

## Food waste measurement as a tool for prevention and reduction: A case study from a hotel in Colombo, Sri Lanka



Fish waste generated in the case study hotel in Colombo, Sri Lanka  
(photo: Nalaka Wickramasinghe/University of Kelaniya)

### KEY MESSAGES

- Food waste quantification, at food supply chain level, is an effective tool to promote prevention and reduction strategies.
- Conducting food waste quantification by applying a mixed method of quantitative and qualitative tools provides actionable knowledge about the magnitude of the problem, causes and economic impacts.
- A systematic food waste reporting mechanism – at the local and national level – should be in place to encourage broader food waste reduction initiatives.
- Investing on simple measures such as weighing scales and displaying information on the food waste generated provides the highest returns on investment.
- Building the capacity of the stakeholders on methodologies and tools for food waste measuring, monitoring and reporting is needed.

The *2030 Agenda for Sustainable Development* has called for halving the global per capita food waste from retail to consumer level and the reduction of food losses along production and supply chains by 2030 (United Nations 2015). Globally, state and non-state actors have introduced measures (e.g., regulatory and other incentive mechanisms) to mitigate food waste (FW) at the national, regional or local/supply chain level (Chalak et al. 2016).

The amount of food waste generated in Local Authority areas of Sri Lanka ranges between 50% and 76% of the total

municipal solid waste, with an average of 56% (FAO and IWMI 2021a). The total FW generated is estimated to be nearly 4,000 tons/day (Arachchige et al. 2019; FAO and IWMI 2021b).

In 2020, a study conducted by the Food and Agriculture Organization of the United Nations (FAO) and the International Water Management Institute (IWMI) focusing on three major waste disposal centers in the Western Province of Sri Lanka – Karadiyana, Kerawalapitiya and Kaduwela – revealed that about 724 tons of the total waste generated in a day is FW (i.e., 55% of total waste).

The study further noted that Colombo Municipal Council in Sri Lanka contributes to 42% of the total FW transported to these disposal sites (FAO and IWMI 2021b).

FW occurs across the food supply chain from manufacturing to households, catering and other food services. In most cases, stakeholders are not aware of the magnitude of the waste generated and believe that FW is a part of the business model. Therefore, it is ignored (Reitemeier et al. 2021), which results in socioeconomic and environmental costs that could have been prevented. For instance, the nutritional loss due to FW

affects the total nutrient availability and accessibility for human intake, including for those that suffer from malnutrition (Fan 2017).

About 22% of the total population in Sri Lanka does not have sufficient food to sustain a healthy life, while about 33% of the population cannot afford a nutritious diet (WFP 2021). Therefore, initiatives on the prevention and reduction of FW will play a significant role in contributing to achieving Goal 2 (zero hunger) of the United Nations Sustainable Development Goals (SDGs).

One obstacle to effective policymaking is the scarcity of FW data (FAO 2019). A good understanding of the availability and quality of FW data is a prerequisite for tracking the progress on reduction targets, analyzing environmental impacts and exploring mitigation strategies (Xue et al. 2017). While FW prevention efforts can be initiated without having detailed information on the FW amounts, quantification is necessary to understand the magnitude and location along the food supply chains (i.e., from wholesale to households) to inform prevention measures (Tostivint et al. 2016).

According to Eriksson et al. (2019), quantifying FW is a good first step towards reducing it. FW quantification helps create

a robust evidence base for developing strategies, action plans and policies, as well as guide the prioritization of actions, evaluation of solutions and monitoring the progress (CEC 2019).

## APPLICATION OF CASE STUDIES FOR FOOD WASTE QUANTIFICATION

The FW quantification case study approach presented in this brief is expected to enable organizations to measure and estimate, in a practical and consistent manner, the extent, the location and the causes. The findings serve as a tool to inform included categories of business entities and support the decision-making process towards FW reduction. Case studies assist in conceiving complex situations and describing actors and processes in an accessible format in order to provide answers to the 'why' and the 'how' (Yin 2003). The case study process adopted consisted of three phases as shown in Figure 1.

**Phase 1** – Observation of the participants' practices and initial FW quantification (7 days). Selected operations are monitored, following the food flow, to have a baseline,

identify causes and help inform reduction actions and strategies to be undertaken in Phase 2. Quantification considers the different supply chain stages and can include, for instance, food sourcing and storage, food preparation, display and post-consumption (i.e., plate waste/leftovers). At the end of each of the 7 days, the amounts of FW are measured with a scale and characterized in their composition (i.e., types/commodities, causes and destination of the waste).

**Phase 2** – In the second phase (7 days), the collected data is analyzed, and FW reduction strategies are identified. Findings of Phase 1 are presented, and potential FW reduction strategies are introduced for validation and implementation of the food business operators. Subsequently, the research team reaches a consensus with the management to implement selected actions – those which are feasible in the short term. The research team engages with the management for a guided implementation and for data collection to estimate the return on investment (ROI).

**Phase 3** – Participants practice observations for the selected prevention and reduction actions (minimum 7 days) and a second quantification step for 7 days is conducted. The second quantification step evaluates the effectiveness of the implemented measures. A consultation is arranged with the management and staff to present the results of the case study (i.e., before and after approach) and obtain feedback (i.e., challenges and potential follow-up).

**Phase 4** – Phases 1 to 3 should be followed up with monitoring and evaluation, several months later, to understand which practices have been adopted, dropped, revised, or even optimized, and the related reasons. The ROI should also be assessed and recalculated to prioritize scaling up solutions.

## SELECTED FINDINGS

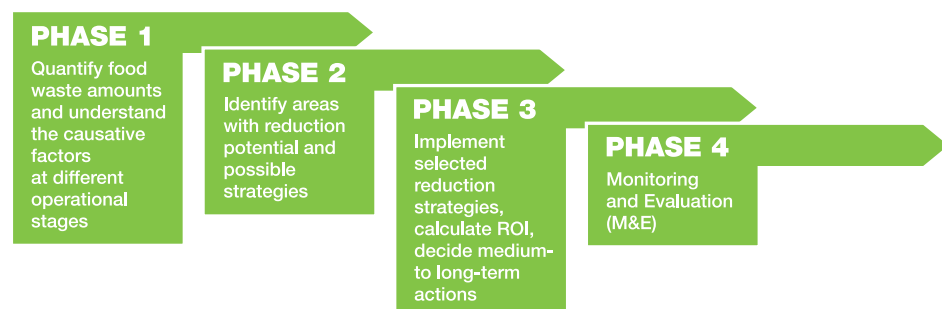
The project piloted the described methodology across Colombo (the commercial capital and largest city of Sri Lanka) in one hotel, one restaurant, one supermarket, one wholesale market, one retail market, one hospital and 10 households. This brief focuses on the results from the hotel. This example represents a stakeholder with an international management that is aware of the FW



Waste of edible cooked food  
(photo: Maren Reitemeier/IWMI)



**FIGURE 1. FOOD WASTE PREVENTION AND REDUCTION:  
A FOUR-PHASE CASE STUDY APPROACH**



challenge, which differs (at present, in this aspect) from other stakeholder groups in Sri Lanka (Reitemeier et al. 2021).

The hotel in Colombo was selected to understand current practices driving FW generation while aiming to facilitate the development and prioritization of reduction strategies. The hotel has 11 banquet halls and 11 restaurants with the capacity for catering to over 4,000 guests under the assistance of more than 400 employees. Before conducting the FW audit, a high-ranking management staff stated, *“I have been working in the hotel industry for more than 20 years and worked in many five-star hotels in the past. Achieving a zero food waste target at a big hotel is hardly possible with the compliance requirements and standards to be followed.”*

The first quantification phase disclosed that the hotel has generated a total of 2,442 kg of FW during the assessed week (August 10–16, 2020), which was 21% of the total food prepared. The major contribution to the total FW was due to buffet surplus (46%) followed by customer plate (33%) and waste occurring during food preparation in the kitchen (21%). About 67% of the FW was identified as edible, which was largely from the buffet surplus (72%). It was also observed that 61% of the kitchen waste and 25% of the plate waste were edible.

The commodity-wise analysis indicated that 38% of the edible waste is cooked rice, 27% is wheat-based starchy foods such as bread, pasta and noodles, and 16.5% is vegetables. The total amount of edible meat, fish and fruit waste was 18.5%. In terms of monetary value, fish accounted for more than one-third (36%) of the total cost of food wasted whereas

the monetary value of the wasted portions of meat, vegetables, starchy foods and rice were 19.7%, 16.5%, 12% and 9.8%, respectively.

The financial value of the ingredients of the wasted edible food during the week was around LKR 439,500<sup>1</sup> (USD 2,350) excluding the cost of preparation (i.e., labor and energy) and other supplementary cooking ingredients such as oil, condiments and spices. Since the hotel had just started its operations in August 2020, after the first wave of the Covid-19 pandemic and lockdown, the waste quantities were lower than before but are expected to be higher after normal operations resume. Hence, the expected financial value of the edible food waste would be higher.

## ROLLING OUT

The key findings of the study were presented to the entire staff of the hotel; several short-, medium- and long-term strategies to prevent and reduce FW were discussed. The findings illustrated strong evidence for FW prevention and reduction in terms of both volumes and costs that were avoidable. After the presentation of the findings, a top management officer expressed that *“We knew there is food waste, but we never knew the quantity and nature of it, especially edible food waste in the kitchen has alarmed us. The profit we should be earning has been discarded as waste.”*

The findings informed the hotel in selecting appropriate strategies and, subsequently, the top management agreed to implement the following FW prevention and reduction actions that focused on measuring and

monitoring, engaging staff and repurposing edible food that was at risk of becoming waste:

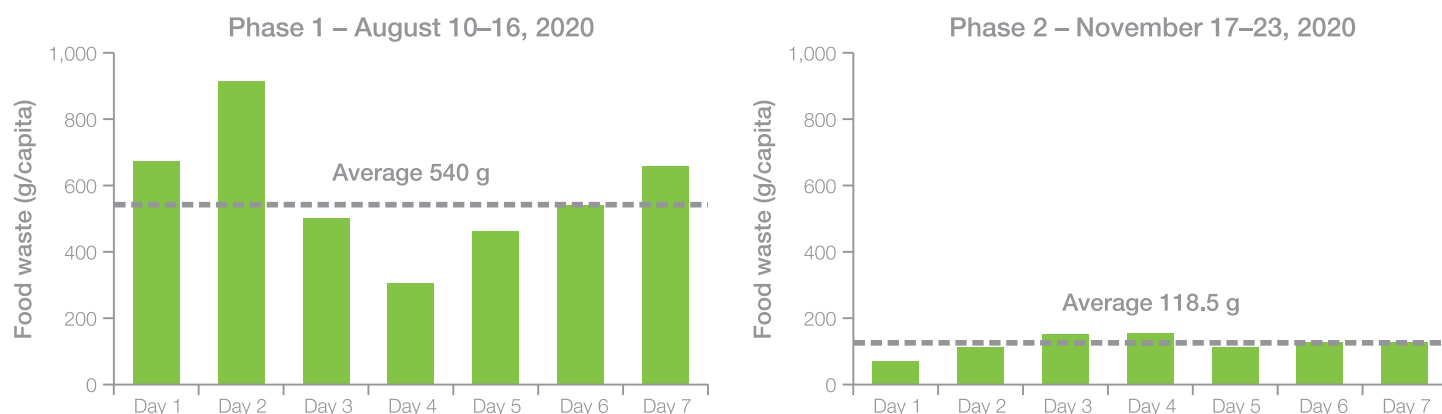
1. Appoint the responsible task force to monitor and manage the FW generated at each point/source.
2. Measure daily FW at source, display the values at each monitored point and report the same to relevant staff meetings.
3. Purchase graded and pre-cut food items instead of purchasing bulk foods that need processing. For example, an alternative to buying the whole fish is to buy the fish cuts for the dishes on the menu.
4. Encourage kitchen staff to prepare alternative foods from unconsumed edible food portions that are kept under safe conditions. For example, selling leftover cake pieces at the staff welfare shop, preparation of desserts with cake offcuts, preparation of cooking stocks from vegetable offcuts, and preparation of curries and cutlets from the fish offcuts generated during the preparation of fish dishes.
5. The kitchen staff has several options to reuse food resources, instead of wasting them (e.g., preparation of orange marmalade using orange skins and production of lime pickles from used lime shells).

The second round of FW quantification was conducted with the implementation of the above five strategies after three months of the first quantification – i.e., November 17–23, 2020. The findings illustrated in Figure 2 below show that the per capita FW has been reduced by 78%, from 540 g to 120 g. Overall, what influenced the food business operator to set FW reduction goals were problem awareness, a behavioral change supported by evidence, and social responsibility and norms. In addition, FW quantification created concerns also due to the amount of money wasted with the food and/or ingredients that were thrown away.

The ROI for the FW reduction initiatives is summarized in Box 1. It should be noted that the results achieved were possible due to the commitment and dedication provided by the leadership of the hotel, who delegated the authority to quantify FW, determine causes and implement solutions to the staff.

<sup>1</sup> USD 1 = LKR 187 in August 2020 (source: <https://www.cbsl.gov.lk/en/rates-and-indicators/exchange-rates/daily-buy-and-sell-exchange-rates>).

FIGURE 2. FOOD WASTE GENERATED AT THE PARTICIPATING HOTEL – FIRST AND SECOND ROUNDS OF QUANTIFICATION



Source: FAO and IWMI 2021c.

**BOX 1. RETURN ON INVESTMENT (ROI)****COSTS**

The hotel had to allocate additional resources to implement the FW prevention and reduction strategies. Some of the costs (e.g., awareness creation and capacity building, etc.) are expected to decline in subsequent years with a steady stream of financial benefits over time.

Awareness program for top management and all the staff (1 hour/month)	LKR 60,000 (USD 321)
Streamlining and executing food waste reduction strategies (1 hour/week)	LKR 60,000 (USD 321)
Conduct FW quantification (3 employees – total 6 hours/day)	LKR 360,000 (USD 1,925)
Hiring a research intern for data recording and analysis	LKR 360,000 (USD 1,925)
Assessing the weekly progress at the departmental level (1 hour/week)	LKR 60,000 (USD 321)
Cost of preparing dishes/items from unused food (LKR 35,000/month)	LKR 420,000 (USD 2,246)
Additional cost of purchasing graded ingredients (LKR 30,000 /month)	LKR 360,000 (USD 1,925)
<b>Total annual costs in the first year</b>	<b>LKR 1.68 million (USD 8,984)</b>

**BENEFITS/RETURN**

The major benefits are the financial return due to reduced FW generation and additional revenue earned from the sale of alternative food/dishes prepared using unsold/unused food. There were no savings in terms of waste management fees as FW, in Colombo, is usually collected for free by pig farmers.

Saving due to FW reduction (per capita waste reduction from 565 g to 200 g per day)	LKR 6.78 million (USD 36,257)
Additional income/saving from sale/use of value-added products (Average LKR 16,250 [USD 87] per month)	LKR 195,000 (USD 1,043)
<b>Total return</b>	<b>LKR 6.97 million (USD 37,273)</b>

**Annual Return on Investment (ROI)**

$$\text{ROI} = \frac{\text{Net return}}{\text{Cost}} \times 100 = \frac{(6.97 - 1.68)}{1.68} \times 100 = 315\%$$

## STATUS AND EFFECTIVENESS OF FW REDUCTION INTERVENTIONS (I.E., PHASE 4)

We revisited the hotel in March 2021, before the third wave of Covid-19, to conduct the monitoring and evaluation of the adoption rate and implementation results for the recommended interventions in August 2020. The findings are summarized in Table 1. The hotel management continued FW measurement to maintain the average per capita FW generation in the range of 120–140 g/day, as shown by the data from January to March 2021. It is encouraging to note that the hotel was sufficiently incentivized by the financial gain realized to introduce even further innovations and strategies for FW prevention and reduction.

## FROM EVIDENCE, TO SHIFTING PRACTICE TO POLICY CONSIDERATIONS

Sri Lanka is a growing economy experiencing a mounting problem related to FW. In the meantime, the government is under pressure to fulfil its global and national commitments on the complex issues of climate change, food security, poverty alleviation and meeting the targets of the SDGs, including Target 12.3 (by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses). Developing food policies to address FW is particularly important because a large share of it is derived from fresh fruit, vegetables, meat and dairy products, and cooked foods, which have embedded nutrition and a short shelf-life.

Past studies indicate that there is not only a robust business case for companies to reduce FW but also a non-financial business case based on strategic and non-financial motivators such as waste regulations, environmental sustainability, food security, stakeholder relationships, brand recognition and a sense of ethical responsibility (Clowes et al. 2018).



Bakery food waste generated in the case study hotel in Colombo, Sri Lanka  
(photo: Kalpana Lakshmi/IWMI)

This case study provides an example where financial (i.e., a sound ROI/cost-benefit ratio) as well as non-financial mechanisms (i.e., brand recognition and sense of ethical responsibility) have driven the implementation of FW prevention and reduction actions in the hotel sector. These actions have been adopted as a voluntary commitment by the hotel. Similarly, case studies conducted by FAO and IWMI (2021c) discovered that the private sector, particularly hotels and supermarkets, already adopt certain strategies to reduce, reuse and recycle food waste as voluntary commitments and/or under Corporate Social Responsibility (CSR) efforts (Reitemeier et al. 2021). Such evidence is essential for scaling up strategies.

FW quantification initiatives have multifaceted effects on people's values and behaviors. They can provide participants with an understanding of the scale of the problem and causes while

generating motivation to invest in logistical improvements that would encourage prevention. Inventory management and production planning have a significant impact on FW reduction in food services. Tracking and analysis of the FW allow for sensitization of the issues associated with FW in terms of social, economic and environmental impacts. FW quantification also facilitates the estimation of economic consequences (i.e., the costs of FW) which can, along with awareness of social or environmental consequences, drive long-term behavior change.

Governance frameworks (e.g., roadmaps, action plans, agreements and strategies) mandating FW quantification at the food business operations level, coupled with a regular reporting mechanism in place, can prompt great attitude and behavior changes while incentivizing the adoption of voluntary commitments towards prevention and reduction.



TABLE 1. STATUS OF FW REDUCTION MEASURES BY MARCH 2021

Initial interventions in August 2020	Status as of March 2021	Reason(s) for the changes
Appointing a task force to monitor and manage FW	The task force was restructured to represent the entire food service function of the hotel. It is chaired by the hygiene manager with representation from the hotel's kitchen department, kitchen stewarding department, food and beverages, and cafeterias (i.e., the cafeteria coordinator).	To establish a formal structure for rigorous monitoring and implementation.
Conducting staff awareness and capacity building	The hotel has created a new initiative with a broader framework of sustainability. The task of awareness creation and capacity building is part of this program. Staff awareness programs are conducted for approximately half an hour per month. Posters have been developed to educate the customers not to waste food, with slogans such as "only serve what you can eat."	To bring all the relevant activities under an established system with a sense of responsibility.
Measuring FW at source daily	Continuing as usual.	
Displaying the measured FW values at source and reporting the FW quantity at the monthly meetings	Displaying in each point is not practiced currently, but this is under consideration. However, FW data is circulated daily to each department through a WhatsApp group and trends are being presented at the monthly meeting attended by the top management and the relevant staff representing each department.	The installment of displays required some additional investment. This is being considered under the new sustainability initiative.
Purchasing of graded food items/ingredients	Purchasing of graded products is currently limited to 60% of the ingredients bought.	Purchasing 100% graded items is not practicable, as certain items are required in full to prepare some dishes; for example, a whole fish is needed to get specific fish cuts.
Preparing alternative foods from unconsumed edible portions	Continuing with more innovative approaches.	There is a demand for such products due to affordable price, taste and texture.
Repurposing inedible food portions through value addition	This practice is continuing. In addition, the hotel has conducted a competition among the staff for alternative dish ideas from what is considered to be inedible food portions (e.g., watermelon peels), without compromising food safety. Innovations were identified for pickles, etc.	The hotel is in the process of registering with 'Global Good Market', a market platform that connects buyers and sellers ( <a href="https://www.goodmarket.global/info/">https://www.goodmarket.global/info/</a> ) and has a reserved a stall to sell the surplus value-added foods such as pickles and marmalades.
Dedicated staff for FW data recording and analysis	Currently, the practice is ongoing, but the hotel is in the process of hiring dedicated staff to undertake the task.	To make it more efficient through empowered and devoted staff.

## REFERENCES

- Arachchige, U.S.P.R.; Heshanka, S.; Peiris, H.I.S.; Udakumbura, M.G.P.M.; Nishantha, P.G.U. 2019. Proposed model for solid waste management in Sri Lanka. *International Journal of Scientific & Technology Research* 8(12). Available at <http://www.ijstr.org/final-print/dec2019/Proposed-Model-For-Solid-Waste-Management-In-Sri-Lanka.pdf> (accessed December 2019).
- CEC (Commission for Environmental Cooperation). 2019. *Technical report: Quantifying food loss and waste and its impacts*. Montreal, Canada: Commission for Environmental Cooperation. 129p. Available at <http://www3.cec.org/islandora/en/item/11813-technical-report-quantifying-food-loss-and-waste-and-its-impacts> (accessed September 15, 2021).
- Chalak, A.; Abou-Daher, C.; Chaaban, J.; Abiad, M.G. 2016. The global economic and regulatory determinants of household food waste generation: A cross-country analysis. *Waste Management* 48(2016): 418–422. <https://doi.org/10.1016/j.wasman.2015.11.040>
- Clowes, A.; Mitchell, P.; Hanson, C. 2018. *The business case for reducing food loss and waste: Catering*. A report on behalf of Champions 12.3. Washington, DC, USA: Champions 12.3. Available at <https://champions123.org/sites/default/files/2020-07/business-case-reducing-food-loss-waste-catering.pdf> (accessed September 15, 2021).
- Eriksson, M.; Malefors, C.; Callewaert, P.; Hartikainen, H.; Pietiläinen, O.; Strid, I. 2019. What gets measured gets managed – Or does it? Connection between food waste quantification and food waste reduction in the hospitality sector. *Resources, Conservation & Recycling: X* 4: 100021. <https://doi.org/10.1016/j.rcrx.2019.100021>
- Fan, S. 2017. *Reducing food loss is key to end hunger and undernutrition by 2025*. IFPRI Blog, September 5, 2017. Washington, DC, USA: International Food Policy Research Institute (IFPRI). Available at <https://www.ifpri.org/blog/reducing-food-loss-key-end-hunger-and-undernutrition-2025> (accessed on November 1, 2020).
- FAO (Food and Agriculture Organization of the United Nations). 2019. *The state of food and agriculture 2019: Moving forward on food loss and waste reduction*. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO). License: CC BY-NC-SA 3.0 IGO. Available at <http://www.fao.org/3/ca6030en/ca6030en.pdf> (accessed September 15, 2021).
- FAO; IWMI (International Water Management Institute). 2021a. *Urban stakeholder analysis for food waste prevention and reduction in Sri Lanka*. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO); Colombo, Sri Lanka: International Water Management Institute (IWMI). Available at [http://waterdata.iwmi.org/Applications/sanitation/reports/Report%20Institutions\\_First%20draft.pdf](http://waterdata.iwmi.org/Applications/sanitation/reports/Report%20Institutions_First%20draft.pdf) (accessed September 15, 2021).
- FAO; IWMI. 2021b. *Quantitative analysis of food waste (i.e. wholesale to households) in Colombo-Sri Lanka*. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO); Colombo, Sri Lanka: International Water Management Institute (IWMI). Forthcoming.
- FAO; IWMI. 2021c. *Case studies on food waste quantification, characterization, and identification of prevention and reduction options in Colombo-Sri Lanka*. Rome, Italy: Food and Agriculture Organization of the United Nations (FAO); Colombo, Sri Lanka: International Water Management Institute (IWMI). Forthcoming.
- Reitemeier, M.; Aheeyar, M.; Drechsel, P. 2021. Perceptions of food waste reduction in Sri Lanka's commercial capital, Colombo. *Sustainability* 13(2): 838. <https://doi.org/10.3390/su13020838>
- Tostivint, C.; Östergren, K.; Quested, T.; Soethoudt, J.M.; Stenmarck, A.; Svanes, E.; O'Connor, C. 2016. *Food waste quantification manual to monitor food waste amounts and progression*. FUSIONS EU project. Paris, France: BIO by Deloitte. Available at <http://www.eu-fusions.org/index.php/publications> (accessed September 15, 2021).
- United Nations. 2015. *Transforming our world: The 2030 agenda for sustainable development*. A/RES/70/1. New York, USA: United Nations. Available at <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> (accessed September 15, 2021).
- WFP (World Food Programme). 2021. *WFP Sri Lanka - Country brief*. Available at <https://www.wfp.org/countries/sri-lanka> (accessed September 15, 2021).
- Xue, L.; Liu, G.; Parfitt, J.; Liu, X.; Van Herpen, E.; Stenmarck, Å.; O'Connor, C.; Östergren, K.; Cheng, S. 2017. Missing food, missing data? A critical review of global food losses and food waste data. *Environmental Science & Technology* 51(12): 6618–6633. <https://doi.org/10.1021/acs.est.7b00401>
- Yin, R.K. 2003. *Case study research: Design and methods*. 3<sup>rd</sup> Edition. California, USA: Sage Publications.

## SOURCE

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