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NATURAL ENVIRONMENT AND TO BUILD
A FUTURE IN WHICH HUMANS LIVE IN
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FOOD WASTE REDUCTION CASEBOOK (SUMMARY REPORT)

Collaboration with



Institute Of Geographic Sciences and Natural Resources Research, CAS

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Shenzhen One Planet Foundation

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Contents

Executive summary	1
I. General context	
i. Research background	4
ii. Definitions and scope	5
iii. Definition of small, medium and micro-sized catering enterprises	6
II. Survey results of food waste awareness and actions in the catering industry	
i. Basic information of restaurants	8
ii. Kitchen waste in the restaurants	10
iii. Food waste reduction in the restaurants	11
iv. Summary	12
III. Cases of food waste reduction in the catering industry	
i. Establish the concept of green development and enhance corporate brand building	15
ii. Promote innovation in recipe design and cooking to boost food waste reduction	16
iii. Utilize menu design for more efficient food use to reduce waste and earn better revenue	17
iv. Estimate sales volume in real time and purchase on demand accurately	18
v. Adopt standardized production and efficient cold chain distribution	19
vi. Engage the public for plate waste reduction and appropriate consumption	20
vii. Adopt digital quantitative monitoring to facilitate food waste reduction	21
viii. Promote food sharing model to avoid waste	22
Appendix: Food waste related regulations and policies	23
Literature	25



EXECUTIVE SUMMARY

Food loss and waste is a global problem, and reducing food waste is an important measure to improve the sustainability of the food system and ensure global food security. The United Nations Sustainable Development Goals (SDGs) Target 12.3 clearly states that “by 2030, halve per capita global food waste at the retail and consumer levels”.

Catering companies are important participants in the food supply chain. According to the National Bureau of Statistics, the market size of China’s small, medium and micro-sized catering industry continues to grow while the expansion is further underpinned by the improved food delivery service capabilities and residents’ rising consumption power. The sector has gained momentum and now enters the maturity stage. Though the overall level of catering industry has been gradually lifted over the years, catering businesses are facing a reality. Their high income usually comes with high expenses and consumers’ high consumption usually leads to high waste. The lean management of catering businesses plays an important role in reducing such waste. Catering companies should shoulder its responsibility in avoiding food waste, which can bring a very promising future. This report, with the support of Eleme, conducts a systematic analysis through questionnaires to study the current situation of food waste awareness and actions in micro, small and medium-sized catering enterprises. The survey results show that such catering businesses currently have a high awareness of food waste reduction, but specific actions need to be further adopted. The corresponding management systems for catering enterprises need to be continuously strengthened, the understanding of the importance of quantitative monitoring needs to be improved, and the monitoring and management tools available for food waste also need to be further understood. The survey also found that in addition to the problem of food waste in the kitchen, it is still a great challenge to reduce plate waste and waste generated from return behavior during catering consumption. At the same time, many restaurants believe they lack ways and effective tools to participate in food waste reduction activities.

Currently there is an increasing attention to food waste reduction. The catering industry all over the country has made active explorations and taken actions from the perspectives of industry norms and corporate practices. Since the release of the national standard **Green Catering Operation and Management** by China Hospitality Association in 2021, the average electricity consumption of pilot catering enterprises drops by 10%, water consumption down by 5%, gas consumption down by 4%, and the disposal volume of kitchen waste is 12% less. With the guidance of policies, industry suggestions and the efforts of enterprises, Beijing Food and Beverage Industry Association has achieved preliminary results in reducing food waste, and the survey has found that the kitchen waste in the catering industry has been reduced by 30%.

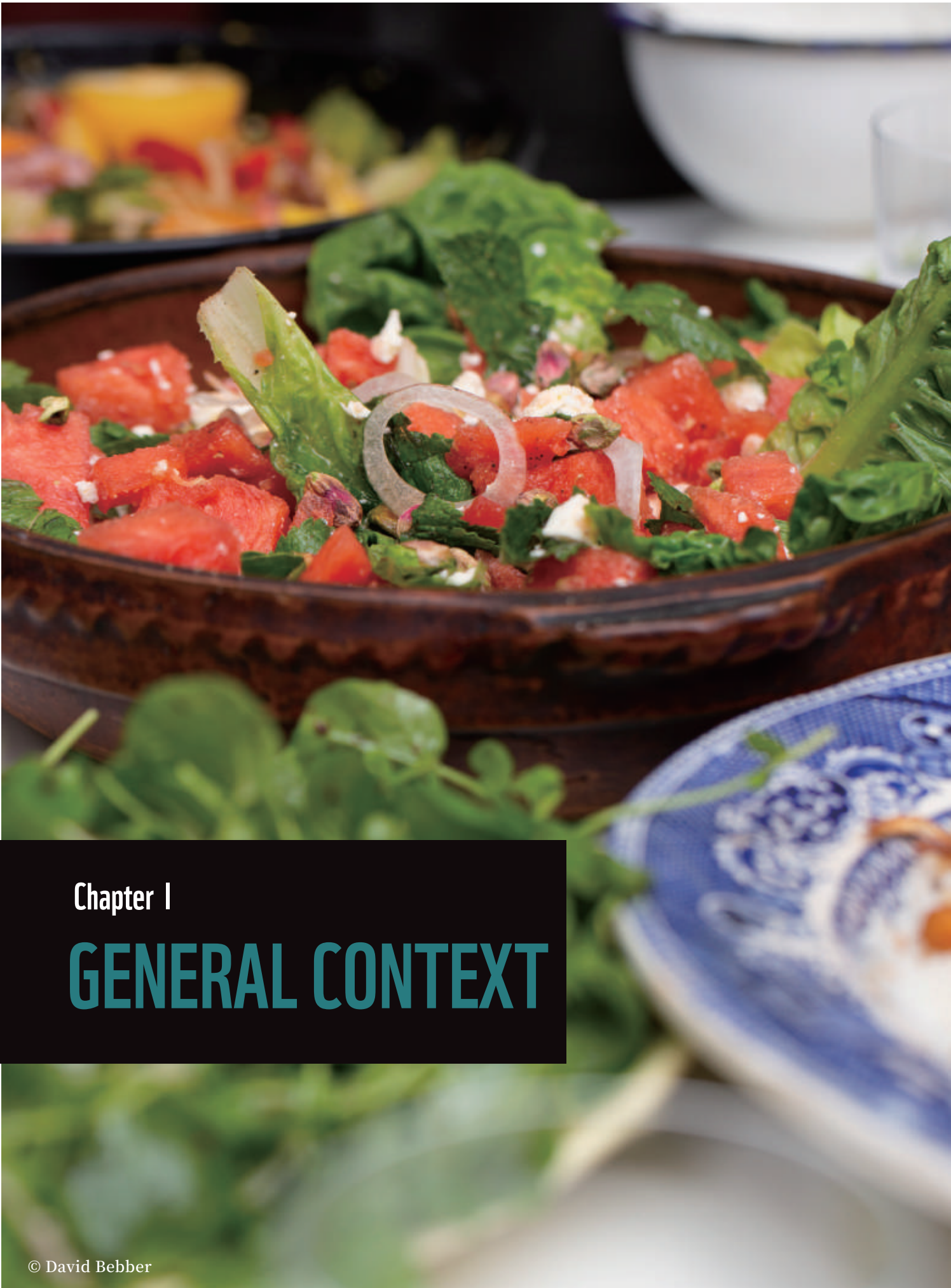
Focusing on current food waste situation in China’s catering industry, this report collects and sorts out the food waste reduction actions and measures adopted in some catering companies in China and summarizes effective experience that is operable, replicable and scalable as follows:

- 1. Establish the concept of green development and enhance corporate brand building
- 2. Promote innovation in recipe design and cooking to boost food waste reduction
- 3. Utilize menu design for more efficient food use to reduce waste and earn better revenue
- 4. Estimate sales volume in real time and purchase on demand accurately
- 5. Adopt standardized production and efficient cold chain distribution
- 6. Engage the public for plate waste reduction and appropriate consumption
- 7. Adopt digital quantitative monitoring to facilitate food waste reduction
- 8. Promote food sharing model to avoid waste

Through these cases and experiences, the report summarizes several key points for the catering industry to reduce food waste:

- 1. The establishment of systems, standards and norms, combined with the promotion and encouragement from platforms such as industry associations, can form a huge motivation and drive the industry to respond actively.
- 2. Prevention efforts should be prioritized in food waste reduction work to avoid waste from the source.
- 3. Quantitative monitoring provides core data support for reduction efforts.
- 4. Accurate classification of kitchen waste is a prerequisite for accurate measurement and implementation of waste reduction action.
- 5. Multiple measures should be adopted to maximize the reduction.
- 6. Catering companies of different scales can act according to their abilities and choose suitable tools and methods. “Small measures” can also deliver “Big improvement” results.
- 7. Every individual in the restaurant, from staff to customers, can be a major force to reduce waste reduction.

This report also compiles relevant policies and regulations on food waste, as well as the application tools and technologies used in the restaurants, providing reference for micro, small and medium-sized catering enterprises to reduce food waste from multiple perspectives. At the same time, when the food waste reduction action in the catering industry across the country is in full swing, the contents of this report cannot reflect the whole picture of the practice in the catering industry due to its limitations. This report aims to inspire more catering enterprises to share their ideas and experiences, and discover many more practical cases of reducing food waste in the catering industry.



Chapter I

GENERAL CONTEXT

RESEARCH BACKGROUND

With the global outbreak of COVID-19, and the intensification of extreme weather such as hurricanes and heavy rainfall, the global food system is facing unprecedented pressure and challenges. In 2020, a total of 720 to 811 million people in the world suffered from hunger, an increase of 161 million compared with 2019. On the other hand, the amount of global food loss and waste is huge as almost 1/3 of the food produced globally (about 1.3 billion tons) is lost or wasted. That means about 28% of the cultivated land goes futile due to food waste every year, and the resulting greenhouse gas emissions are as high as 3.3 billion tons.

In 2015, the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development, in which Sustainable Development Goals ((SDGs) Target 12.3 called for “by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains”. With only nine years to go, the task remains very urgent and arduous.

As a major agricultural country, China uses 7% of the world’s arable land to feed 22% of the world’s population, but China’s main food is subject to varying degrees of loss and waste from agricultural production to consumption. According to the sampling survey results of the National Food and Strategic Reserves Administration, the annual food loss in China from farm to table is about 135 billion jin (or 67.5 billion kg), accounting for about 11% of the total food output. The consumer side accounts for the largest proportion of food losses. According to *Report on Food Waste in China’s Urban Restaurants*, China wasted 17-18 million tons of food each year on dining tables from 2013 to 2015, which is equivalent to 30-50 million people’s annual consumption.

President Xi Jinping attaches great importance to food security and food loss and waste reduction, and has made important instructions on many occasions. In January 2013, Xi Jinping called for strictly saving food and combating waste. In August 2020, Xi made another important instruction to stop food waste. On April 29, 2021, the 28th Session of the 13th National People’s Congress passed the “Anti-Food Waste Law of the People’s Republic of China”, lifting thrift and frugality from a moral practice to a legal norm.

Catering enterprises are important participants in the food supply chain, and the lean management is an important tool to eliminate catering waste. The results of a global food waste survey in 2019 show that the average return on investment of food waste reduction in the catering industry is 1:7. The adoption of lean management and innovative actions to reduce food waste enables the industry to achieve win-win results on both environmental responsibility and economic benefits. These efforts are conducive to the sustainable development that emphasizes safety, health, nutrition, high efficiency and low carbon. Therefore, catering companies should respond positively by avoiding food waste and promoting food safety!

DEFINITIONS AND SCOPE

The food system from farm to table can be divided into different stages (Chart 1).

The scope of this report are food waste reduction behavior and measures adopted at different stages covering ingredients procurement, processing, cooking, consumption, food residue disposal by restaurants, cafeterias of enterprises and institutions, and other catering enterprises.

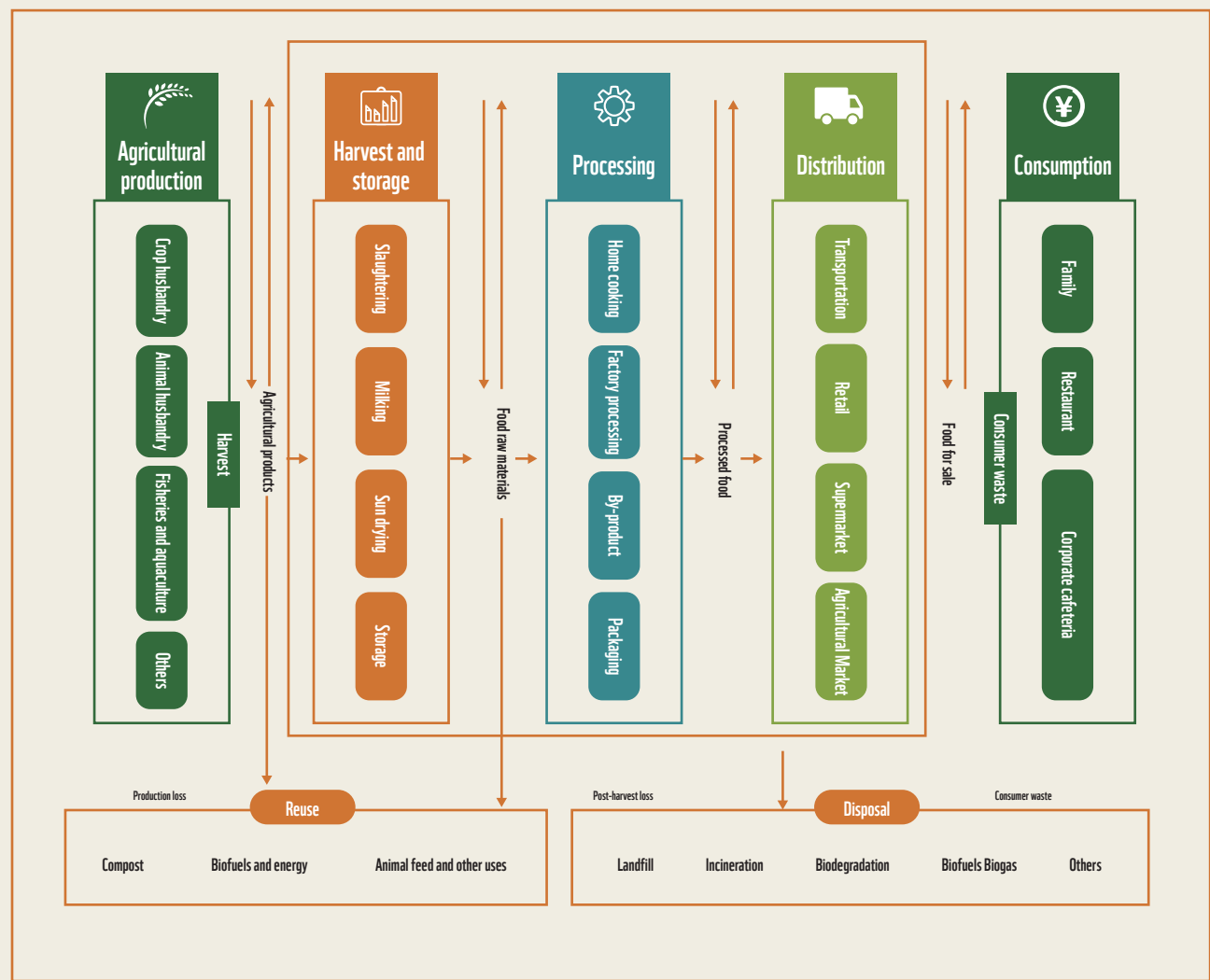


Chart 1 Food loss and waste from agricultural production to consumption

DEFINITION OF SMALL, MEDIUM AND MICRO-SIZED CATERING ENTERPRISES

This report is mainly aimed at small, medium and micro-sized catering enterprises. According to the *Measures for the Classification of Large, Medium, Small and Micro-Enterprises in Statistics (2017)*, those with less than 300 employees or operating income of less than 100 million yuan are small, medium or micro-sized catering enterprises. For specific classification, see Table 1.

Table 1 Classification of small, medium and micro-sized catering enterprises

	Category	Employees (headcount)	Operating income (million)
Restaurants	Medium	≥100<300	≥20<100
	Small	≥10<100	≥1<20
	Micro	<10	<1

According to the operation mode

catering enterprises are divided into chain operation, independent operation and dependent operation;

According to the service mode

they are divided into haute cuisine restaurant, table service restaurant, counter service restaurant, buffet restaurant and fast food restaurant.

According to their functions

they are divided into comprehensive commercial catering enterprises, non-comprehensive commercial catering enterprises and non-commercial catering service enterprises.

According to the business form of catering service operators

they are divided into restaurants (including hotels), fast food restaurants, snack bars, beverage stores, cafeterias, central kitchens, food delivery caters for collective consumption, etc.

According to the operation characteristics

they are divided into Chinese restaurant, western restaurant, banquet hall, café, special restaurant and bar.

This report believes catering businesses that meet the above-mentioned definitions can be classified into the category of small, medium and micro-sized catering enterprises, regardless of its business type. Among them, chain-operated enterprises are a very important part of the catering industry. Their chain restaurants are legal entities independently registered at the local administrations of industry and commerce, and they have relatively independent management entities. They can be regarded respectively as small, medium or micro-sized enterprises and are included in the scope of research.



Chapter II

SURVEY RESULTS OF FOOD WASTE AWARENESS AND ACTIONS IN THE CATERING INDUSTRY

From October to November 2021, the project team conducted a special food waste survey in catering enterprises through the Eleme App, with the purpose of understanding such enterprises' practices and problems in reducing food waste, and of improving their awareness and understanding. It surveyed catering enterprises in 12 cities in North China, Central China, South China, East China and Northeast China. A total of 400 questionnaires were collected.

Basic information of restaurants

Most of the people in charge of the surveyed restaurants were born in the 1980s and 1990s, accounting for over 60% of the total (Chart 2). Regarding the size, 95% of the restaurants have an area of less than 180 m² (dining area and kitchen included). As for the traffic, 67% of restaurants have an average daily traffic of less than 150 people (offline and online customers included), 10% of restaurants have an average daily traffic of 150 to 300 people, and 19% have an average of 300 to 500 people (Chart 3). Regarding the operation model, 52% of restaurants adopt independent operation; 47% adopt chain operation, of which 19% use central kitchen service and the rest 29% have no such service (Chart 4).

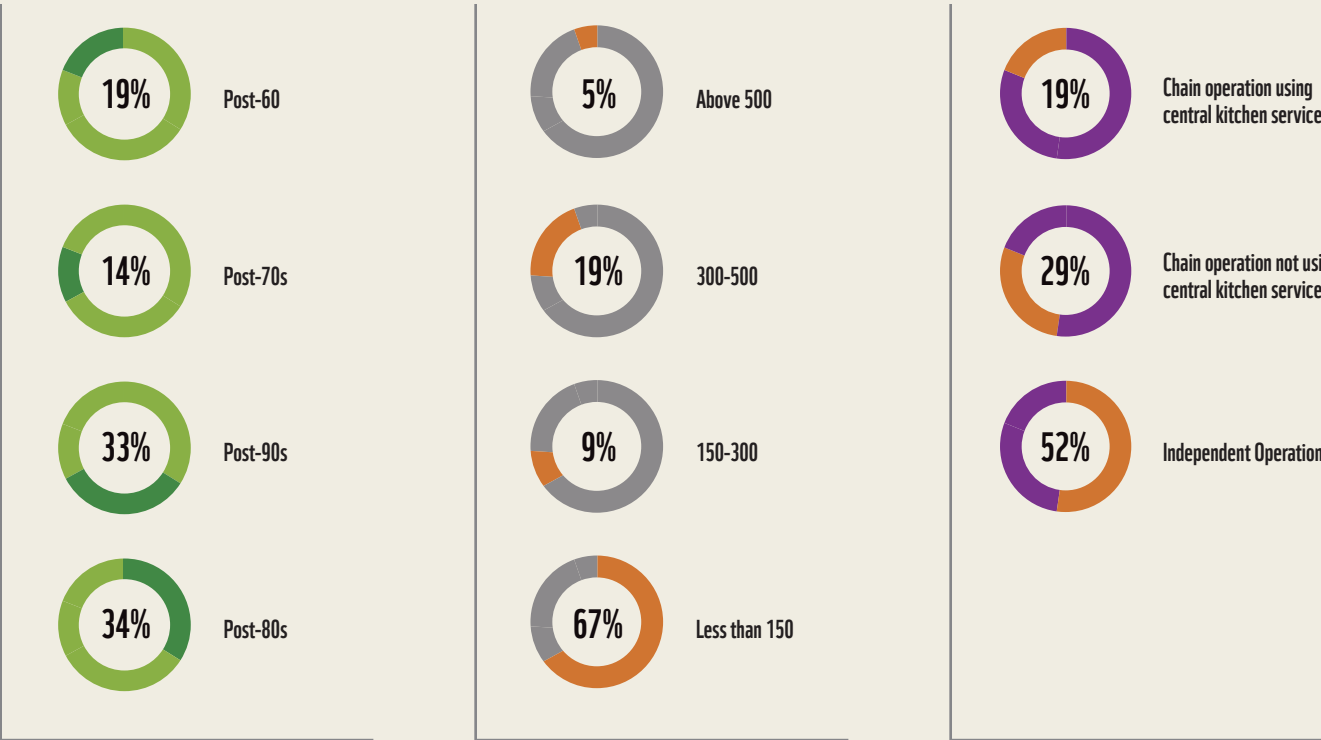


Chart 2 Age distribution of restaurant managers

Chart 3 Average daily traffic

Chart 4 Restaurant operation types

In terms of consumption, 83% of restaurants said their customers spend less than RMB 50 per capita (Chart 5). Most of the customers order working meals or quick meals followed by leisure consumption, and most of customers usually order 1 or 2 dishes (Chart 7).

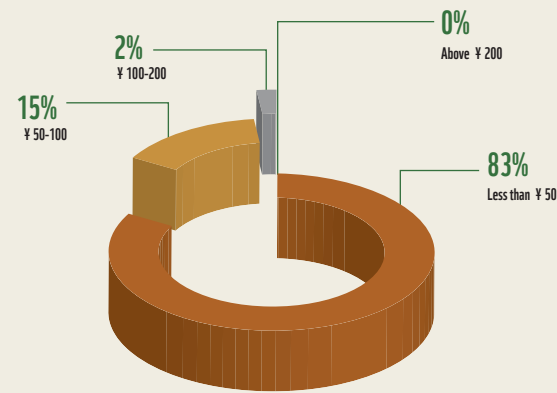


Chart 5 Average spending

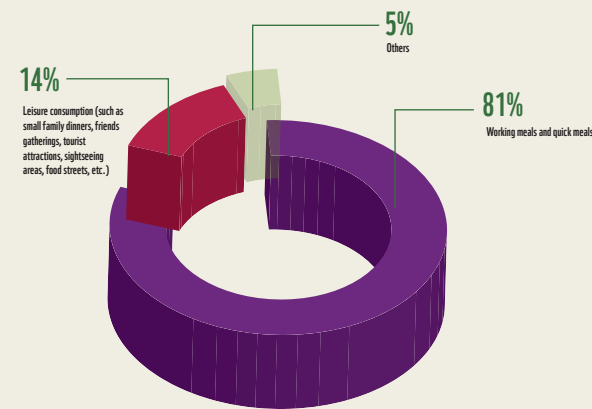


Chart 6 Main dining types

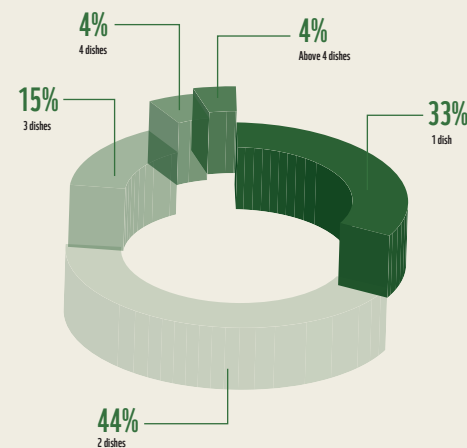


Chart 7 Average order

KITCHEN WASTE IN THE RESTAURANTS

In the kitchen waste survey, 21% of the restaurants generate an average of 5kg kitchen waste (trimmings) each day; 10% of the restaurants produce 0kg trimmings (Chart 8). Among them, 16% generate average plate waste (slops, i.e. leftovers) of 5kg each day, 12% generate 15kg, another 12% of restaurants generate 0kg plate waste, and 4% generate over 50kg (Chart 9). Moreover, 47% of restaurants dispose of kitchen waste and slops together, and 53% dispose of them separately. Kitchen waste is mainly disposed of through trash cans, recycling, classification and sanitation treatment, and slops are mainly recycled and disposed of by government.

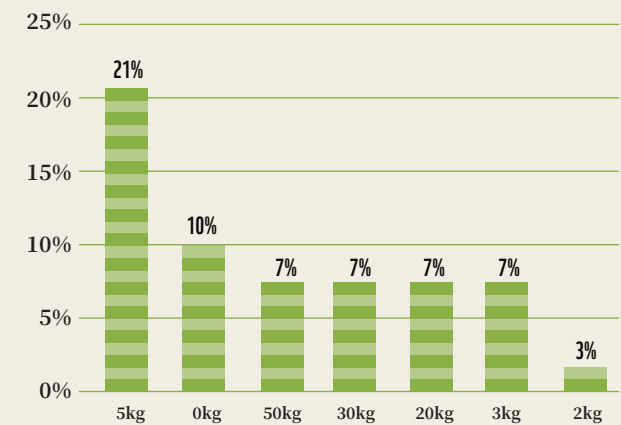


Chart 8 The amount of kitchen waste generated

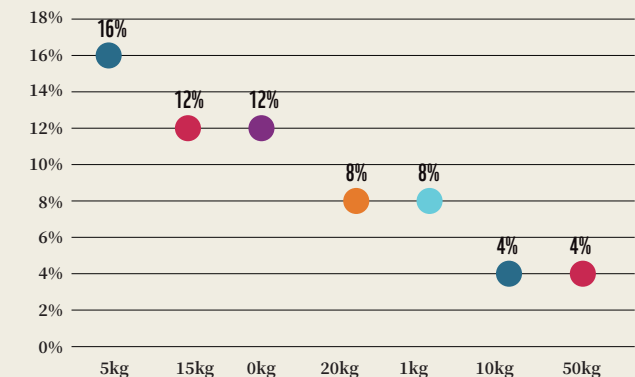


Chart 9 The amount of slops generated

Analyzing the reasons behind food waste, restaurants generally believe that the three most serious wastes are leftovers on the table or plate waste (45%), spoilage or discarding caused by improper procurement/storage (29%), and trimming waste in the kitchen (26%)(Chart 10). They also believe that the waste and loss (leading to high cost) that include waste generated from customers return behavior (39%), raw materials loss (21%) and processing loss (15%) to be the biggest hurdle to food waste reduction.

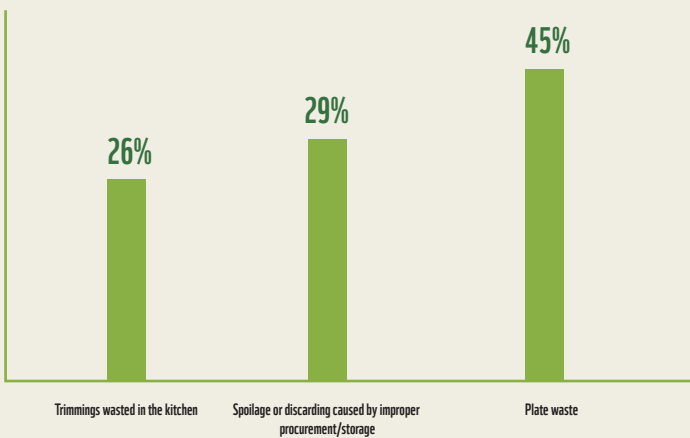


Chart 10 Waste source

FOOD WASTE REDUCTION IN THE RESTAURANTS

In terms of food loss and waste monitoring, 57.2% of restaurants believe that food loss and waste monitoring can effectively reduce costs and increase efficiency and will not increase operational burden as long as there is good coordination among various departments; 42.5% of restaurants believe that it will add some operational burden by increasing workload and communication costs, but it is acceptable; 0.3% of restaurants think it is very troublesome and do not want to increase workload (Chart 11).

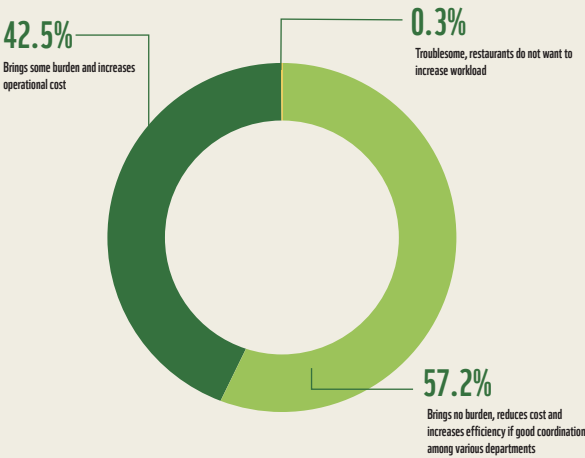


Chart 11 Perception about food waste monitoring

During the daily operation and management, 38% of restaurants have put staff in charge of food waste management; 33% only focus on cost control such as ingredient procurement, but have no special food waste management and control; 29% have no special personnel in charge of such issues (Chart 12).

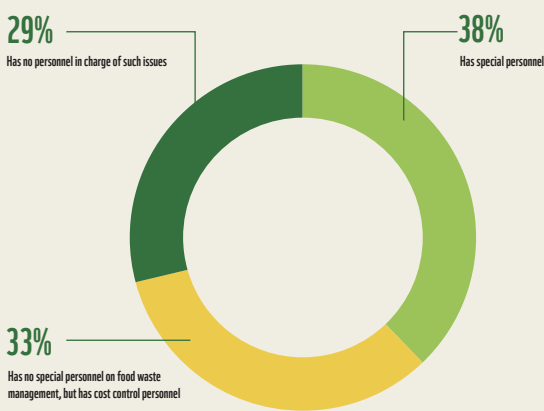


Chart 12 Food waste management

In terms of quantitative management of food waste, 44% of restaurants have carried out indexed and quantitative management of food waste; 38% have only qualitative management, but have not yet carried out quantitative management; 18% have neither qualitative nor quantitative management (Chart 13).

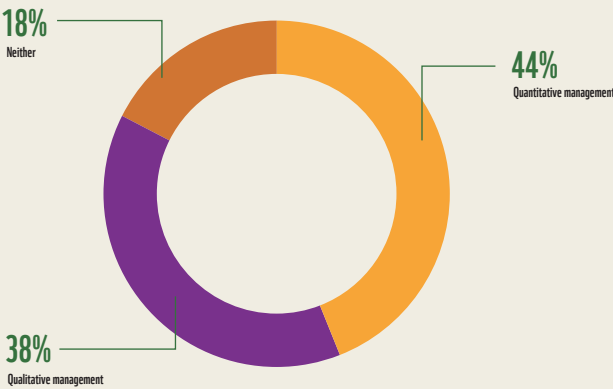


Chart 13 Indexed management of food waste

Regarding the actions of reducing food loss and waste, 76% of restaurants have slogans or posters such as “Clean Your Plate” in place; 54% focus on employees’ training and education; 53% focus on food reduction publicity activities; 52% of restaurants focus on reducing trimmings waste; 38% focus on procurement planning (Chart 14).

Moreover, 72% of restaurants provide small meals; 57% offer their customers with the option of ordering extra rice; 43% provide thermal insulation bags for winter meals or special food. These actions help consumers order more accurately and appropriately, maintain the quality of dishes to the greatest extent, and alleviate the behavior of food return or discards caused by taste problems.

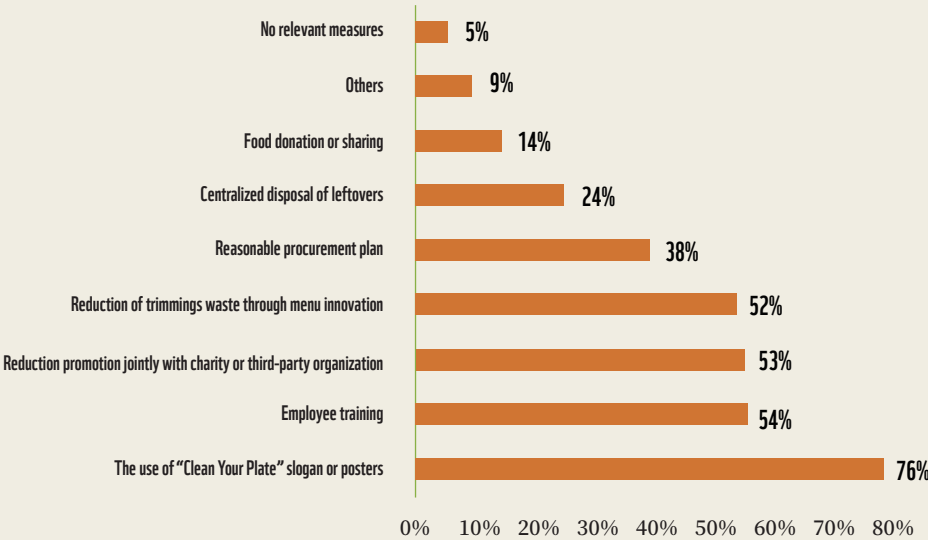


Chart 14 Food waste reduction measures

SUMMARY

Companies should incorporate its saving practices into its operations

According to the survey results, most restaurants currently recognize the importance of reducing food waste and have taken action to reduce such waste. Therefore, catering enterprises, as one of the main bodies of responsibility for advocating saving and eliminating food waste, still have big potential in preventing food waste and guiding consumers to reduce waste. However, the survey results also show that many small, medium and micro-sized catering enterprises have imperfect or incomplete food waste management systems. A sound management system can standardize and guide enterprise staff with saving behavior, and help enterprises promote saving efforts more comprehensively and orderly.

The awareness and actions of food waste quantitative monitoring need to be improved

Quantitative monitoring of food waste can help catering enterprises accurately grasp the situation of food waste, carry out lean management, and achieve cost savings and efficiency gains. Some small, medium and micro-sized catering enterprises have recognized the importance of quantitative monitoring of food waste, and have taken active actions in the sorting and weighing of kitchen waste. But the project team also noted that part of catering enterprises have not recognized the importance of monitoring. Publicity and training are necessary for companies to enhance their awareness of quantitative monitoring of food waste.

Publicity and training of food waste management tools need to be promoted

Food waste management tools are powerful assistants for catering companies to save food and reduce losses. Some enterprises expressed that they have no access to relevant information on training nor tools for food waste management. Specific monitoring tools can be provided to them, and the development and promotion of relevant tools and training courses for food waste management should be increased. Therefore, more enterprises can have access to effective tools to reduce food waste, and are willing to carry out reduction efforts and obtain economic benefits through these tools.



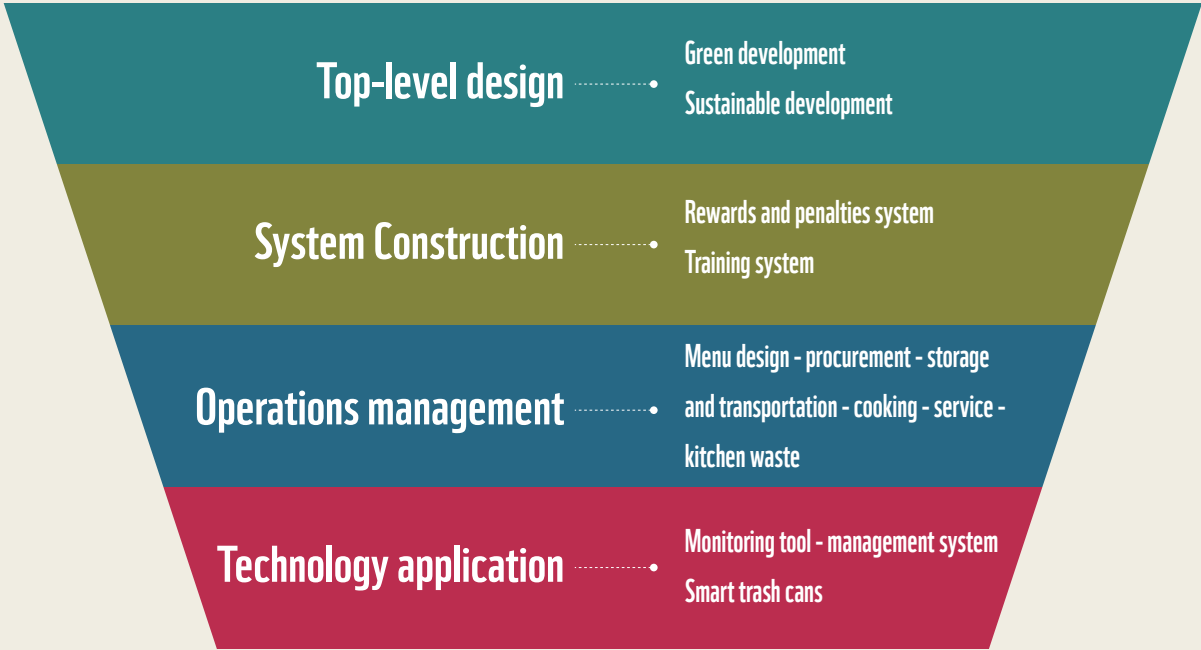
Chapter III

CASES OF FOOD WASTE
REDUCTION IN THE
CATERING INDUSTRY

In response to the policy of reducing food waste, some catering companies took the lead in taking action, actively exploring aspects such as corporate management, procurement, distribution, processing, cooking, services and other ways, introducing new technologies and new models, and carrying out diversified publicity and guidance. These are good references for food waste reduction action.

This report selects typical catering enterprises based on the different levels of food waste reduction actions carried out by them, from top-level design, system construction, operation management to technology application. Their experience and practices in reducing food waste are summarized and analyzed, which can provide some reference to the industry.

Actions to reduce food waste by catering companies



ESTABLISH THE CONCEPT OF GREEN DEVELOPMENT AND ENHANCE CORPORATE BRAND BUILDING

- Catering companies should take the initiative to fulfill their social responsibilities for green development. They could post and publicize signs in restaurants calling for acting against waste and ordering food in moderation. They also implement actions such as individual serving, “Clean Your Plate”, waste sorting, energy conservation and emission reduction, anti-food waste, and restrictions on the use of single-use plastic products.
- Catering companies should also enhance employees’ awareness of saving during procurement, processing, cooking, packaging and sales. Service staff shall actively remind customers to save food, publicize reduction campaign and call for saving practice.
- A resource utilization accountability system shall be established and used to assess staff and motivate them to actively practise saving and reduce waste.

Sunya Cantonese Restaurant asks its staff in daily training to remind consumers to avoid excessive ordering and add dishes when needed, and to use the to-go box at the end of the meal. The restaurant also places slogans and signs of “Clean Your Plate” on the dining tables.

Huda Restaurant trains its own waste reduction advocates. Advocates would remind guests to actively respond to the “Clean Your Plate” action and guide them to order meals in moderation. If there is quite a lot of leftovers, they would remind guests to get a to-go box. Through the persuasion of these advocates and the combined effect of small portions of dishes, its kitchen waste has been reduced by around 40%.

Sheraton’s Western Buffet Restaurant explains in the employee handbook how to put the concept of saving food into action; this concept is usually conveyed to hotel staff at corporate culture events; posters of saving food are placed at places where staff often walk around. Food saving month is also arranged to reward staff who come up with good saving methods. High standards of workflow are also established to reduce food waste through fine service.



PROMOTE INNOVATION IN RECIPE DESIGN AND COOKING TO BOOST FOOD WASTE REDUCTION

- Advanced processing technology is used in raw materials processing to reduce food waste.
- Ingredients are innovated and reused to develop new dishes and maximize the efficiency of resource use.

Shandong Hotel’s catering department uses a recycling box for all trimmings, and then innovatively processes them according to ingredient type. The trimmings from vegetables are made into appetizers like pickles and special snacks, and the trimmings from seafood and meat become ingredients for broth. The practice reduces waste and saves costs, and becomes a new source of revenue.

Tianmuhu Hotel, apart from creating the wellknown Tianmuhu Braised Fish Head in Casserole, continuously develops a series of fish dishes by making full use of the remaining raw materials. The middle part of the fish is made into “Tianmu Boiled Fish Fillet”, skin into “Fish Skin Shreds”, scales into “Deep Fried Golden Scales”, tail into “Fish Offering Flowers”, bones into “High Calcium Bone Soup”, and fins into “Fish Fins with Yellow Pepper”. These designs not only effectively use the ingredients, but also strengthen the restaurant’s fish food culture and brand building.

Tongchunyuan Restaurant uses one fish for multiple purposes. The fish body is made into thin fish fillets, the head is made into a braised fish head in casserole, and the tail is made into braised fishtail in brown sauce. These designs maintain the quality of dishes and reduce kitchen waste at the same time. The kitchen waste is reduced by at least 50% through this method.

Makai Restaurant cooks one type of raw material with a variety of flavors, and the menu is redesigned to achieve the principle of making the best use of everything. This reduces the menu from over 100 dishes to around 60 and the raw materials from over 150 types to about 70 to 80. For example, the restaurant uses the remaining pig tripe to make a series of dishes such as double pepper fried pig tripe, dry pot pig tripe, pig tripe stewed with crispy bamboo shoots and so on. The ingredients are processed in accordance with the standard specifications, and the major and the minor ingredients are fully used to improve the yield and utilization.

McDonald’s avoids waste and ensures the freshness of the ingredients through various improvement methods and innovative measures. Processes of potatoes through steam peeling and water cutting can save at least 5,000 tons of potato raw materials every year. Potato skins can be composted after moisture removal, and the potato scraps left in the potato chips production line are used to make biogas, a type of clean energy for factory production.

UTILIZE MENU DESIGN FOR MORE EFFICIENT FOOD USE TO REDUCE WASTE AND EARN BETTER REVENUE

- Scientifically designed menus with optimized dish options and serving size options are adopted to provide customers with more information to make decisions.
- Feedback of catering service is collected. Companies regularly replace products of less orders and launch a variety of serving sizes according to consumers' preferences.

Xiabu Xiabu reduces waste by offering both set meals and dishes options. By analyzing consumer data, Xiabu Xiabu regularly replaces products of less orders, adds best sellers into set meals, and launches set meals for one person and for two persons as well as dual dish combo. They consider to reduce waste from the design of structure and serving size. The packaged seasonings for hotpot in some chain restaurants are changed into self-service seasoning tables, which reduces the waste caused by packaged seasonings.

Shanghai Akasatei Restaurant has added data such as calories and grams to the menu to provide customers with dish size reference and avoid excessive ordering.

Guangzhou White Swan Hotel implements dynamic management and controls the amount of cooked food based on customer traffic. In addition, the restaurant eliminates the dishes with the lowest sales every month, and replaces the five dishes with the highest waste rate with new dishes. The purpose is to reduce the waste caused by low popularity.

To reduce food waste, many catering companies provide options such as small dishes and one person portion for both dining at the restaurant and online orders. In this way customers can order in moderation. For example, QuanjudeRoast Duck restaurants launched “Assorted Shumai”, which puts top four types of Shumai together and customers can taste 4 flavors by just ordering one dish. As for breakfast, the chain brand offers half portion shumai to fit into customer needs. Jiumaojiu Group has launched “half bowl rice” among its four sub-brands for formal meals, and for every five bowls of rice sold in the restaurants, one of them is “half bowl rice”, which helps save food.

MeizhouDongpo Restaurant has sorted out the dishes that customers usually prefer, and launched half-portion dishes at half price, allowing customers to reduce waste while tasting delicious food. The Lubolang Restaurant selects dishes from the best-sellers, makes combos and changes them into small portions, one plate with two flavors, which diversifies meals and curbs waste.

ESTIMATE SALES VOLUME IN REAL TIME AND PURCHASE ON DEMAND ACCURATELY

- Raw materials should be ordered on demand and preparation methods should be improved to reduce raw material waste;
- The number of consumers should be reasonably estimated for accurate procurement arrangements to avoid waste from overstorage;
- Intelligent system could be adopted to accurately match the consumer catering data and production chain reservation data with on-site processing data in order to obtain accurate cost analysis, set stock warning and procurement forecast, and avoid food waste caused by extensive operation.

Huatian Kaifeng Restaurant combines on-demand cooking with accurate classification of kitchen waste. On-demand cooking means that when the restaurant passes the peak of dining, the staff will roughly calculate the traffic till the closing time, and cook according to the dining needs. In terms of waste classification, food waste is divided into plate waste and kitchen waste, and there are also special kitchen waste bins for each department such as cold meat, noodles and Chinese pastry, cutting and preparation. The “raw material yield rate” is calculated to encourage all departments to control the cost of raw materials and reduce waste. Through these practices, ingredients are used appropriately, and customers who visit later are ensured with fresh dishes.

Xiabu Xiabu uses the digital catering supply chain system, so that they accurately know the quantity of ingredients in different links including procurement, ordering, restaurant requisition and storage. The daily and weekly amount of goods to be used is automatically calculated based on big data analysis, and then a restaurant order is generated. Each restaurant fine-tunes the quantity according to the business district and property it operates in to ensure accuracy of daily orders.

Makai Restaurant has launched a sales forecast function through its business intelligence system. It estimates the procurement volume based on previous week's sales and traffic to achieve accurate ordering. It is based on the principle of purchasing less volume with a higher frequency and of replenishing when ingredients are out of stock. These ingredients are consumed based on first-in, first-out principle to minimize waste. According to the statistics of Makai Restaurant, they reduce the waste from the perspective of procurement and dish preparation, and its kitchen waste is reduced by about a quarter.

Xibei Restaurant uses its dish forecast system to help itself improve the accuracy of dish forecast and understand the sales pace, which improves Xibei's accuracy of dish sales, reduces the amount of leftovers at the end of the business day, and effectively reduces its inventory and the waste caused by defective products. The restaurant sets up waste control targets, conducts cost accounting through daily inspection, and makes daily settlements. In terms of supply chain, Xibei adopts standardized food supply which is freshly cleaned and uses small packaging size to reduce the loss of raw materials. In terms of restaurant operation and management, an accurate food requisition model is formed to accurately estimate requisition volume and time-based processing and avoid waste from large-scale processing. In terms of process support, the headquarters provides rapid cooking and small batch processing to reduce waste from overproduction. In terms of supervision and inspection, scores are marked to reduce waste in inventory and from overproduction.



ADOPT STANDARDIZED PRODUCTION AND EFFICIENT COLD CHAIN DISTRIBUTION

In recent years, many restaurants, especially chain restaurants, adopt the central kitchen model and procure pre-made dishes. The **2019 China Catering Industry Annual Report** released by the China Hospitality Association shows that 47.89% of the surveyed enterprises have central kitchens, of which 80.88% have one central kitchen, 14.71% have two and 2.94% have three, and 1.47% have four or more central kitchens. Central kitchens reduce food waste and include the following features:



Centralized procurement and production to improve ingredients utilization

Central kitchens adopt the model of agricultural production base + central kitchen processing + distribution, which associates the supply with demand accurately and ensures ingredient supply and circulation efficiency.



More efficient food circulation through digital orders and deliveries

Central kitchens use centralized information processing to accurately plan production and processing. During the distribution process, route optimization and cold chain temperature control are used to ensure food safety and quality and reduce waste as well.



More standardized and industrialized food production process

The central kitchen model establishes unified standards and process procedures for ingredients processing, and each process is charged by special personnel to avoid ingredients loss caused by non-standard operations.

Models such as central kitchen/centralized distribution can help restaurant outlets reduce food waste to a certain extent. But at the same time, the central kitchen/group meal company should pay attention to the problem of food waste in its operation and distribution.

Yoshinoya changes its raw material procurement by ordering standard packaged food. For example, vegetables are directly purchased in standard mixed vegetable packs, which greatly reduces the loss of raw materials such as vegetable leaves. This reduces vegetable cost loss by 70%.

Beijing GEO-JH's central kitchen can basically reduce the front-end waste by about 70% which otherwise would occur when turning raw materials into pre-cut materials.

Shanghai Tramy establishes a full-time GPS monitoring system to monitor and analyze the driving route, vehicle temperature and operating status, which is convenient for route optimization, precise temperature control, and reduction of fuel consumption and product loss. All sales terminals are equipped with special low-temperature freezers to realize the same storage condition of the entire cold chain “from the central kitchen to the market”, which ensures food safety and quality.

ENGAGE THE PUBLIC FOR PLATE WASTE REDUCTION AND APPROPRIATE CONSUMPTION.

- Catering enterprises should actively expand publicity, post “Clean Your Plate” signs in restaurants, and clearly mark the portion size on the menu for consumers’ reference.
- They set up incentive mechanisms to encourage consumers to participate in “Clean Your Plate” campaign.
- They pay attention to ordering services and reminder services, and guide consumers to enjoy their meals in a civilized manner. After meals, restaurants actively provide packaged services for consumers and incorporate such services into regular business.

Restaurants and online platforms for deliveries across China actively advocate “Clean Your Plate” and “Food Saving” campaigns, which have laid a very good foundation and gained the momentum for publicity. On top of that, many catering companies also use creative ways to establish good interaction with consumers, collect feedback from them, and encourage them to reduce plate waste. For example, restaurants set up incentives or discounts for a clear plate, launch “Clean Plate Set Meals” and remind them to associate the number of diners with order size, establish “Clean Your Plate” campaign, and issue “Clean Plate” certificates.

ClearPlate is an innovative interaction application dedicated to reducing food waste. After the meal, users take a photo of the plate through the application, and after being identified as a “clear plate” by artificial intelligence, users can obtain points and rewards. In April 2020, the Central Committee of the Communist Youth League, together with the China Environmental Protection Foundation and Clear Plate, launched the “2020 Restart from A Clear Plate” Challenge. According to statistics, the number of readings of this topic on Weibo exceeded 110 million, covering thousands of colleges and universities. During the event, the cumulative number of clear plate clock-ins exceeded 1 million, which is equivalent to a reduction of food waste by 55 tons and carbon emissions by 196 tons.



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ADOPT DIGITAL QUANTITATIVE MONITORING TO FACILITATE FOOD WASTE REDUCTION

- Catering intelligent management software, such as self-service weighing sales system and healthy diet management system, are used to quantify the weight and calories of food consumed by consumers, which encourages them to consume meals in moderation, and reduces unnecessary waste;
- Intelligent trash cans are also utilized to automatically identify and record the type and quantity of food left in the kitchen and on the table, and provide suggestions for corporate procurement and product optimization.

Food quantification, whether it is quantification on the use of ingredients, consumer ordering or food waste, helps restaurants to prepare food accurately and helps consumers enjoy food appropriately. With the continuous development of science and technology, smart connection and smart terminal devices evolve very quickly. The popularization and application of small programs, APPs, software and other tools have also brought convenience for digital management. An increasing number of restaurants are actively experimenting with these technologies, leading to a reduction in food waste.

Guangdong Ocean University's Cafeteria and Xixi International Restaurant have introduced a "smart" cafeteria model and use big data to manage purchase-sales-inventory system. At the front end, customers can complete the whole process of self-service food selection, pickup, and payment by scanning the QR code or using facial recognition. At the back end, the big data platform is used to reflect the customer's food preferences in real time. Thus, the menu can be adjusted according to the popularity of the dishes and the sales ranking. Big data can also be used for precise food procurement and preparation. This model reduces kitchen waste by 90%.

Sodexo China uses the food waste monitoring system to monitor and analyze the production, supply, consumption and other links, which can improve the quality of catering services and effectively reduce food waste. From July 2021 to January 2022, 130 monitoring systems launched by the company at operating points across the country have reduced food waste by 13.29%, or about 115,000 kilograms.

Intelligent monitoring of kitchen waste can help restaurants better understand the source of food waste, and also provide a reference for the selection and supply of dishes in the dining hall and kitchen. In 2019, five hotels, Changxing International Hotel, New Zijin Hotel, Jinling Grand Hotel, Zijin Hotel and Grand New Century Hotel, participated in the food waste reduction project supported by WWF China. In the three-month pilot project, through the measurement and prevention of food waste, the following conclusions were drawn: 1) Food waste monitoring plays a key role in reducing waste. During the project, the pilot hotels with relatively complete data monitoring have the best waste reduction performance, a reduction of about 48%. 2) Food waste monitoring should be carried out at the front and back ends, so as to find out the main sources of waste. For example, the proportion of plate waste and excessive preparation in five hotels is different. Some hotels have as high as 75% of excessive preparation, and some hotels' plate waste accounts for 87% of the total waste.

PROMOTE FOOD SHARING MODEL TO AVOID WASTE

- Near-expired products or products that have manufacturing defects are, given that they are still safe to be consumed, sold to consumers at a discounted price, which not only reduces food waste in restaurants, but also allows consumers to enjoy delicious food at a discounted price or even for free;
- Leftover foods are donated to charities, such as food banks. Near-expired foods are given away for free to people or groups in need through online platforms and apps.

KFC (China) shares the daily unsold food in the restaurants with the neighboring residents for free and actively explores forms of "Clean Your Plate" initiative. Food at KFC Food Bank is stored in frozen form, and the refrigerator temperature is between minus 22 to minus 18 degrees to ensure food safety. Information such as the date of deposit and the consumption guidelines are clearly marked on each packaging bag to ensure the food safety to the greatest extent. As of January 2022, KFC has opened more than 130 "food banks" in 30 cities across China to popularize the green development concept of "food saving and reuse" among the society.



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APPENDIX : Food waste related regulations and policies

Release time	Title	Released by	Level	Category
May, 1997	<i>Several Rules on the Party and Government Bodies Practicing Frugality and Stopping Extravagant and Wasteful Behaviors</i>	Central Committee of the Communist Party of China and the State Council	Government Department (Departmental)	Rules
October, 2007	<i>Operating Standards of Catering Enterprises</i>	Ministry of Commerce of the People's Republic of China	Industrial	Standard
July, 2008	<i>Notice on the Practice of Saving Food and Combating Food Waste Among All Central CPC and Government Departments</i>	National Government Offices Administration, Government Offices Administration directly under the CPC Central Committee	Departmental	Rules
December, 2012	<i>Eight Rules on Improving Officials' Conduct and Maintaining their Close Ties with the People by the Political Bureau of the CPC Central Committee</i>	Political Bureau of the CPC Central Committee	Departmental	Rules
January, 2013	<i>Six Prohibitions by the Central Commission for Discipline Inspection</i>	The Central Commission for Discipline Inspection	Departmental	Rules
January, 2013	<i>Guiding Opinions on Practicing Diligence and Frugality and Combating Extravagance and Waste in the Catering Industry</i>	Ministry of Commerce of the People's Republic of China, China National Tourism Administration	Departmental	Rules
November, 2013	<i>Rules of Practicing Frugality and Combating Waste in Party and Government Bodies</i>	General Office of the CPC Central Committee, General Office of the State Council	National	Regulations
March, 2014	<i>Opinions on Practicing Frugality and Combating Food Waste</i>	General Office of the CPC Central Committee, General Office of the State Council	National	Rules
December, 2014	<i>Packaging Requirements for Catering Enterprises</i>	Ministry of Commerce of the People's Republic of China	Industrial	Standard
October, 2015	<i>Food Safety Law of the People's Republic of China</i>	Standing Committee of the National People's Congress	National	Law
March, 2017	<i>Implementation Plan for the Domestic Waste Classification System</i>	National Development and Reform Commission, Ministry of Housing and Urban-Rural Development	Departmental	Rules
May, 2017	<i>Specifications for Food Saving Practice in Catering Enterprises</i>	Ministry of Commerce of the People's Republic of China	Industrial	Standard
July, 2018	<i>Code of Practice for Food Safety in Catering Services</i>	State Administration for Market Regulation	National	Standard
March, 2019	<i>Packaging Requirements for Catering Enterprises</i>	Dongguan Chain Catering Development Promotion Association	Group	Standard
April, 2020	<i>Code of Practice for Online Food Delivery Service</i>	Zhejiang Provincial Administration for Market Regulation	Local	Standard
June, 2020	<i>Guidance on Individual Serving in Catering Service</i>	National Service Standardization Technical Committee	National	Standard
October, 2020	<i>Specifications on Practicing Frugality in Catering Consumption</i>	Yancheng Municipal Administration for Market Regulation	Local	Standard
October, 2020	<i>Packaging Requirements for Catering Enterprises(Draft for Opinions)</i>	Ministry of Commerce, the People's Republic of China	Industrial	Standard
October, 2020	<i>Specifications for Food Saving Practice in Catering Enterprises (Draft for Opinions)</i>	Ministry of Commerce, the People's Republic of China	Industrial	Standard

Release time	Title	Released by	Level	Category
November, 2020	<i>Regulations on Restricting Food Waste Behavior in Hefei City</i>	Standing Committee of Hefei Municipal People's Congress	Local	Regulations
December, 2020	<i>Specifications for Food Saving in Huzhou, Zhejiang Province</i>	Huzhou Municipal Administration for Market Regulation	Local	Standard
January, 2021	<i>Opinions on the Standardization of the Practice of Saving Food and Combating Food Waste</i>	State Administration for Market Regulation, Ministry of Commerce of the People's Republic of China, Ministry of Culture and Tourism of the People's Republic of China	Departmental	Rules
February, 2021	<i>Guidelines for Catering Industry Supply Chain Management</i>	China General Chamber of Commerce	National	Standard
February, 2021	<i>Specifications for Information Description of Food Delivery</i>	China General Chamber of Commerce	National	Standard
February, 2021	<i>Code of General Hygiene Practice for Catering Services</i>	National Health Commission, State Administration for Market Regulation	National	Standard
February, 2021	<i>Green Catering Operation and Management</i>	Ministry of Commerce of the People's Republic of China	National	Standard
March, 2021	<i>Dingzhou Restaurant Cooking and Catering Industry Association-Specifications for Practicing Frugality and Eliminating Waste Behavior</i>	Dingzhou Restaurant Cooking and Catering Industry Association	Group	Standard
April, 2021	<i>Anti-Food Waste Law</i>	Standing Committee of the National People's Congress	National	Law
May, 2021	<i>Beijing Municipal Anti-Food Waste Regulations</i>	Standing Committee of Beijing Municipal People's Congress	Local	Regulations
April, 2021	<i>Specifications of Conduct for Curbing Waste in Banquets</i>	Ministry of Commerce of the People's Republic of China	Industrial	Standard
September, 2021	<i>Gansu Provincial Anti-Food Waste Regulations</i>	Standing Committee of Gansu Provincial People's Congress	Local	Regulations
June, 2021	<i>Specifications for the Practice of Stopping Waste in Commercial Catering</i>	Jiangxi Provincial Administration for Market Regulation	Local	Standard
July, 2021	<i>Specifications for the Practice of Stopping Food Waste in Catering Industry</i>	Hefei Municipal Administration of Commerce	Local	Standard
September, 2021	<i>Evaluation Standards for Food Saving Practice in Catering Enterprises</i>	Hohhot Municipal Administration for Market Regulation	Local	Standard
September, 2021	<i>Specifications for Saving Practice in Catering Enterprises</i>	Zhejiang Catering Industry Association	Group	Standard
November, 2021	<i>Food Saving Action Plan</i>	General Office of the CPC Central Committee, General Office of the State Council	National	Rules
November, 2021	<i>Beijing's Specification for Anti-Food Waste</i>	Beijing Cuisine Association	Group	Standard
January, 2022	<i>Implementation Plan for Promoting Green Consumption</i>	The National Development and Reform Commission, the Ministry of Industry and Information Technology, the Ministry of Housing and Urban-Rural Development, the Ministry of Commerce of the People's Republic of China, the State Administration for Market Regulation, National Government Offices Administration, Government Offices Administration directly under the CPC Central Committee	Departmental	Rules

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