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透過建構一個社會行銷干預方案中的利益系統以「輕推」餐廳客人減少餐後廚餘

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The Government of the Hong Kong Special Administrative Region

of the People's Republic of China

Chief Executive's Policy Unit

Public Policy Research Funding Scheme

Constructing a System of Interest for a Social Marketing Intervention to Nudge Plate Waste Reduction in Restaurants

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Project Number: 2022.B24.001.22A

FINAL REPORT

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Executive summary

Plate waste, generated when consumers leave edible food uneaten on their plates when dining out of home, constitutes appropriately one-fifth of food waste worldwide. Food waste has long been a global problem faced by both developed and developing countries, entailing significant environmental, social, and economic costs. Plate waste behaviour is a complex problem beyond individuals purchasing meals to various stakeholders in food demand and supply. This project extended the focus of intervention beyond individuals. It adopted a systemic inquiry approach involving all major stakeholders who interact and influence each other's behaviour related to plate waste at the point of sale. Using four studies, this project constructed a 'system of interest' among major stakeholders and co-designed a social marketing pilot intervention to provide values to all stakeholders, engaging them in voluntary plate waste reduction behavioural change. Findings demonstrated the efficacy of "nudging" consumers to reduce out-of-home dining food leftovers by providing options on portion size and side ingredients, supplemented by corresponding information, significantly reducing plate waste by half. Meanwhile, restaurants also recorded a decrease in food costs which directly benefits the business's bottom line. This research-identified solutions co-created by food service establishments and consumers provide insights for policymakers to consider implementing regulations about enforcing catering businesses to offer consumers options and information for portion size and ingredients. Moreover, through tender invitation for canteen tenancy, the Hong Kong government can also take the lead in imposing these proposed actions on catering services providers for governmental and government-affiliated/related organisations.

消費者在外出用餐時將未吃完的食物留在餐盤而產生的餐後廚餘，約佔全球食物浪費的五分之一。 食物浪費一直以來都是發達及發展中國家共面對的全球性問題，

造成巨大的環境、社會和經濟成本影響。 剩食浪費行為是一個複雜的問題，不僅限於是個人的膳食購買行為，還涉及食品供應與需求方各個利益相關者。 此研究項目將重點擴展到個人之外，採用了系統性的調查方法，並涉及所有重要的利益相關者，這些利益相關者在銷售點相互作用並影響的行為。 此項目透過四項研究，構建了一個包含主要利益相關者的 “利益系統”，共同設計出一個可供試驗的社會營銷干預方案。此試驗方案為所有利益相關者提供價值，讓他們自願參與影響消費者減少餐後廚餘的行為改變措施。 試驗結果顯示，通過提供份量和成分的選項並輔以相關信息，能有效「輕推」消費者減少外出就餐的剩食，成功減少約一半的餐後廚餘。 與此同時，餐館的食品成本也有所下降，帶動環保之餘更直接為餐廳增加盈利。 這種由餐飲供應商和消費者共同創建的研究確定的解決方案，非常值得政策制定者參考，考慮實施有關法規強制餐飲企業於餐牌向消費者提供分量和成分的選項及相關資訊。 此外，政府還可起牽頭作用，於為政府或政府附屬/相關機構的餐飲服務商招標時，要求投標的餐廳提供量和成分的選項及相關資訊予消費者。

The layman summary on policy implications and recommendations

The findings of this project clearly showed that a change in the business practice of the catering premises significantly reduced both consumer plate waste and food costs for restaurants. The changes include providing diners with portion-size options and information on ingredients and net weight for high-waste items. While Hong Kong has upheld the free market principles for decades, the government may consider implementing regulations about enforcing catering businesses to (1) do waste sorting, allowing government and other environmental stakeholders to formulate corresponding waste recycling and reduction measures against kitchen waste and plate waste; (2) offer tax incentives (rather than short-term project-base subsidiaries to restaurants), motivating the F&B industry to proactively and continuously seek to reduce food waste in the challenging post-pandemic business environment; (3) state the net weight or size of high waste items (e.g. carbohydrates for the first step), enabling consumers to know and decide how much they want to consume for the sake of healthiness and environmental protection. Moreover, while it may be difficult to mandate commercial catering settings to offer portion size options on their menu, the Hong Kong government may take the lead in requesting catering suppliers and canteens in governmental, government-affiliated, and government-related establishments (e.g. government offices, universities, public libraries, airport, hospitals, prisons, etc.) to provide portion-size and garnish options and respective information to diners in the tender invitation for canteen tenancy.

此項目的研究結果清晰地表明，餐飲場所只需實踐一些輕微的改變，便可以顯著地減少消費者的餐後廚餘以及同時降低餐廳的食品成本。這些改變包括為食客提供分量選

擇以及標明食物的成分和淨重信息。 雖然香港一直秉持自由市場原則，但政府可考慮實施有關措施要求餐飲業(1)進行廢物分類，讓政府及其他環保持份者就廚房廚餘及餐後廚餘製定相應的廢物回收或源頭減廢措施 ; (2) 提供稅務優惠 (而不是向餐館發放短期的項目津貼)，以為餐飲業在充滿挑戰的疫後商業環境中積極並長期尋求減少食物浪費的營運模式； (3) 註明大量被浪費的餐後廚餘食品的淨重或分量 (第一步可從碳水化合物食物如米飯開始)，讓消費者於下單時能決定為了個人健康和環保不浪費食物的情況下需要購買的分量。 此外，雖然要求商業餐飲機構在其菜單上提供分量及配菜選項有一定的難度，但香港政府可以率先在政府內部、政府附屬機構和政府相關機構開始實行以上建議，要求政府機構的餐飲供應商和食堂 (例如辦公室、大學、公共圖書館、機場、醫院、監獄等) 在租賃招標中加入向食客提供分量和配菜選項以及相關信息。

(1) Introduction

Plate waste refers to the edible food served but left uneaten by diners when they consume food in out-of-home settings (Buzby & Guthrie, 2002). Plate waste is accountable for approximately one-fifth of the food wasted globally and contributes to half of the food service industry's food waste on average (ReFED, 2018; Reynolds et al., 2019). Food waste causes over USD400 billion in annual economic impact, 8-10% of greenhouse gas emissions, and about 30% of municipal solid waste globally (FAO, 2021; FDA, 2023; UNEP, 2023). Unlike uneaten food generated during some other stages along the food supply chain, food leftover from what has already been served could hardly be redistributed due to food safety and hygienic concern and would inevitably be discarded. The Nations (2021) estimated that 931 million tonnes of food waste had been wasted worldwide in 2019 alone, yet 828 million people worldwide were still suffering from hunger (FAO et al., 2022). While food prices were anticipated to keep reaching new record heights due to the damage brought by the COVID-19 pandemic, food is becoming scarcer than before (Global Network Against Food Crises, 2022). There is a growing urge to identify effective solutions that minimise plate waste to enhance food security.

According to the EPDHK (2022), the largest component of Hong Kong's municipal solid waste (MSW) disposed of in landfills in 2021 remained to be food waste, which constituted 30% by weight of the disposed MSW. As the saturation of the three landfills had been impending in Hong Kong, the Environment and Ecology Bureau (formerly Environment Bureau) issued "A Food Waste and Yard Waste Plan", which outlined the city's target to "cut down the amount of food waste that goes to landfills by at least 40% from 3600 tonnes to 2160 tonnes per day by 2022" (EBHK, 2014, p. 8). Although various waste reduction programs have

been carried out since then, Hongkongers were still disposing of about 3.5 kilotons of food waste per day in landfills as of 2021 (EPDHK, 2022). The disposal of food waste from the commercial and industrial sector to landfills has not seen any improvement, with the amount reaching 1,095 tonnes in 2021(EPDHK, 2022, p. 13), surpassing the previous figure of 1,033 tonnes in 2014 when the plan was issued (EPDHK, 2015, p. 9). Landfills in Hong Kong will be shortly overwhelmed if such a trend in food waste generated by the food service sector is not reversed.

About half of the world's food waste disposed of by the food service sector is plate waste, which could be avoided if diners could completely consume the food they have ordered or take away their unfinished food. However, taking away unfinished food might further lead to issues such as food hygiene problems, increasing single-use packaging usage and the associated plastic or paper waste. Above all, there is no guarantee that unfinished food taken away will eventually be consumed and would not become domestic food waste ultimately. Thus, prevention and reduction of plate waste at source should always be prioritised when creating strategies against out-of-home consumer-level food waste (UNEP, 2014).

Efforts across the globe to reduce plate waste through government policy and pro-environmental campaigns have achieved marginal success as it is ineffective to induce consumer behaviour change concerning food waste reduction by solely employing educational tools (Kim et al., 2020). Regardless of their diminishing efficacy, consumer education and informational programs, led by experts or driven by researchers, remained the current prevalent practice instead of programs employing additional change mechanisms (Carins & Rundle-Thiele, 2014). It has been assumed that individuals would switch to favourable behaviour once they learned the related information and benefits after exposure to behaviour interventions with

education or communication approaches. In contrast with such an assumption, the cognitive approach seldom guarantees behaviour change in food waste or plate waste reduction, even if it could significantly increase awareness, knowledge, attitudes, or belief towards the food waste problem.

Plate waste behaviour is a complex problem not solely driven by rationality but also moulded by different beliefs, norms, emotions, and motivational biases, which vary among individuals. Theoretical drivers leading to plate waste behaviour have been identified through previous research. To start with, marketing activities at point-of-sale initiated a vicious cycle which creates a considerable volume of plate waste as marketing activities both "reinforce and is a response" to consumers' over-purchase behaviour. Meanwhile, buffet-style, large portion sizes, and overly large menus are imperative means for food service providers to satisfy pluralistic consumer demand and variety-seeking needs in consumers despite the consensus that such practices are drivers of plate waste (Filimonau & Krivcova, 2017). Second, consumers might not hold themselves responsible for the plate waste generated in full-service non-buffet-style restaurants serving fixed-portion meals. Attribution bias might be demonstrated among these consumers who shifted the responsibility to food service providers for oversizing the portion, which led to plate waste (Bartling & Fischbacher, 2012). Third, their conflicting self-regulatory goals (Block et al., 2016). When food portions are predetermined, health-concern might prevail over environmental concerns in consumers' decision-making process, thus leading to plate waste behaviour to avoid overconsumption at the point of consumption. Fourth, the identity-signalling theory states that materialistic consumers signal wealth, power, or value to others by ordering a large variety of food. In addition, parents or caretakers wishing to signal their "good provider" identity tend to cater to the different needs of family members by providing abundant food varieties (Visschers et al., 2016). In such cases,

consumer behaviour driven by identity signalling usually generates an enormous amount of plate waste when the portion size of dishes signalling the abundance or variety of food was predetermined.

Conventional education and information provision approaches were ineffective in tackling the motivational biases that consciously or unconsciously influenced consumers' over-purchase, over-acquisition, and food waste behaviour, as they took little account of the cognitive motivators and barriers of food waste. In contrast, social marketing interventions with a track record in effectively changing an individual's social, health, and pro-environmental behaviour have rarely been adopted in the food context and were therefore advocated (Kim et al., 2019).

Social marketing interventions have been advocated as one approach that can be applied to combat food waste by voluntarily changing individuals' behaviour through commercial marketing techniques (Kim et al., 2019; Kim et al., 2020; Pearson & Perera, 2018). Plate waste occurs at point-of-sale, where restaurant staff intersect with diners. Point of sale involves marketing activities intended to drive revenue and customer satisfaction. However, it simultaneously unintentionally poses a counteracting effect to eliminate the potential impact of plate waste reduction nudges (Block et al., 2016). For example, restaurants deliberately offer a high level of variety to satisfy customers with diverse preferences, even when the overly large menu is found to be a notable driver of food waste in restaurants (Block et al., 2016).

As plate waste reduction interventions are implemented at point-of-sale where interdependent actors of the food marketing system (i.e. restaurant personnel and diners) interact and influence each other's behaviour in a cyclical pattern, a systems thinking is needed

to envelop this study (Domegan et al., 2016; Flaherty et al., 2020). Food waste is a complex problem created by interactions among different stakeholders of the food marketing system, including upstream policymakers; midstream food service establishments; and downstream customers (Kim et al., 2019). Systems-thinking social marketing *"enhances the field's conventional behavioural change with concepts of scale, causation, and iterative co-creating change processes for complex health and environmental problems"* (Domegan et al., 2016, p. 1123). Based on the concept of causation among stakeholders in systems-thinking social marketing, this intervention study will move beyond individualised behavioural design to deal with the system determinants of change, ensuring both demand and supply factors identified in the system are taken into intervention planning (Anibaldi et al., 2020).

As theory-informed social marketing interventions can promote individuals' voluntary behaviour change resulting in plate waste reduction, this approach was advocated to nudge consumers to reduce plate waste successfully. Social marketing refers to "the application of commercial marketing principles and techniques to the analysis, planning, execution and evaluation of programs designed to influence the voluntary behaviour of target audiences to improve their welfare and that of society" (Andreasen, 1995, p. 7). The emphasis of social marketing approach to plate waste reduction is to create "value" appealing to the targeted groups who will in turn switch to the desired behaviour voluntarily (Kim et al., 2019). A theory-informed social marketing program aims to initiate voluntary behaviour change by engaging consumers through applying social marketing principles to design interventions to reduce plate waste.

(2) Objectives of the study

1. From theoretical perspectives, this study structurally explores the problem situation of plate leftovers and constructs a "system of interest" in which leverage points between the food services supply side and consumer demand side are identified.

2. For market practices, the findings of this study will provide guidelines for the catering industry to redesign their menu that could assist consumers in leaving less uneaten food on plates through the provision of portion size choices of most wasted items.

3. For policy measures, as referencing food waste policy recommendations in Europe (Bos-Brouwers et al., 2020, p. 26), the nudging tools including portion size, plate type and size to be recommended to catering premises could also be implemented by public policymakers who may shape the catering operation in hospitals, schools, prisons etc.

(3) Research methodology

This research focused on nudging consumers of non-buffet-style restaurants to reduce the food leftovers on the plates. A 10-month mixed-method research including direct observations, focus groups, semi-structured expert interviews, co-design sessions, and an in-store pilot experiment was conducted to develop and examine social marketing interventions to reduce plate waste.

Study 1 used direct observation to identify food items leading to a higher volume of plate waste in restaurants. Once having pinpointed the high waste food items, this research further investigated how these plate waste items could be minimised using a systematic co-enquiry (i.e. Studies 2 and 3). **Studies 2 and 3** included exploratory qualitative studies across supply and demand side stakeholders to understand the motivation for and barriers against plate waste reduction. Additionally, previous successes and failures in employing behaviour change interventions were also gathered through a systematic literature review. **Study 4** was co-designed sessions performed after the systematic enquiry with stakeholders across the supply and demand side were gathered. Based on the insights obtained from the first three studies, consumers, front-of-house, and back-of-house staff co-designed the social marketing nudges with the researchers.

Study 1: Direct observation

Direct observations were conducted in non-buffet-style restaurants to identify categories of food items mostly wasted by consumers, thus, the food items targeted by the intervention might lead to the most significant plate waste reduction (Massow & McAdams, 2015). The food menu and the types of plate waste in each participating restaurant were

recorded to inform the research team on formulating the interview protocol and open-ended questions to be employed during the first phase of the systematic co-enquiry (i.e. Studies 2 and 3). In-store food waste observations were conducted over six days[1] from 29th August to 3rd September 2022 in three different restaurants[2], including (i) a café style restaurant in Kwun Tong, (ii) a casual-dining restaurant in Quarry Bay, and (iii) a mid-market Japanese restaurant in Sai Ying Pun.

The waste observation was conducted during major mealtimes (i.e. lunch and dinner) to collect plate waste data[3]. A portable camera was installed above the finished plate collection

[1] Duration of observation:

The data collection period was shortened to six days instead of the originally proposed seven days due to data saturation.

[2] Restaurants participated in the observation:

The three participating restaurants were newly recruited, replacing the two restaurants that originally agreed to participate in this research. When this research was funded in Aug 2022, the research team contacted the restaurants recommended in the project proposal submitted. However, the COVID-19 pandemic has been rapidly reshaping the catering business landscape, which caused difficulties for these restaurants to arrange waste observation in their stores. The owners revealed that the resumption of dine-in operations due to easing pandemic control measures had caused difficulties in operation and a staff shortage. Thus, the research team sought replacements immediately to implement Study 1 from August to September 2022, in compliance with the proposed project's timeline. Three types of restaurants were recruited to ensure data representativeness.

[3] Collection of waste data:

The proposal originally suggested arranging student data collectors to observe and record waste data in the store in person. However, due to the limited space in kitchens, the presence of a data collector was considered undesirable from the participating restaurants' point of view. The research team managed to videotape the waste data for coding and analysis. The revised method enhanced data validity as the videotaped data allows inter-rater validity check compared to on-site pen and paper records.

station and waste bin to videotape the food left over on each plate, then coded by trained student coders. Plate waste was videotaped when restaurant staff cleared dishes collected from the dining tables after consumers had finished their meals. Student coders were trained and coded the video to identify (i) meal mix and types of plate waste, (ii) relative amount of high-volume plate waste, and (iii) times and dates (mealtimes and weekdays/weekends) when food leftovers occurred. Inter-rater validity was assessed to enhance data equity.

Study 2: Consumer research (demand side)

Study 2 involved focus groups conducted in September 2022 with 49 consumers[4] recruited to investigate their plate waste behaviour and possible intervention to nudge them into plate waste reduction from the consumer perspective (i.e. demand side of food service). The objectives of Study 2 were threefold. First, this study was conducted to understand what could motivate consumers or what could be the obstacles for consumers to engage in behaviour that could reduce their chance of generating plate waste in out-of-home dining settings. The concerns and self-reported value mediated by consumers' personal and environmental benefits were also examined regarding plate waste behaviour change. Consumers were also asked to provide suggestions that might help them reduce plate waste. Second, this study aimed to understand consumers' rationale for or against choosing plate waste reduction options. Third, this study investigated what motivational biases might be consciously or unconsciously activated by point-of-sale marketing, thus influencing consumers' plate waste-related behaviour in out-of-home dining.

[4] No. of focus group participants:

49 consumers participated in the focus group vs 48 participants suggested in the proposal. The additional participant came with a participating consumer to the focus group and was willing to participate without incentive.

Focus group participants were recruited using convenience sampling. Upon consent to participate, respondents were assigned to each focus group based on availability. Each participant received an HKD300 supermarket voucher as an incentive. Each face-to-face focus group lasted approximately 60 minutes, during which participants were guided through open-ended questions and topics related to the objectives mentioned above facilitated by the PI.

The focus group facilitation questions were developed based on a systematic literature review of prior plate waste studies targeting voluntary plate waste reduction. Researchers could understand consumers' motivations, barriers or concerns when the plate waste was generated. To begin, researchers introduced the project objectives and definition of plate waste to participants. Participants were then asked to recall plate waste items they usually generated in each of the four dining occasions, (i) eat alone; (ii) eat with family; (iii) eat with colleagues; and (iv) others (e.g. friend gathering). Next, participants were invited to share the reasons for plate waste and suggestions to policymakers, restaurants, and diners to minimise possible plate waste. Finally, topics linked with the high waste food items and set-meal opt-in/opt-out dilemma identified in study 1 were discussed to reveal why certain food items were more often wasted by consumers and possible solutions to reduce waste at source.

Study 3: Stakeholder research (supply side)

While Study 2 attempted to understand the consumers' point of view regarding plate waste and how to nudge them into plate waste reduction behaviour, Study 3 aimed to integrate opinions from multiple supply-side stakeholders using semi-structured interviews. This study covered stakeholders directly involved in operating restaurants, who provide services or products which might determine the operation, and other major stakeholders that may influence

the behaviour of restaurants and diners (e.g. NGOs or experts who advocate food waste reduction). These stakeholders could offer the research team a macroscopic view of the plate waste problem and the potential opportunities or existing limitations through their lenses of management, administration, policy, operations, processes, and government regulations.

The opinions regarding plate waste reduction gathered from Study 3 were representative across different layers, roles, and responsibilities in commercial restaurants, and associated third parties were to be ensured. Thus, purposive sampling was initially employed in Study 3 to identify corresponding stakeholders under the referral of food service collaboration partners. Following this initial stage of interviews using purposive sampling was another stage of interviews by snowball sampling. As supplemental stakeholder groups had been identified during the first stage with its interviewees, the research team extended the invitation to such supplemental stakeholders through the referral of the interviewees. A total of 25 supply-side and expert stakeholders participated in this study (Table 1). The interviewees represented the narratives from restaurants owners, senior management staff, training and human resources management managers, marketing managers, operation managers, front-of-house staff and back-of-house staff, food service advisors, experts from NGOs and institutions advocating food waste reduction, point-of-sale system suppliers for restaurants and scholars specialising in hospitality training. Except for the five interviewees working with non-profit or educational organisations who refused to receive monetary incentives, 20 expert interviewees each received an HKD300 supermarket coupon upon completing the interviews. The interviews were conducted face-to-face for 21 interviewees and through online meetings for four interviewees from October 2022 to April 2023. Each interview lasted around an hour, and all interviews were recorded, transcribed, and coded for analysis according to the guidelines of thematic analysis (Clarke et al., 2015).

Table 1. Summary of roles and positions of interviewees (Study 3)

Roles of interviewees	No. of interviewees
Owner	4
Front of house (FOH) - supervisory level	3
Front of house (FOH) - operation level	5
Back of house (BOH) – head chef or chef	5
Senior management, HR, and marketing personnel	4
Point-of-sale (POS) system supplier	1
NGO	2
Education and training (hospitality)	1

The understated open-ended questions outlined the semi-structured interviews conducted in Study 3. The interview protocol was developed based on the systematic literature review and insights identified from Studies 1 and 2. The questions were themed to understand the structures, roles, opportunities, and barriers related to how reduced-potion options could be provided in addition to regular options in out-of-home dining settings to nudge consumers' behaviour change leading to plate waste reduction. Major questions in the interview protocol include:

- Please describe the role that you play in the design and implementation of food options to consumers (responsibilities).
- In your opinion, is plate waste a problem in your restaurant/catering?
- In your opinion, how serious is plate waste in your restaurant/catering?
- In your opinion, how important is plate waste reduction in your restaurant/catering?
- In your opinion, why do consumers have plate leftovers?

- In your opinion, how can consumer plate waste be reduced (probe for ideas that address the waste categories identified in Study 1 and consumers' motivation and barriers identified in Study 2)?
- In your opinion, what are the challenges for restaurants to implement the plate waste reduction ideas mentioned in the last question (motivation, barrier, other stakeholders involved)?

Study 4: Co-design

In combination with findings from Studies 1 and 2, the findings in Study 3 were used to visualise the situation of interest, influences, and opportunities for action regarding the plate waste problem in out-of-home dining settings incorporating both the supply and demand side. The visualised "system of interest" was eventually used to outline the co-design discussion with consumers and stakeholders on the social marketing programme. Such an approach has been proven during the development of the social marketing intervention to motivate voluntary behaviour change related to food well-being (Anibaldi et al., 2020).

Study 4 conducted co-design sessions for the research team to navigate the application of social marketing intervention to activate plate waste behaviour change among consumers. As proposed, 48 participants were recruited across stakeholders from the supply and demand side in restaurants of partnering chains (i.e. Pokka Café), which would later implement and pilot the effectiveness of the social marketing programme developed in the co-design sessions in Study 4. Ten participants were among the restaurant's managerial staff, back-of-house staff with different seniority and duties and front-of-house staff from supervising roles to serving roles. The other 38 participants were consumers who dined and were recruited in the restaurant.

An incentive worth HKD300 was offered to each participant participating in a 60-minute co-design session from March to April 2023.

The co-design sessions were outlined following the stages of the co-design framework (Trischler et al., 2019) and Co-create-Build-Engage (CBE) framework (Rundle-Thiele et al., 2021). Prior to the co-design sessions, plates collected from diners with unconsumed food and the plate waste bin in the pilot restaurant were videotaped to categorise and pinpoint food items that led to a larger volume of plate waste, hence having the potential to contribute to a more considerable volume of plate waste reduction once its wastage was avoided with the nudge (Massow & McAdams, 2015). The reasons leading to major plate waste and feasible solutions co-designed by the supply and demand side were developed and piloted in the participating restaurant chain. For four weeks from mid-February till mid-March in 2023, staff from the pilot restaurant weighed its daily plate waste collected in the waste bin and reported the data to the research team. The data collected formed the pre-pilot baseline data. Social marketing benchmark criteria were also incorporated by participants under the guidance of the research team. Insights obtained from the findings of the previous three studies had been formulated into programme ideas that were presented to the participants for comment. Subsequently, the plate waste program developed in the co-design was piloted in the store for four weeks in May 2023. Plate waste data were collected using the same method as in the baseline period for results comparison.

(4) Research findings and discussion

Study 1

Study 1 observed major plate waste items in three different types of restaurants. High-volume plate waste items, consistent with findings in the extant literature, were (i) carbohydrates (e.g. rice, spaghetti, and French fries, Figure 1); (ii) vegetable garnishes (Figure 2); and (iii) unhealthy food (e.g. chicken skin, fried onion rings that come with large portion size). Reasons for leaving these top waste items on plates were explored in focus groups (Study 2) to understand why consumers leave these food items unfinished and how to reduce relevant plate waste.

Figure 1. Top plate waste item – carbohydrates.

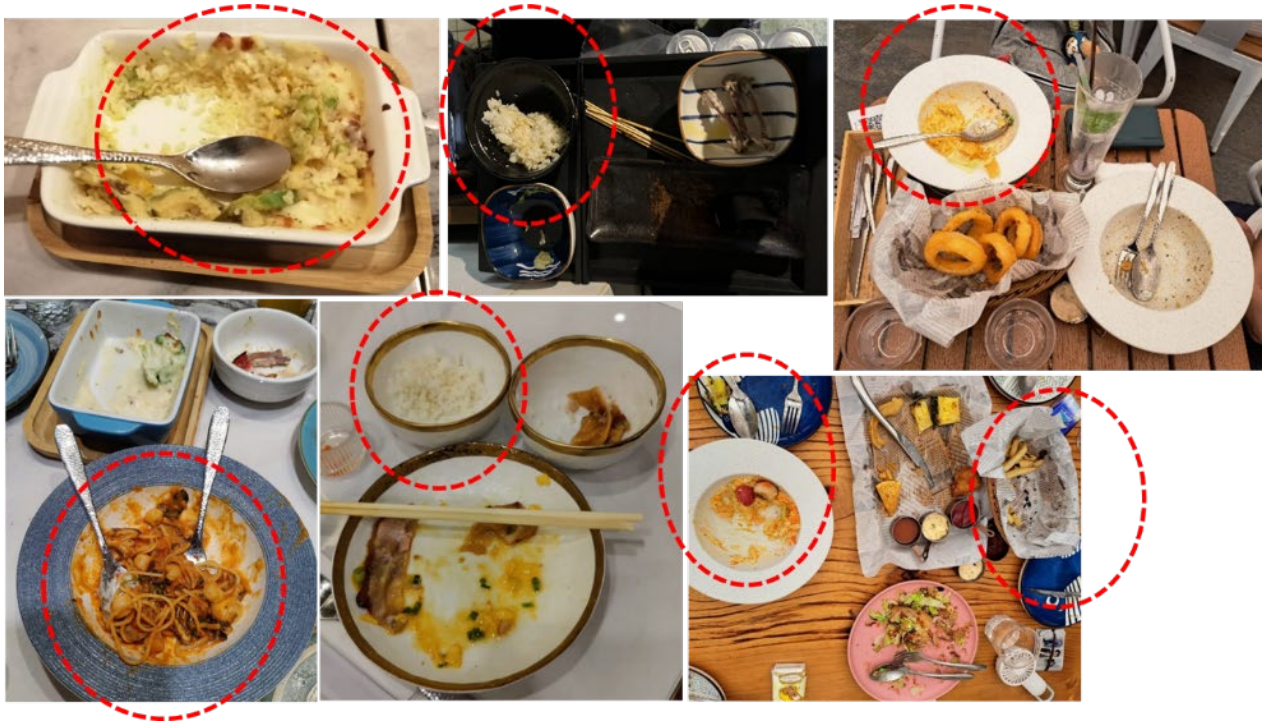
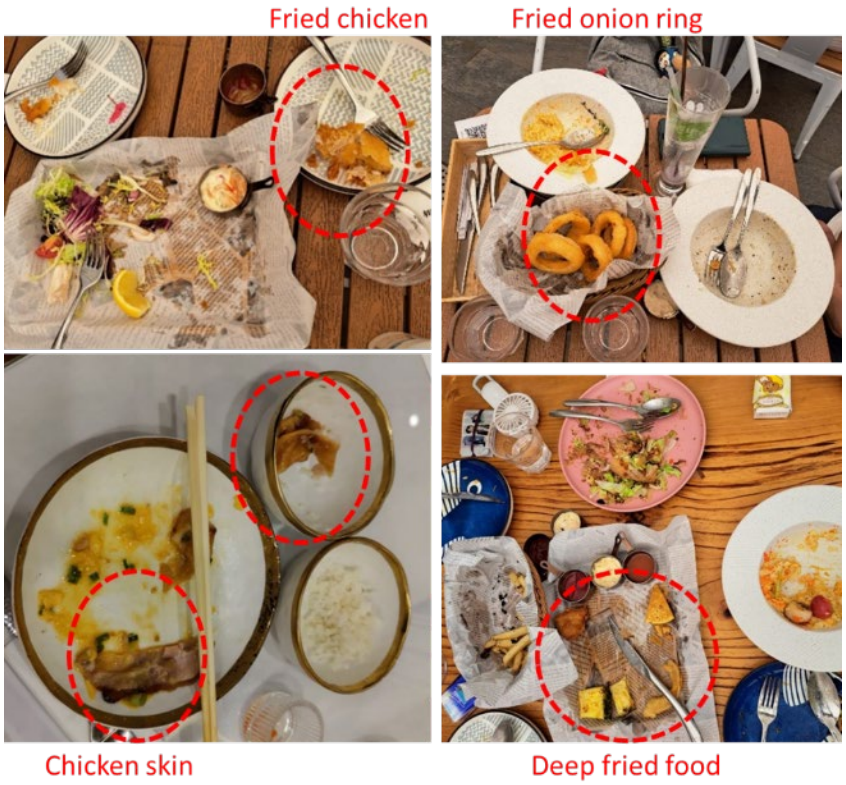


Figure 2. Top plate waste item – vegetable garnishes.



Figure 3. Top plate waste item – unhealthy food served in large portion.



Study 2

Study 2 used focus groups to investigate factors affecting behaviours of plate waste among consumers in out-of-home dining. Major reasons for consumers to leave food unfinished on plates include (i) the portion size is too big to finish; (ii) the food is not tasty, and (iii) dishes consist of ingredients that they do not eat. Echoing the findings in Study 1, consumers usually leave carbohydrates unfinished because the portion is too big and they are too full to finish all. Forcing themselves to finish all carbohydrates seems unhealthy, which is also why they leave deep fried items on the plate, as illustrated in Study 1 (Figure 3). Consumers also frequently leave vegetable garnishes unfinished because they dislike eating several items. However, it is sometimes difficult for them to avoid this type of plate waste as they did not know the ingredients when they ordered. Table 2 summarises the findings of the focus group study on factors and categorises the insights into marketing-mix components (i.e. product, price, place, and promotion) to understand how marketing tactics affect the plate waste behaviour of consumers. Each insight is exemplified with examples verbatim.

Table 2. Summary of factors affecting plate waste reduction.

Plate waste reduction factors	**Examples of verbatim**
Product:	
1. Availability of smaller serving-size options	*"The portion is sometimes too big for me to finish. I would have left no food on my plate if I could opt for smaller portions."*
2. Availability of smaller serving-size options with price reduction	*"I think restaurants can offer price cuts to motivate diners to order 'less rice' and reduce food waste."*

3. Tasty food / pre-order food tasting	*"The food is not tasty, so I don't want to eat."*
4. Information and options about ingredients	*"I don't eat … (e.g. ginger, carrot, … etc.), so I leave them on the plate. If I knew that these items were part of the ingredients when I ordered, I would have asked to remove them before they were served to me."*
5. Information about serving size	*"If I know the serving size when I order, I can estimate if I can finish all and decide if I want to order a smaller portion size."*
6. Availability of kid menu or tasting menu	*"When I eat out with my kids, I have to cater to their needs and wants, although I know we can't finish all the food we order. Thus, restaurants can help me to reduce plate waste by offering a kid menu."* *"In friends' or colleagues' gatherings, we tend to over-order because different people want to order different dishes."*
Price:	
1. Zero plate waste discount or incentive	*"I will try to finish everything on my plate if the restaurant offers a discount/ incentive for zero plate leftovers."*

2. Plate waste penalty	*"I think I will not leave food on my plates if there is a penalty for plate waste."*
Place:	
1. Consumers can request size and ingredient adjustments, preferably using a self-ordering system.	*"Requesting options (e.g., the reduced portion of rice, no onion in dish A, no tomato in dish B, …. etc.) will make me look very troublesome to the waiters. Thus, a self-ordering system (e.g. scan and place order via QR code) will serve my needs to choose the portion size and ingredients without being embarrassed or looking troublesome".*
Promotion:	
1. Communication materials – the amount of food to be consumed based on nutritional information	*"If I know the serving size, nutrient value, and its respective calorie content when I order, I can estimate if I can/ want to finish all and decide if I want to order a smaller portion."*
2. Communication materials – environmental benefits	*"I think it is useless to remind me of the environmental impacts of food waste as the impact is well-known. I just need a reminder and options (e.g. smaller portion size)."*

Insights from focus group studies with demand side consumers revealed that consumers are generally aware of the food waste problem and how they may reduce plate waste. Nevertheless, options (portion size and ingredients) are needed to facilitate their behaviour change. Moreover, providing information is also crucial to facilitate plate waste reduction behaviour. For example, if consumers do not know how big a regular portion is, they do not

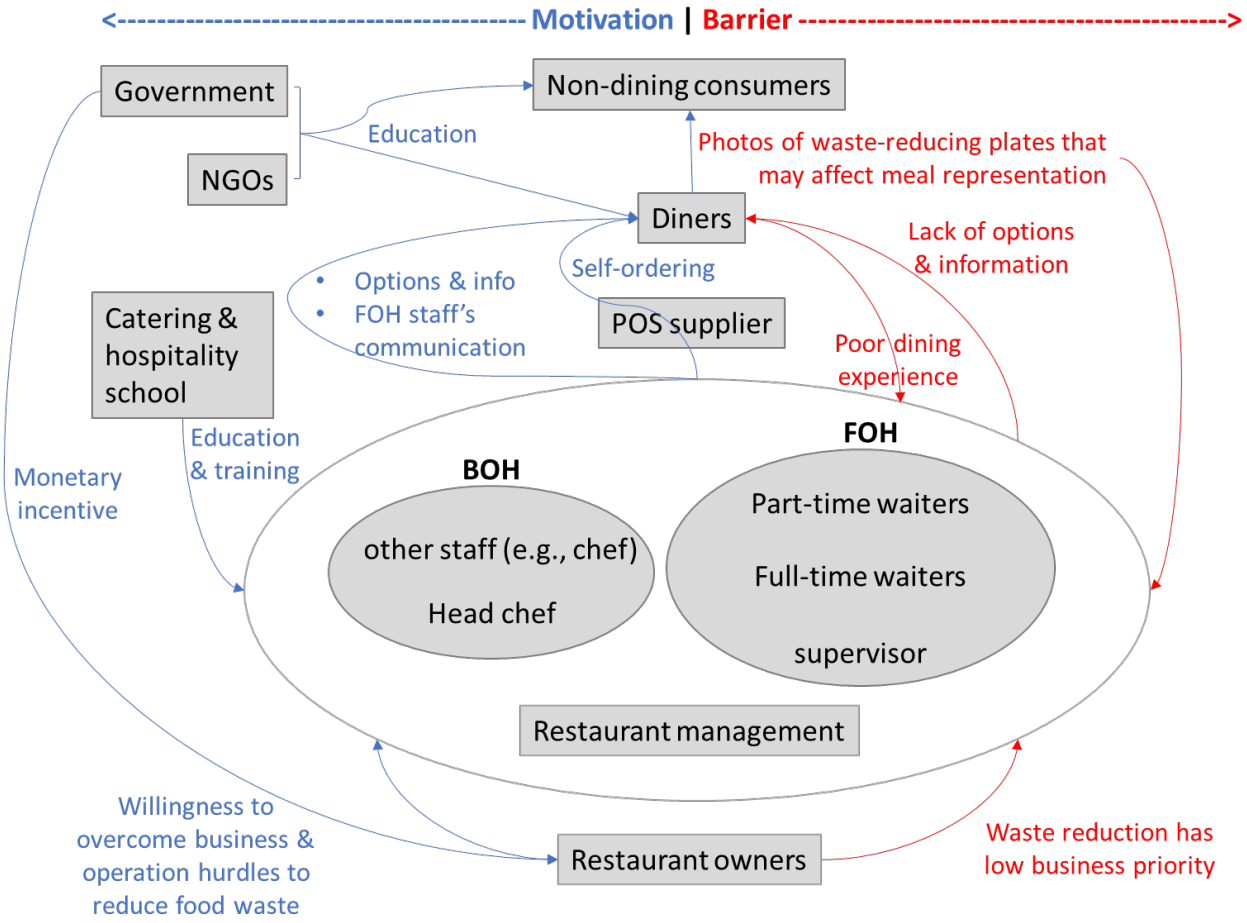
know if they should choose a smaller portion. If consumers do not know that the dishes come with ingredients they do not eat, they cannot ask for options. Consumers have diverse views on whether offering a price cut for ordering a smaller portion (opt-out) or paying more for ordering an additional portion (opt-in) is more effective. Meanwhile, with options provided by restaurants, ways to lower their embarrassment to ask for or express their preference for portion and ingredient options (e.g. self-ordering) will strongly promote plate waste reduction.

Study 3

Based on the ideas shared by consumers in Studies 1 and 2, Study 3 collected experts in food waste and supply side stakeholders' opinions using semi-structured interviews. The data collected from the semi-structured interviews were analysed to generate a system of interest influencing consumers' plate waste reduction behaviour using thematic analysis. Figure 4 illustrates the "system of interest", showing how the supply and demand sides create motivation and barriers to diners' plate waste reduction behaviour.

First, restaurant owners are strong influencers in determining the restaurant's waste reduction direction and practice. Although owners being interviewed claimed that monetary incentives can motivate them to provide plate waste solutions to consumers, all the interviewees agreed that actions would cease once the subsidiary or incentive is stopped. Thus, incentives to restaurants in the form of short-term subsidiaries will be ineffective in promoting long-term changes. One NGO interviewee suggested that the government can implement the incentive through organisations related to restaurants' business operations. For example, the government can consider requesting local banks to offer better terms for business loans to restaurants with certain plate waste options provided to consumers.

Figure 4. A system of interest affecting consumers' plate waste behaviour.



Second, restaurant staff are affected by many stakeholders, including owners, front-of-house (FOH) and back-of-house (BOH) colleagues, catering education institutions, point-of-sale (POS) suppliers, diners, and non-diners who are exposed to meal photos of their restaurants on social media. Providing portion size options and information to diners (as found in Study 2) requires owners' endorsement, training provided to FOH staff, reinforcement of options and information provision by supervisory staff, implementation support from BOH chefs, and system support from POS suppliers. Most importantly, restaurant staff must be confident that proactively offering plate waste suggestions to diners does not affect their dining experience. Moreover, restaurants are also worried that other non-dining customers may have a poor perception of the quality of their food when they are exposed to meal photos showing "less

rice", "fewer ingredients", or "in smaller portions" on social media as tailor-made plate options may affect meal presentation.

Third, interviewees believed that governments and NGOs should educate consumers about the importance of plate waste reduction so that diners will proactively ask for plate waste options (e.g., smaller portion size or ingredient mix) to ease the anxiety of frontline staff in providing solutions to diners. By lowering the anxiety of restaurant staff that providing plate waste options and information may result in poor dining experience, the barrier to implementing plate waste solutions can be eliminated.

Lastly, catering and hospitality education institutions can incorporate more training and education into the curriculum for FOH and BOH workers in the catering business. Hence, the training will enhance catering workers' ability to design menus that aid plate waste reduction and lower food costs for the restaurants, to communicate effectively with diners to promote waste reduction options without affecting the dining experience, and to understand the business and environmental impacts of all the efforts behind the implementation of food waste solutions.

Study 4

Based on the findings of the above studies, audience-centric co-design sessions were conducted in Study 4 to bring consumers and restaurant staff together to design a plate waste reduction program that is effective, feasible, and practical for all major stakeholders. Throughout the co-design study, challenges, concerns, and proposed solutions were discussed among all stakeholders. A social marketing intervention covering the 4Ps of marketing-mix was developed to reduce the high-volume plate waste items (i.e. rice and vegetable garnishes) and tested in a pilot restaurant (Pick café by Pokka) in Taikoo Shing.

For product, two initiatives about how to reduce unfinished rice were developed: (i) information about the amount of rice to be served will be shown on the menu (Figure 5a), and (ii) consumers will be asked if they want "less rice" (i.e. a smaller-size portion) when placing order.

Figure 5. Product options (size and garnish) and information.



Solutions about how to reduce uneaten rice were easy to finalise. However, diverse views were shared about how to reduce fresh side vegetables. While some consumers perceive that fresh side vegetables are for decoration instead of for eating, consumers recommended removing fresh side vegetables. However, the restaurant team disagreed as it may affect the visual presentation of dishes. Restaurant staff counter-proposed mentioning on the menu the freshness of the organic side vegetables, but consumers claimed that this would not change

their behaviour. Thus, during the pilot, fresh side vegetables continued to be served (Figure 5b), and waiters proactively asked if consumers ate fresh side vegetables and provided them with a removal option. As different consumers dislike different types of cooked vegetable garnishes (e.g. tomato, carrot, zucchini, … etc.), the restaurant provided information about the garnish mix providing consumers with options to opt out of unwanted garnishes (Figure 5c).

For price, all participants in the co-design sessions agreed to try “no price discount” for "less rice" and "fewer side vegetables" options in the pilot experiment, although literature and consumer focus groups revealed that price cuts might lure consumers into choosing plate waste options. Consumers expressed that for those who are genuinely environmentally friendly, a few dollars discount does not make a difference when options are provided to them to fulfil their moral obligation.

For place, the restaurant did not want to offer a self-ordering system as it violated the chain's premium brand image and customer service level. Instead, co-design participants agreed that waiters could proactively inquire diners about options to reduce plate waste to lower consumers’ embarrassment in choosing these options.

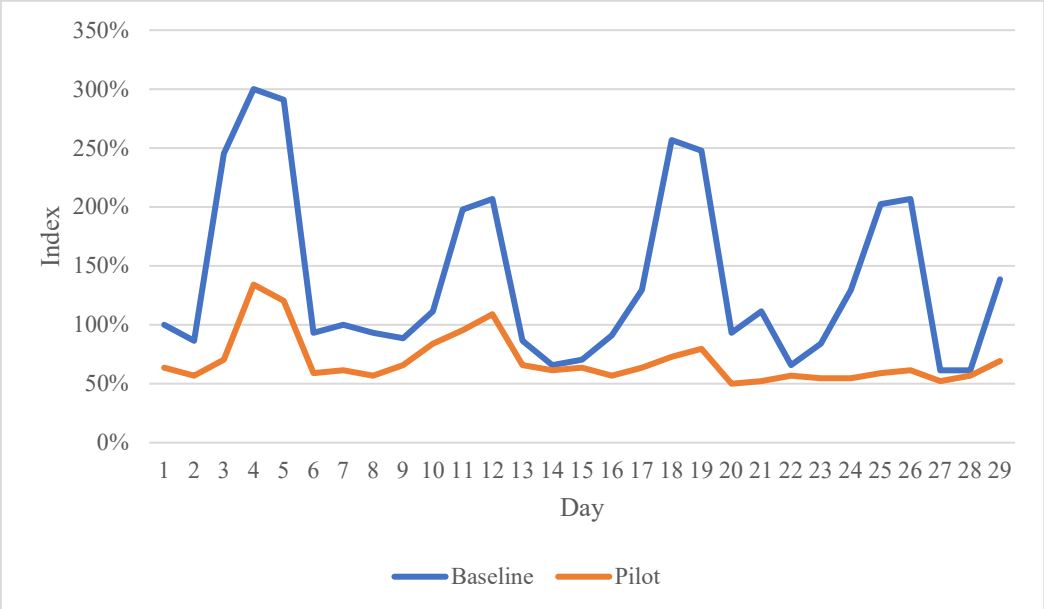
For promotion, as the pilot restaurant was worried about asking too many questions about whether consumers want less rice and vegetables would create negative dining experience, instore and menu board notices were displayed to inform the diners about the special practices during the pilot period (Figure 6).

Figure 6. Notice informing consumers the plate waste reduction pilot



The marketing mix agreed upon by all stakeholders in the co-design was experimented with for four weeks in the pilot restaurant. Daily plate waste data was collected for comparison against baseline data measured before the pilot implementation. Figure 7 shows the daily plate waste data (baseline vs pilot). Data shows an index with day 1 data of baseline equal to 100% to protect the business privacy of the pilot restaurant. The average daily plate waste on weekends was 143% and 52% higher than on weekdays during baseline and pilot, respectively.

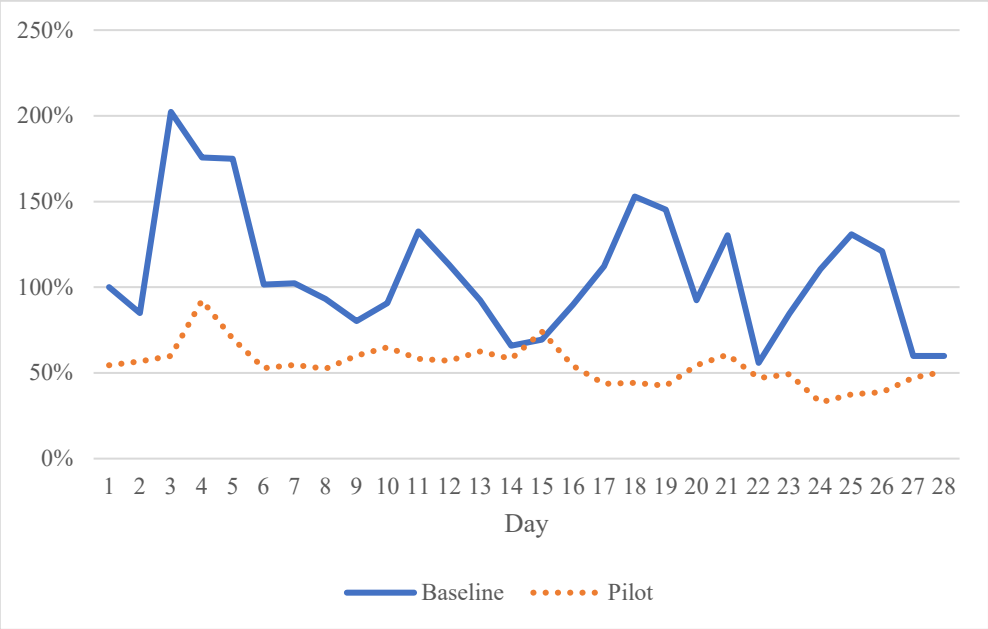
Figure 7. Plate waste data (baseline vs pilot).



* Absolute weight of plate waste on day 1 of baseline period = 100%

Daily sales revenue was used as a control variable on waste measurement to look at the real impact of the social marketing program implemented in the pilot period. Figure 8 shows the daily plate waste weighted by sales revenue, reflecting the changes in waste as a proportion of changes in sales.

Figure 8. Plate waste data weighted by revenue (baseline vs pilot).



As consumers waste more food on plates during weekends when diners usually over-order in eating occasions with friends and families, the amount of waste as a percentage of sales revenue at weekends was 53% greater than on weekdays when no waste reduction options were provided in the baseline period. When waste reduction options were offered during the pilot period, the waste-to-sales index was only 1% higher at weekends vs weekdays. The average weighted plate waste decreased by 41.9% on weekdays and 61.5% at weekends, indicating significant plate waste reduction on both weekdays ($F(1, 38) = 28.2992$, $p < 0.00$)

and weekends ($F(1, 14) = 69.2674$, $p < 0.00$). Overall, the average plate waste in the pilot period was 49.4% lower than in the 4-week baseline period. A one-way ANOVA revealed that there was a statistically significant difference in average daily plate waste between the baseline and pilot period ($F(1, 54) = 52.3720$, $p < 0.00$).

(5) Policy implications and recommendations

To provide policy recommendations to the Hong Kong government based on the results of this funded project, this section starts with a highlight summarising the major plate waste reduction policies implemented by various national governments worldwide. These policies could be legally binding, directions set by governments, or voluntary. Some of these policies might be punitive, while others provide incentives to encourage certain practices.

France

Echoing the EU's Directive 2008/98/EC on waste, France passed laws to regulate the practice regarding food waste in 2016. These laws were further reinforced in 2019 and 2020 (Condamine, 2020a). France has established its food waste hierarchy prioritising food waste prevention as a preferable strategy, followed by food donation in 2016. Ordinance No. 2019-1069 extends the obligation to donate unsold food products and the prohibition of destroying unsold food products fit for consumption from supermarkets and food retailers to mass catering and the whole food industry (JORF, 2019). The 2019 ordinance further required restaurants to provide doggy bags for diners to take away their leftovers. The penalty for destroying unsold food has been raised from a fixed amount to 0.1% of the annual turnover. Apart from these laws specifically targeting food waste, the French Code of Commerce 225-102-1 also allowed the reporting of actions against food waste to be included in a company's social report (Giordano et al., 2020).

One limitation of these laws pointed out by Zero Waste Europe is that the law made food donation mandatory while the amount of food donated is not regulated. Hence, a restaurant donating very little of its unsold food would have fulfilled the legal obligation even

when repurposing most of its unsold food is yet to be discovered. On the other hand, Giordano et al. (2020) welcomed the inclusion of measures against food waste in companies' social reports as they saw it as an incentive for companies to take action against food waste voluntarily to promote the company image. However, most of the measures taken by the French government so far might have little effect in preventing the creation of food waste, especially when restaurants are concerned. The doggy bag policy might help reduce food waste disposed of on-site, but it could also simply shift the disposal from the commercial to the domestic level. None of the policies mentioned have addressed food waste prevention in restaurants on the consumer level. Furthermore, no incentive is provided directly from the government to encourage food waste prevention or food surplus repurposing.

Germany

Germany has committed to halving the nation's food waste by 2030 (Bundesregierung, 2019). It has launched a publicity campaign named "*Zu gut für die Tonne*" [too good to throw away] since 2012, which aims to educate Germans on the source of and how to reduce food waste. The German government has also initiated dialogues with various stakeholders on reducing food waste (The Federal Ministry of Food and Agriculture, 2022). German government currently does not have many interventions to reduce food waste through legislation. A petition calling for the prohibition of disposing of food has received no response from the government so far.

Although Germany seemed not to have acted as promptly as some other EU member states, it does realise its major food waste source is generated at the consumer level. Legislative measures targeting actors along the food supply chain need to be improved. It also studies the feasibility of making its National Strategy for Food Waste Reduction more legally binding. In

addition, it is considering incentivising food donation through tax benefits. However, the German government intended to prioritise source reduction over all other approaches regarding food waste reduction.

Italy

Another EU member state, Italy, also complied with the EU's 2008 Directive. At the national level, the Italian government have set guidelines regarding food waste prevention and food surplus donation in public food services. Meanwhile, it has encouraged doggy bags and funded bag suppliers to create more sustainable doggy bags (Giordano et al., 2020). One policy worth highlighting is the tax reduction for companies proportional to the amount of food they donated through legislation in 2016 (Condamine, 2020b).

Unlike France, Italy's policies against food waste concerning the food industry are leaning on a suasive approach instead of a more regulatory one. The government provides direct incentives encouraging restaurants to reduce food waste through donations through tax reduction. However, the policies did not particularly address food waste prevention in restaurants setting, especially at the consumer level. The tax reduction only encouraged food donation but failed to motivate entities to refrain from producing excessive food in the first place.

Japan

Japan's food waste-related policy dates back to its Food Waste Recycling Law enacted in 2001. After several revisions in the following decades, the law covered food waste from food-related industries and businesses, including restaurants. This law requires the food industries and businesses to promote food waste recycling and reduction (Liu et al., 2016). The

Japanese government has also set up a periodic reporting system which requires actors who generate more than 100 tons of food waste per year to report food waste-related data mandatorily (Liu et al., 2016). In 2019, Japan's National Diet passed its Act on Promoting Food Loss Reduction (Umeda, 2019). Every October was established as the "food loss reduction month", and 30th October was established as the "food loss reduction day" under this law to promote public awareness of the issue (e-gov.go.jp, 2019).

Although Japan has committed itself to halving its food waste by 2030, it is unclear at this stage how exactly its government will implement this. The act and law aforementioned are mostly setting directives. Much focus has been placed on recycling food waste instead of source reduction. Although the Food Waste Recycling Law mentioned the reduction of food waste, the definition of reduction in this law should be treated with caution as it covers food waste processing to reduce its volume or mass (e-gov.go.jp, 2000). Some efforts have been placed in publicity campaigns to raise public awareness of food waste by Japan's Consumer Affairs Agency.

People's Republic of China (China)

Alerting the nation to "maintain a sense of crisis regarding food security" amid the COVID-19 pandemic, Chinese President XI Jinping ordered legislation and supervision to stop food waste nationwide (Huaxia, 2023). China adopted the Law of the People's Republic of China on Food Waste (NPC of PRC, 2021). Under the law, state entities are restricted from providing excessive food on official occasions. The law specifically outlines measures for catering service providers to prevent generating food waste, such as displaying anti-food-waste signs, standardising serving sizes to fit the actual needs of consumers, providing different portion size options for consumers etc. It also officially recognised the Clean Plate Campaign

(some referred to as the Clean Your Plate Campaign or Clear Your Plate Campaign) and encouraged catering services to incentivise the campaign participants meanwhile penalising diners who waste food through the collection of waste handling fees. The law also prohibits creating, releasing or disseminating any content that promotes food waste or overeating. Offenders will be penalised (Wang et al., 2022). Despite the many interferences from the government through the law, the Clean Plate Campaign, which encourages diners to finish every food item served, is voluntary (Wang et al., 2022).

China is the only country covered in this review that has specifically targeted plate waste and food waste generated at the consumer level. Unlike many other countries reviewed, it did not take the approach that focuses on donating food scraps or unsold food, nor on repurposing food waste through composting or feeding to animal stock. Instead, its law on food waste focuses on source reduction. One unique feature of the Chinese law on food waste is that it also limits, if not prohibits, content which promotes wasteful food consumption behaviour in various media. This is uncommon among other countries reviewed, yet worth imitating. Cigarette ads have been banned in many countries out of public health concerns. Similarly, governments worldwide could consider limiting the content which jeopardises food security or promotes wasteful food consumption behaviour.

Republic of Korea (South Korea)

In 2005, South Korea officially banned sending food waste to landfills (Lee et al., 2019). Almost all of the nation's food waste is recycled today (Kim, 2022). South Korea requires food waste to be disposed of separately, which will then be recycled to feed animal stock, for composting, or to be turned into biogas for energy. An initiative was carried out in 2010 by the government, which invited various actors, including restaurants, to sign an agreement to reduce

food waste. An example of the measures under this agreement is to ask restaurants to use smaller side-dish plates (Research Office of the Legislative Council Secretariat (HK), 2013).

Food waste policies in South Korea prioritise food waste recycling instead of source reduction. From a waste management perspective, South Korea might be a shining example to the world with its almost zero food waste record. However, it did not address the issue that excessive food was produced without consumption. One identified source of food waste in South Korea is the unconsumed side dishes that restaurants are expected to serve. As of 2022, South Korea recycled 95% of food waste (Marshall, 2022). The South Korean government could do more to lead the change in restaurants and their consumers to break this norm rooted in their culture and tradition, thus reducing food waste at its source instead of investing in waste recycling.

United States of America (US)

The US has set its goal to reduce half of its food waste in 2030 compared to the baseline in 2015 (EPA, 2023). In 2016, US Congress signed the Protecting Americans from Tax Hikes (PATH) Act which grants tax benefits to incentivise food donation from food businesses (Sakaguchi et al., 2018). Certain states or municipalities in the US have banned the disposal of organic waste in a broader sense, or food waste in particular (Sandson et al., 2019). However, these local laws usually focus on repurposing the food scraps (such as collecting them to feed animal stock or composting them) instead of promoting the reduction of food scraps generated in food businesses. None of these measures focused on the food waste generated at the consumer level in a restaurant setting.

Summary of national policy around the globe

Among the national policy reviewed, most legislative measures do not focus on plate or food waste in a restaurant setting, except for China. Tax reduction or benefits resulting from food waste reduction measures in food businesses seems to be the trend. Banning food waste disposal is the first step to food waste reduction as it forces the public and food businesses to face the issue of food waste, urging them to realise the need to adopt new behaviours on food processing or consumption. Food donation could help feed people in need while reducing food waste from unsold food still fit for consumption, yet it is ineffective in reducing plate waste. Food waste recycling help relieve the pressure on waste management and provide a seemingly more sustainable option for energy, fertilising, and animal stock feeding. However, source reduction should be prioritised as long as plate waste is concerned since the prevention of producing food surplus is critical to safeguard food security. Lastly, this paper also recognises the differences in socioeconomic structures and culture among the nations reviewed. Some policies designed according to one nation's context might not apply to another. For example, the Chinese might embrace its government to prohibit content which promotes wasteful food consumption behaviour in various media. However, the same practice might face strong opposition once implemented in other nations.

Policy recommendations for Hong Kong

1. ***Waste sorting***

   Mandatory waste sorting might be a critical step for effective food waste management as it allows government and other stakeholders to have a more concrete figure on the amount of food waste generated in back-of-house (kitchen waste) and front-of-house (plate waste). Separating food waste from other waste at its source is also preferable to facilitate food waste recycling and reduction at source.

2. ***Tax incentives***

Hong Kong has upheld the free market principles for decades. Rather than providing project-base short-term subsidiaries to restaurants, the government may consider providing tax rebates for the food and beverage (F&B) industry which meet a government-set food waste reduction standard. This will motivate the F&B industry to raise the priority of food and plate waste reduction among other business and profitability goals. In this post-pandemic era, the F&B industry struggles to recover its business. If taking measures to reduce food waste would result in paying less tax, this could also help ease the pressure in the F&B industry. Meanwhile, the government could save costs in municipal waste management if food waste is reduced, promoting a win-win situation. This could be combined with the "Food Wise Eateries" scheme when determining the amount of tax rebate. Restaurants that fulfil the higher "class" requirement could receive a larger tax rebate (i.e. a progressive scheme). Thus, it motivates the dominating food chains with greater business benefits to pioneer the practices.

3. ***Stating the net weight or size of each food item served on the menu***

It is common for Western restaurants to state the weight of the food (e.g. steak) and the ingredient mix to be served on the menu. A measure supported by some of the diners is a similar practice applying to every food item served on the menu. These diners believed they could better judge whether they could finish a dish before ordering if the net weight of the food items served was available. Furthermore, the measure could help them decide whether to request a reduced portion or opt-out of unwanted ingredients. However, the implementation of such measures for all items on menu could be difficult. It could be hard to ensure the food items served always meet the stated net weight after the cooking process,

thus risking the restaurants offending the Trade Descriptions Ordinance. Thus, the government may encourage or regulate this measure for top wasted items such as carbohydrates for the first step.

4. ***Including "portion-size" and "garnish" options on the menu in government's catering tenders***

   Extant literature and this funded research confirmed that providing smaller-size portion options (especially for carbohydrate items such as rice) significantly reduces consumer plate waste. While it may be difficult to mandate commercial catering settings to offer portion size options on their menu, the Hong Kong government may take the lead to request catering suppliers and canteens in governmental, government-affiliated, and government-related establishments (e.g. government offices, universities, public libraries, airport, hospitals, prisons, … etc.) to provide portion-size and garnish options and information to diners in the tender invitation for canteen tenancy.

5. ***Aligning food waste collection policy and the Food Hygiene Code***

   One feedback from the F&B industry is the contradiction in food waste collection practices and the Food Hygiene Code. To meet the current standard from the Food and Environmental Hygiene Department, restaurant owners need to dump away their waste on a daily basis. However, food waste is not collected on a day-to-day basis, making the F&B industry difficult to contribute to the food waste recycling effort.

(6) Details of the public dissemination held

Public dissemination of the results of this funded project includes (i) a Chinese advertorial on AM730[5] published on 29th June 2023; (ii) an English advertorial on The Standard[6] published on 29th June 2023; and (iii) eDM (using the advertorial featured on AM730) sent to all members (over 10,000 catering establishments) of the Hong Kong Federation of Restaurants & Related Trades Ltd. (HKFORT) via e-newsletter (Figure 9) in July 2023.

[5] https://www.am730.com.hk/%E6%9C%AC%E5%9C%B0/%E9%A3%9F%E7%89%A9%E9%82%84%E6%98%AF%E5%BB%9A%E9%A4%98-%E5%8F%AA%E5%9C%A8%E4%B8%80%E5%BF%B5%E4%B9%8B%E9%96%93-%E5%AE%A2%E4%BA%BA%E6%88%96%E5%93%A1%E5%B7%A5%E7%9A%84%E4%B8%80%E5%8F%A5%E8%A9%B1-%E6%88%90%E5%8A%9F%E6%8E%A8%E5%8B%95%E6%83%9C%E9%A3%9F/384849

[6] https://www.thestandard.com.hk/section-news/fc/4/253715/PolyU-SPEED's-research-propagates-social-marketing-intervention-to-cut-down-plate-waste

Figure 9. eDM of HKFORT

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致：餐飲聯會長、主席、副主席、會董及全體會員
由：餐飲聯秘書處
日期：**2023**年7月18日
主題：轉發通告—理工大學報導：廚餘減廢研究

轉發通告—理工大學報導：廚餘減廢研究

為研究如何減少餐後廚餘，香港理工大學專業進修學院 (PolyU SPEED) 早前與百階 (香港)有限公司合作，於該公司旗下位於太古城的Pick Coffee by Pokka Café 推行以「社會行銷方案」減少餐後廚餘的研究，經過3個月測試，成功減少約一半廚餘，同時亦為餐廳節省成本，締造業界、消費者、及環境保護的三贏局面。

有關報導的詳情請參閱圖片，謝謝。



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退訂電郵 • 反垃圾郵件政策

(7) Conclusion

We used a Co-create-Build-Engage (CBE) social marketing intervention process to develop, implement, and evaluate the effectiveness of a social marketing intervention to influence plate waste reduction behaviour. To do so, we conducted formative research, including a systematic literature review, focus groups among demand-side consumers, semi-structural interviews among supply-side stakeholders and food waste experts, and co-design sessions among all major stakeholders to develop a social marketing program to reduce out-of-home plate waste. We found that only small changes for restaurants to provide smaller portion-size options and portion-size/ingredient information significantly reduce unfinished food leftovers on the plates. Most importantly, the measures do not affect consumers' dining experience and simultaneously reduce food costs for restaurants.

Our results suggest that only small changes which do not increase the operation cost and pressure can contribute to consumers' behaviour change that significantly reduces plate waste in Hong Kong. Thus, we suggest policymakers educating the public to ask proactively for plate waste reduction options when dining out. Moreover, measures other than short-term subsidiaries should be introduced to nudge the catering industry to provide portion-size options and information to consumers to facilitate the behavioural change required to reduce food waste in Hong Kong.

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