanese history that retail capacity exceeded consumer demand, and fierce competition urged food businesses to rapidly part with the old traditional system (Larke and Causton 2005). Such circumstances ensured the survival only of those who made effective and efficient changes to their management and marketing models: for example, large multiple chains which were able to adopt cost-reduction techniques and service improvements (through such methods as advanced information technology which collected information on customer spending habits in order to improve ordering speed and accuracy). In-store inventory was kept low through a frequent turnaround of stock and just-in-time delivery arranged with suppliers (Larke 1994; Whitelaw 2006; Potjes 1993). Food producers and manufacturers had to keep in line with retailers' efficiency and speed and modify their own delivery system accordingly (Bestor 2006).

The one-third rule and other commercial customs came to be adopted over time, following the adaptation of distribution businesses to economic and market changes. These practices, in turn, caused the food system to become excessively rigid and generated a high number of out-of-specification and returned items. This, on the one hand, affected the microeconomic dynamics of several firms which were burdened by prohibitive costs and responsibility for the disposal of unsold goods (Souma 2013). On the other hand, lost food resulted directly in an increase of food prices in the market, affecting the macroeconomics of the country as a whole (Souma 2013; *Mainichi Shinbun*, November 19, 2012). Reduction of food loss came to be regarded as a possible way of improving the economy by decreasing extra disposal costs and allowing resources to be efficiently used within society (DEIJ 2013). This is what food loss

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fighting initiatives have been trying to achieve so far, aiming not only at environmental but also at economic sustainability in the Japanese food system. In fact, the target values for food waste reduction and the other measures for improvement in the distribution system are promoted as both contributing to the overall food cost reduction and helping to secure a stable food supply (MAFF 2013a; MAFF 2013e; MAFF 2008b). If the Japanese food industry achieves further efficiency in handling its resources, the entire national food system will benefit from higher autonomy, thus reducing Japan's dependence on imported resources (MAFF 2013a). It is therefore clear why the Japanese government has attached such critical importance to food loss reduction initiatives as an additional strategy for raising the rate of food self-sufficiency (MAFF 2009).

Chapter 3 – Raising Awareness

Once the issue of food waste recycling and food loss prevention in the food industry had been successfully addressed, it became clear that the raising of public awareness was also critical. Consumer behaviour emerged as the root cause and as a large contributor to these problems; direct disposal, excessive peelings and food leftovers account for half the amount of national food waste (CAA 2013a). Food businesses cater to high expectations and the preference for “perfect, pristine and pretty” products by paying careful attention to quality all along the food supply chain. The sharp eye of the consumer on best-before dates encourages retailers to pull products from the shelves prematurely (before their sell-by dates) for fear of consumer boycotts. In addition, the situation has been aggravated by short sell-by dates for numerous prepared foods (often no longer than just a few hours at convenience stores) and consumers growing preference for freshness (Barrett and Smith 2009; DEIJ 2013). This explains why the one-third rule, which originally aimed at supporting the expectation of receiving the freshest product, is said to stem directly from consumer psychology (*Mainichi Shinbun*, November 19, 2012; 2HJ, pers. comm.). Wealth and easy access to food allowed consumers to waste more, and marketing strategies and technology (as in food packaging, for example) made it easier to purchase larger quantities than were actually needed (Melikoglu, Lin, and Webb 2013). Additionally, food waste at the household level is exacerbated by misinterpretation of food labels and confusion over best-before and consume-by dates. For fear of food poisoning, one-fourth of all household food is discarded before it reaches its best-before date—and therefore when is still perfectly edible. The absence of the production date on the majority of labels precludes consumers from accurately assessing food degradation, and thus the reliance on best-before and consume-by dates is emphasized even more. In addition, widespread mistrust of the food industry leads consumers to purchase and eat products well within those dates (DEIJ 2013; MAFF 2013a; CAA pers. comm.).

Increased awareness of the dynamics of the food supply chain, more conscious purchase and consumption patterns, and cultural shifts in the valuing of food would have a knock-on effect on corporations and ultimately reduce waste production (Parfitt, Barthel, and Macnaughton 2010). It is therefore necessary for consumers to understand the efforts of the food businesses to address food loss, and to follow suit and assume their own responsibility (CAA 2013a). While it is easy for consumers to access information, it is not always easy to

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understand this information or apply it to their own daily lifestyle (Souma 2013; CAA 2012a). The inclusion of the consumer population in waste reduction efforts should take place through education (e.g. proper knowledge about food labelling and storage) and open communication between consumers and other stakeholders in order to ensure mutuality in the campaign to fight waste and food loss (CAA 2013a; Hanzawa 2013).

The government has shown commitment to improving consumer awareness on these issues. The Consumer Affairs Agency (CAA) was founded in 2009 and has been publishing awareness-raising information ever since following the requests of MAFF. As a result of opinion-exchange meetings with consumer groups, in 2011 corrective measures were suggested to improve the food labelling system. These measures included a thorough definition of consume-by and best-before dates, the promotion of information on good conservation techniques, clarification of expiry dates and relabeling decisions by businesses, and acknowledgment of the arbitrariness of the one-third rule. In 2012 food loss issues were officially brought into the wider discourse of sustainable consumption, and the Waste Elimination Project was created to raise and expand awareness and to improve consumer waste habits. From 2013 onwards, the CAA will focus on intensifying awareness-raising and improving their education web site. It has already published a leaflet that features explanations on product best-before and consume-by dates, recommendations against excessive shopping (e.g. checking the home stock and buying only what is needed) and excessive cooking (e.g. avoid preparing large quantities and re-use leftovers). All of these initiatives have been framed by the spirit of *mottainai*, which embodies the concept of resource valorisation and waste-avoiding lifestyles (CAA 2012a; CAA 2012b; CAA 2013b; OECD 2010). Furthermore, for the Fiscal Year 2013 CAA plans to include scholars and experts from consumer groups in the research for effective policies, and to start new investigations in collaboration with more than ten local governments on household organic waste composition (CAA 2012a; CAA 2013c; *Nikkei Marketing Journal*, February 25, 2013).

MAFF also addresses consumer awareness on food waste through webpage sections for both children and adults, where the world hunger situation and “eco-recipes” are featured (MAFF 2013g; MAFF 2013h). Likewise, its 2008 campaign Food Action Nippon—originally aimed at improving the nation’s eating habits—has among its main projects the promotion of waste avoidance through good consumption practices (Assmann 2010b; FAN 2013). Among Food Action Nippon partners, Better Home holds *Mottainai Kitchen* cooking classes, teaching

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how to make the best out of every ingredient without wasting any part of it.¹⁴ Similarly, Glossy Inc. runs the Zero Leftovers campaign that expresses widespread concern on food waste by collecting stories and views by food experts, producers and cooks.¹⁵ Finally, Reac Japan Inc.'s collaboration with the Doggy Bag Committee aims at distributing its easy reusable containers to transport leftover food from restaurants to households, thereby eliminating waste in food service facilities and restaurants by educating consumers to act responsibly (MAFF 2013a).¹⁶

A Liaison Committee was set up in July 2012 comprising all the authorities concerned with food loss reduction and consumer policies (i.e. the Cabinet Office, MAFF, CAA, MoE, the Ministry of Health, Labour and Welfare or MHLW, the Food Safety Commission of Japan, the National Police Agency, and, from 2013, academics and the Ministry of Education, Culture, Sports, Science and Technology or MEXT). This committee is currently working on building quick and accurate responses to consumer concerns. By cooperating with existing educational programmes on food and nutrition, it will discuss strategies to improve consumer habits (e.g. the correct understanding of best-before dates, refrigeration and conservation management, and reformation of waste consciousness) and to promote the best practices among local governments by sharing common knowledge. It will also support consumer organizations by strengthening their public relations through symposiums, events, pamphlets distributions, and mass media communications (Hanzawa 2013; CAA 2013a; CAA 2012a). In March 2013 the CAA's Waste Elimination Project, Cabinet Office and MoE supported a Food Loss Reduction Symposium—a joint sponsorship event between MAFF and the Japan Organic Recycling Association held in Tokyo and Osaka to which the participation by the general public was actively encouraged. The symposium was thought to build an environment that supports the initiatives in the food chain and educate to the concept of *mottainai*. The national and global situation on food loss was presented by the experts together with MAFF's Working Team, food banks activities, and the Eco-Cooking initiative (Furusawa 2012; JORA 2013).

The Foodloss Challenge Project, founded in 2013 by former consultant at FAO Liaison Office with Japan Emiko Onoki, the NPO Hunger Free World and Keio University Social Design Centre, intends to start fighting food losses in the distribution sector through consumer awareness. It will promote a new prototype of doggy bag, share knowledge about

¹⁴ www.betterhome.jp/taisetsu/index.php.

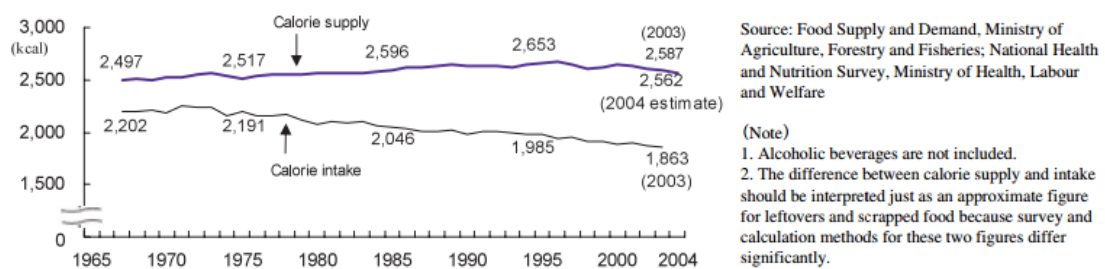
¹⁵ www.food-sommelier.jp/zero/index.html.

¹⁶ www.doggybag-committee.com/controller/index.php.

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conservation techniques and sustainable cooking, and facilitate micro-projects by citizens. It will then design action plans in order to propose innovative products and services throughout the entire food supply chain. By including the general public in a multi-stakeholder partnership (including the government, NPOs, think tanks, and universities), it will address social and market needs with a systematic approach (JORA 2013).

As mentioned earlier, food waste was first acknowledged as a problem when the amount of food available substantially exceeded the amount consumed. From the post-war period onwards, the excess of per-capita calorie supply over consumed calories had been continuously increasing. Besides general overstocking, the easy and stable access to food brought an overall devaluation of food which allowed people to feel less guilty about throwing it away (MAFF 2013i; Parfitt, Barthel, and Macnaughton 2010).



Changes in calorie supply and actual daily individual intake (MAFF 2013i).

Both during and after World War II, the country's daily calorie supply struggled to reach 2,000 kcal per capita. The rapid post-war economic expansion, however, brought a radical change in both the quantity and quality of food consumption. By the late 1960s, lower prices made a wider array of food products easily accessible to the vast majority of Japanese consumers. With the shifting of concerns from the general availability of food to its quality and production process, came a gradual move from a diet based on rice, soybeans and fish to a diet with an increased consumption of wheat, meat and dairy products (Jussaume, Hisano, and Taniguchi 2008; Cwiertka 2006). The increase in the spending power during the economic boom of the 1980's promoted consumption in the forms of frequent shopping and dining out (Francks 2009; Hagirian 2010). The increase in spending power during the economic boom of the 1980s led to increased shopping and dining out (Francks 2009; Hagirian 2010). These years witnessed a Gourmet Boom that led consumers to look for novelty and leisure in food outside the household, guided by general trends and overwhelming information from the media. Such thorough attention to food eventually created a propensity towards a health-

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oriented diet which was reinforced by the close relation between eating and well-being long valued in traditional Japanese culture (Kaneko 1990; Jussaume, Hisano, and Taniguchi 2008). In some cases, the promotion of personal health distorted original beliefs about nutrition and resulted in Food Faddism; ever more consumers engaged in idiosyncratic diets that assumed nutritional properties of health products as cure-alls or started to avoid any food products which had been found toxic (Takahashi 2004).

This new focus on functional food and its potential effects on the human body was only one of the many expressions of widespread concerns about food safety. These were caused by widely publicized food poisoning scandals and increased citizen awareness on environmental degradation. The Morinaga Milk incident in 1955 and the Kanemi Rice Oil case in 1968 were respectively caused by contamination by arsenic and polychlorinated biphenyls. The Minamata and Niigata poisoning affairs in 1953 and 1964 respectively passed contaminants on to the local resident consumers through harvested seafood. Despite the revisions of the Food Safety Law in 1957 and 2003, a series of similar incidents have followed one after the other, increasing consumer awareness on food safety and having a tremendous impact on public perceptions of the food industry. For example, in 2007 two Japanese confectioners firms took part in cases of fraud; Fujiya had to admit that it repeatedly used expired ingredients and mislabelled consume-by dates for its products, and Akafuku falsified production dates of its popular sweets. An important precedent was created for imported food after a 2008 poisoning scandal involving frozen dumplings imported from a Chinese company (Assmann 2010b). Concerns about the safety of imported food peaked with debates over the imports of food treated with illegal postharvest chemicals and the liberalization of rice imports (Jussaume, Hisano, and Taniguchi 2008).

As a result, growing consumer consciousness regarding the importance of food origins provided the basis for the rise of the food safety movement in contemporary Japan (Nagata 2008; Jussaume, Hisano, and Taniguchi 2008). Traditional sensitivities about access to food and the role it plays in general well-being evolved into food safety protest movements in the 1960s and 1970s, and into a number of grass-root organizations in the 1980s with food safety or security as their main cause. For example, the fight against genetic recombination and endocrine disruptors was the basic idea behind the Consumers' Union of Japan and Japan Consumers' Association, while the impact of new, processed food on the Japanese diet and on health at large was the central concept of the Committee for the Consideration of Japanese Traditional Diet. These safety and quality concerns also stimulated the growth of Japanese consumer cooperatives whose marketing strategy from the 1970s was to shift their priority

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from low costs to good and safe products. In the 1990s this trend reached mainstream industry which decided to exploit the marketing potential of safe food by introducing their own policies on commodities free from genetically modified organisms. Similarly, the government announced the adoption of mandatory labelling and safety reviews for genetically engineered products. Consumer concerns about safety had become so widespread both in general society and in the political economy that the same institutions which were promoting economic rationalization of agriculture and food distribution also began to address individual requests (Jussaume, Hisano, and Taniguchi 2008).

In its socio-political aspect, food activism took not only the shape of collective citizen action but has also shaped national dietary habits by following the logic of self-responsibility (Kojima 2011). This is the domain where the Japanese government decided to take a more active role, bringing forward a national movement aimed at encouraging everyone to make proper dietary choices both inside and outside the home. The Fundamental Law of Shokuiku (i.e. food education) was legislated in 2005 as a response to the perceived lack of public knowledge about healthy dietary habits both in and out of the home. The law divides the responsibility for providing information on food between food-related businesses and local government (Assmann 2010b; MAFF 2013i). Under the Food Safety Commission of Japan's leadership, MEXT, MHLW and MAFF collaborated for the implementation of comprehensive and consistent measures, creating Dietary Guidelines in 2000 and a Food Guide Committee in 2004. MEXT has promoted shokuiku through school programs, MHLW through awareness campaigns, and MAFF through a focus on the entire food chain, by perpetuating traditional food culture, providing information on food safety and promote people's understanding of agriculture, forestry, fishery and the food industry (MAFF 2013i).

Food loss and waste fighting in consumer education had the clear objectives of sensitizing the people to environmental problems and to spread the know-how about proper individual food choices. For example, Eco-Cooking gives shopping, cooking and cleaning tips for saving ingredients, energy and water (and consequently the consumer's expenses) while spreading information about global warming, waste disposal, and pollution of the oceans, rivers and air. It denounces a high-production, high-consumption and high-disposing society, stressing the concepts of limited natural resources and encouraging the construction of a low-carbon society starting from the kitchen. This strategy proved effective by halving CO₂ emissions, making consumers use 42% less gas, 82% less water, and wasting 64% less food (MAFF 2013a; Nagao, Kita, and Mikami 2007). Nevertheless, Eco-Cooking also stresses the need for

consumption of local products in order to reduce Japan's food miles¹⁷—the highest in the developed world—and to cut down on the importing of agricultural products (Sakurai 2013).¹⁸

When the idea of shokuiku was introduced in the political arena in the early 2000s, the consequences of the radical shift away from the traditional diet were already becoming a part of national consciousness. Despite Japan was still able to sufficiently satisfy the demand for food that national diets required until the mid-1980s, the gradual reduction in rice, fish, soy and local vegetable consumption effected the capitalization of national resources (Nagata 2008; MAFF 2011b). It became clear that the change in dietary habits was the primary cause for Japan's high and chronic reliance on food imports (Kojima 2011). One way to counterbalance this trend was to encourage a return to the traditional diet and to provide incentives to buy local products. This is in fact what shokuiku aims at stressing the uniqueness and healthfulness of Japan's own food culture. In order to support the declining domestic agriculture, campaigns like Food Action Nippon promote a “visible producer” (i.e. products which are traceable, reliable and of high quality) by organizing sales of regional agricultural products in order to expand distribution networks (MAFF 2011b; Assmann 2010b; MAFF 2008a). Their objective is to fight the negative consequences of globalization (i.e. the loss of traditional food culture and the spread of nutritionally unbalanced diets) through a producer-consumer joint collaboration which responds to the looming crises of food safety and dwindling domestic demand. Therefore, the re-valorisation of national products, which includes waste prevention, has also been directly connected to the attempt to raise the rate of national food self-sufficiency (Assmann 2010b; MAFF 2013g; MAFF 2013i; CAA 2012a; MAFF 2008a; MAFF 2009).

In addition, MAFF aims at increasing the consistency of the methods employed by the food-related businesses in formulating food labels. The measures that have been proposed include the improvement of the scientific procedures to assess food degradation properties, the provision of stronger labelling guidelines and the establishment of a thorough government inspection system aimed at ensuring general food safety. MAFF plans to revolutionize the existing Japanese Agricultural Standard regulations and labelling system (e.g. by re-including production dates of products) in order to answer to consumer needs and to gain their trust for future collaboration. These measures are addressing the system's very foundations, and are

¹⁷ Food miles refer to “the emissions produced and resources needed to transport food and drink around the globe.” “Glossary of environmental science,” Wikipedia, last modified December 10, 2012, en.wikipedia.org/wiki/Glossary_of_environmental_science.

¹⁸ www.eco-cooking.jp.

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listed among waste prevention policies developed to guarantee a stable food supply for the nation (MAFF 2009; CAA pers. Comm.).

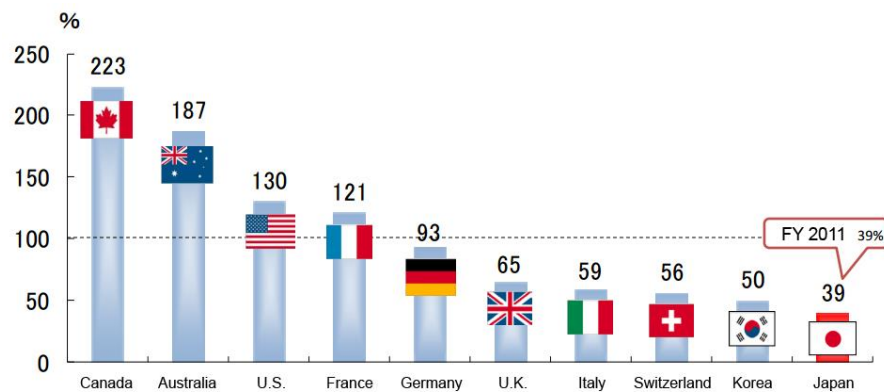
Chapter 4 – Securing Food

Concerns about food security have been central to the modern history of Japan and its people. In the latter half of the 19th and most of the twentieth century, the focal point of government policy, provoking several popular uprisings, had been the adequate provision of staples. Rice supplies were the motivating factor behind both colonial expansion, to find an external source of rice, and the 1921 Rice Law, to discourage rice imports. Although ostensibly at odds, both measures were meant to guarantee the country's food self-sufficiency. The hardships of the late 1940s and early 1950s as result of World War II and its aftermath encouraged national policy to boost rice production and distribution through large subsidies. Although by the late 1960s and early 1970s there was almost no need to worry about food availability, consumers were well aware that a large proportion of the food on their table was coming from overseas. The Oil Shock and the U.S. soybean embargo of the early 1970s instigated public concerns over the connection between food supply and imports. At the same time, the government and the media were constantly exposing the progressive decline in the rate of food self-sufficiency (Jussaume, Hisano, and Taniguchi 2008). This rate went from 79% in 1960 to 50% in 1987, reaching a record low of 37% in 1993. In 2006 it rose slightly to 39% and has since remained roughly unchanged (Kako 2009; MAFF 2012c; MAFF 2013j). The sharp fall can be attributed to both production and consumption factors. On the one hand, domestic supply capacity had been weakened, above all, by a decline in the number of farmers, the aging of the remaining farmers, and a fall in cultivable land (MAFF 2011b). On the other hand, the rapid economic growth after World War II precipitated a significant appreciation of the yen against the U.S. dollar, together with radical changes in eating habits and the food industry as a whole (Kako 2009). Reduced consumption of rice led to an increased demand for meat and vegetable oil which Japan had to start importing. This was exacerbated by the spread of processed foods through services like fast food restaurants, which rely heavily on cheaper imported foodstuffs (Nagata 2008). At the same time, Japan was kept under strong pressure by negotiated trade agreements like the General Agreement on Tariffs and Trade and by the World Trade Organization, linking Japanese agriculture to the restructuring of the global food system. This ignited a national debate regarding the stark choice between agricultural protectionism on the one hand, and trade liberalization, on the other. In order to adhere to beliefs about the inevitability of globalization and the urgency for

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technological intensification, the government promulgated a series of new laws designed to de-regulate food production and to liberalize rice imports. However, these were widely criticized for threatening Japan's sovereignty and stressing productivity, economic efficiency and profit over the personal, the community and environmental well-being which are considered the foundation of a healthy agri-food system (Jussaume, Hisano, and Taniguchi 2008).

Despite the recent decline in population, in 2011 Japan still ranked tenth among the most populated countries in the world, and seventh for population density (MIAC 2012). Its rate of food self-sufficiency, however, stands at 39% and is currently the lowest among the major developed countries (MAFF 2013c; MAFF 2013j).



Food self-sufficiency rates in main developed countries (MAFF 2013c).

The sum of these two factors results in an overpopulated country that is extremely far from being self-sufficient in its food supply. Japan is now able to provide about 2,000 kcal daily for every citizen, just slightly more than the lowest per capita supply during and after the war (Jussaume, Hisano, and Taniguchi 2008; Nagata 2008). This is critical if the global food supply-demand situation is taken into consideration. In fact, the global food system is currently facing a turning point, with some developing countries starting to limit food exports in order to satisfy their domestic demand for food, ethanol and bio fuel. Moreover, international prices of corn, soybeans and wheat are constantly increasing and the instability of global agricultural production as a consequence of global warming continues to grow (MAFF 2013k; Nagata 2008). Being the world's largest net food and feed importer, with 60% of its food supplied from abroad, any exacerbation of global circumstances would put Japan at serious risk (Sudou and Hishida 2010). Consequently, Japan is engaged in all possible efforts

to stabilize food supply and demand by increasing its own rate of food self-sufficiency. This was also the strategy adopted by the Japanese government to contribute to the stabilization of food supply and demand in the global market (Kako 2009; Nagata 2008; Sakurai 2013; MAFF 2013l).

One recent attempt is represented by MAFF's decision in 2000 to raise the rate of food self-sufficiency to 45% by 2010. This was, however, postponed to 2015 and then changed to an objective of 50% by 2020. It is the first time that Japan has embraced such an ambitious target, and the first case of a developed country setting a numerical target for food self-sufficiency. With the adoption of food governance as a central national strategy, Japan is now aiming to reinvigorate domestic agriculture and restore trust in its domestic food system, by not only promoting greater consumption of domestic products but also reducing food loss and recycling food waste into feed and fertilizer in order to cut down on imports (Sudou and Hishida 2010; Nagata 2008; MAFF 2010a; JIN 2000; MAFF 2009). The cause and effect relationship between low food self-sufficiency and food losses and waste had not been acknowledged until very recently. It was only in 2008 that MAFF's Research Team for the Reduction of Food Loss declared in its first statement of intent that wasting food boosts demand and results in increased need for imports (MAFF 2008b). In addition, the opposite is also true; frequent imports make Japan vulnerable to great quantities of food loss during the import process. Therefore, the promotion of national production and consumption will also eventually result in less food going to waste (Barrett and Smith 2009).

The Japanese concern over food security in relation to food losses and waste, however, has developed quite differently than elsewhere. Earlier international studies in Europe have always highlighted the implications of food loss and waste for malnutrition in poor regions of the world (Parfitt, Barthel, and Macnaughton 2010). The reduction of food loss in developing countries was included in the mandate of FAO when it was established in 1945. It constituted the reason for the initiation of the Freedom from Hunger campaign in the late 1960s in preparation for the UN First World Food Conference in Rome in 1974. Here postharvest were identified as one of the fundamental causes of world hunger (Parfitt, Barthel, and Macnaughton 2010; FAO 2012a; Nieremberg, pers. comm.).¹⁹ Food losses came to be seen as a problem in Europe in the 1980s, when big agricultural subsidies by the Common Agricultural Policy and a series of mandates by FAO increased food production such that

¹⁹ Danielle Nieremberg is the co-founder of the think tank Food Tank, and the director of the project Nourishing the Planet for the Worldwatch Institute.

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huge amounts of food were destroyed or left to rot in the fields. High waste management costs and lack of space for landfilling prompted the issue of food waste to be included in the environmental policies of the European Union's new green economy (EU 2013). The global food and financial crisis that started in 2007 has further highlighted the fact that food losses and waste are not only an ethical and environmental problem but also compelling evidence of the failure of the market system (Nieremberg, pers. comm.). This, together with the integration of the global market and the lengthening of food chains, led FAO and its partners to adjust their intervention strategies to focus on systemic improvements of food chains (FAO 2012a). The anticipated failure of the UN's Millennium Development Goals is currently encouraging renewed reflection about food uncertainty in the developing world, and food losses and waste are being reviewed in light of the prospect for feeding a world population of nine billion people by 2050 (Nieremberg, pers. comm.; Gaiani, pers. comm.).²⁰ Additionally, the Zero Hunger Challenge by the UN was established and integrates the objective of food security while aiming at zero food losses and waste and 100% sustainable food systems.²¹

²⁰ Silvia Gaiani is a researcher of the Department of Agricultural Economics and Engineering, University of Bologna.

²¹ www.un.org/en/zerohunger.

Conclusions

The analysis conducted in this thesis has clearly indicated that the economic and cultural history of food loss and food waste fighting in Japan carries strong implications for current national strategies. Although the food loss and waste problem only became clear in the public domain very recently, it has long been tackled at the policy level. The issue of food waste, however, only really entered the political agenda as an attempt to deal with the larger waste and garbage problem that Japan was beginning to face at the end of the twentieth century. At first, the focus was on recycling as a means to diminish the volume of garbage that required landfilling or incineration. Waste prevention was addressed only at a later stage, when the structure and dynamics of the national food system came into question due to food loss. Finally, food education was used as a way to raise waste awareness within the wider cultural context of consumers' beliefs and concerns. Along with targeting the sustainability of the food system, recycling, prevention and education were pinpointed within the need to improve Japan's dramatically low level of food self-sufficiency.

Both the Japanese and international approaches to fighting food losses and waste share a major concern for the environment, particularly with current understanding concerning the unsustainability of modern societal practices. Nonetheless, in their original discourse on food losses and waste, international organizations did not include food security in the developed world but rather highlighted the access of poor countries to food. While contributing to the 7% total international food aid as the second top donor (INTERFAIS 2012), securing a future stable food supply for its own population is a problem that Japanese policy makers cannot afford to ignore. The distinctive motivation of Japanese self-oriented efforts to address national food insecurity can be found in their fear of facing even worse consequences in the event of a global food system crisis. Although domestic food security is a significant concern for all countries, the situation in Japan is aggravated due to the delicate situation surrounding the importation of agricultural products. Japan is, in fact, heavily dependent on overseas resources for satisfying domestic food demand—a result of dietary globalization and the liberalization of trade.

Despite similar concerns for fighting food losses and waste shared by all the developed countries, it is possible to consider Japan as an exceptional case. National food insecurity is directly addressed in Japanese policies concerning food loss and waste and is a theme that

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recurs throughout recycling, loss reduction and consumer awareness raising activities. In this sense, the issue of their low rate of food self-sufficiency adds a unique facet to Japan's efforts with respect to other countries' approaches to fighting food loss and waste. In Japan, food losses and waste issues entered a realm in which food security was not only its basic principle in the past but also remains its prime objective today. As the government identified a higher rate of food self-sufficiency as a functionally significant variable of the national economy, ways to maintain favourable food-based efficiency ratios were also given a major priority. This critically influenced the entire food system, making national food security decisive in facilitating efforts against food losses and waste and in determining national strategies and measures. The motivation to fight food loss and waste in Japan does not merely have to do with lower costs for consumers and producers, concerns for the global environment or solidarity with underdeveloped nations. It also demonstrates a strong streak of nationalism, autarky and opposition to globalization.

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