

# UNEP PILOT DATA COLLECTION ON FOOD WASTE REPORT

**12** RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



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## Contents

Introduction.....	2
An overview of the UNEP Food Waste Index Report 2021.....	2
Description of the UNEP Food Waste Questionnaire.....	3
Countries specific data input to the questionnaire.....	4
Japan food waste data.....	4
Argentina food waste data.....	5
Mexico food waste data.....	5
USA food waste data.....	6
Palestine food waste data.....	6
Mauritius food waste data.....	6
Ecuador food waste data.....	7
Countries that submitted different data.....	7
Countries for which data is not yet available.....	7
The data collection status with other countries.....	8
Difficulties encountered in completing the questionnaire.....	8
Recommendations for improving the questionnaire.....	8
Concluding remarks.....	9



Retail trade



Food service



Households

## Introduction

The United Nations Environment Programme (UNEP) initiated a pilot data collection project on food waste in January 2023 with the objective to gather information and insights on food waste for future initiatives, and to support reporting on Sustainable Development Goal (SDG) indicator 12.3.1(b), which measures the food waste index, as well as support the UNEP Food Waste Index Report 2023. UNEP has reached out to various agencies in twenty-eight countries, including Ghana, Mauritius, Uganda, South Africa, Nigeria, China, Japan, Malaysia, Thailand, Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Dominican Republic, Paraguay, Uruguay, Bahrain, Jordan, Saudi Arabia, Lebanon, Oman, Palestine, Qatar, the United Arab Emirates (UAE), and the United States of America (USA). They were asked to provide their input and feedback to the data collection questionnaire by an initial designated deadline of 20 March 2023. However, upon request by some countries this deadline was extended. Attached to the invitation email were three key documents – an official invitation letter, a questionnaire on food waste, and a list of national experts participating in UNEP's Regional Food Waste Working Groups on behalf of their countries.

- ✚ The **invitation letter** served as an introduction to the pilot data collection project and underscored the importance of collaboration in addressing the global issue of food waste. The letter specifically invited the countries to contribute their insights and expertise to this effort.
- ✚ The second document was a **questionnaire on food waste**, which required input from the countries. The purpose of this questionnaire was to gather information and data on food waste, covering various aspects starting by a guidance sheet (see the figure below) which includes introduction, steps to follow and description of tables; a list of definitions and classifications sheet; and another two sheets to fill in with data on food waste generation and management (Table F1) and supplementary information (Table F2). By completing this questionnaire, the recipient's agencies would help UNEP in its mission to tackle food waste more effectively.
- ✚ Lastly, the **list of national experts** participating in UNEP's Regional Food Waste Working Groups was included to involve the individuals from the participating countries who could contribute to this data collection initiative. This list could serve as a point of reference for the national statistical offices and the SDG focal points, allowing them to connect and collaborate with these experts during the project.

In summary, the email informed the countries about UNEP's pilot data collection project on food waste and invited them to participate by providing their feedback and completing the questionnaire. The list of national experts offered an opportunity for collaboration and networking with other professionals working on this issue at a regional level.

## An overview of the UNEP Food Waste Index Report 2021

The UNEP Food Waste Index Report 2021 is the first UNEP publication that focuses on the issue of food waste and its impact on the environment and food security. It highlights the commitment of Sustainable Development Goal 12.3 to halve food waste and reduce food loss by 2030. The report estimates that food waste from households, retail establishments, and the food service industry totals 931 million tonnes each year. This amount of waste significantly contributes to greenhouse gas emissions and exacerbates the three planetary crises of climate change, nature and biodiversity loss, and pollution and waste.

The report provides a comprehensive analysis of food waste data, including measurement methodology and data coverage. It emphasizes the need to address consumer behaviour in all cultural

contexts to achieve the target of reducing food waste. However, previous estimates of consumer food waste have significantly underestimated its scale. The report also acknowledges that few governments have robust data on food waste, making it difficult for them to prioritize and take action effectively.

The methodology presented in the report offers a way for countries to measure food waste at the household, food service, and retail levels. This will help track national progress towards the 2030 target and report on SDG 12.3. It is estimated that 61% of food waste comes from households, 26% from the food service industry, and 13% from retail establishments. The report estimates that around 17% of total global food production may be wasted, with 11% in households, 5% in the food service industry, and 2% in retail.

The report emphasizes the importance of measuring food waste, as it provides evidence for governments to develop strategies and prioritize efforts to reduce waste. It also highlights the benefits of measurement, including the ability to track progress over time and make meaningful comparisons among countries. The report concludes by stating that the methodology presented will enable countries to generate strong evidence and guide national strategies for preventing food waste and meeting the SDG target. The full report can be downloaded [here](#).

## Description of the UNEP Food Waste Questionnaire

The UNEP Food Waste Questionnaire was developed by UNEP in consultation with United Nations Statistics Division (UNSD) and Food and Agriculture Organization (FAO) using the concept of the UNSD-UNEP Questionnaire on Environment Statistics (waste section).

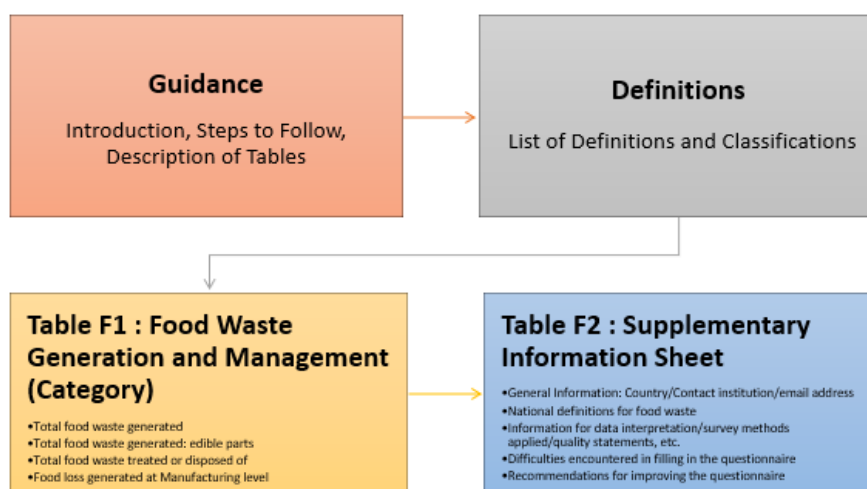


Figure 1. The UNEP Food Waste questionnaire content flowchart

In the list of definitions, the questionnaire provides information on co-digestion, which refers to the simultaneous anaerobic digestion of food loss and waste and other organic material in one digester. It explains that food waste includes both edible and inedible parts removed from the human food supply chain in sectors such as retail, food service, and households. It emphasizes that the definition of food waste is based on whether the food was intended for human consumption, rather than whether it is edible or not at the point of disposal. It mentions Food Waste Index, which measures total food waste at the retail and consumer level, excluding materials that are directly recycled or reused at the place of generation or discharged into ambient water or air as wastewater or air pollution. It clarifies that

food waste includes not only solid food but also beverages and substances used in the manufacture, preparation, or treatment of food.

The questionnaire also provides information on the International Standard Industrial Classification (ISIC) codes relevant to the different sectors involved in food waste generation and management. These include manufacture of food products, water transport, warehousing and support activities for transportation, land transport and transport via pipelines, air transport, manufacture of beverages, and retail trade. It was clarified that the data collected in the questionnaire will be analysed by the United Nations Environment Programme (UNEP) and used in international work.

The questionnaire sheet itself focuses on collecting data on food waste generated during different stages of the supply chain, including retail trade, food service, and households. It also asks for information on how food waste is treated and disposed of. The questionnaire encourages countries to provide complementary sources of information such as website addresses and publications related to food waste. It highlights the importance of collecting data on food waste to support reporting on Sustainable Development Goal indicator 12.3.1(b) "Food Waste Index."

## Countries specific data input to the questionnaire

At the end of the pilot data collection, seven out of 28 countries provided specific data according to the questionnaire:

### Japan food waste data

Japan provided information about food waste generation and management in the country from 2008 to 2021. The data included the total food waste generated, amounts generated by different sectors such as retail trade and food services, and the treatment or disposal methods for food waste. In 2020, the total food waste generated was 10,091,000 tonnes, which is a decrease compared to previous years. The breakdown of food waste generation by sector showed that the retail trade generated 1,110,000 tonnes of food waste, while the food service sector generated 1,506,000 tonnes. Households accounted for the majority of food waste generation with 7,475,000 tonnes. Japan also provided information on the amount of food waste edible parts. In 2020, the edible parts of food waste amounted to 3,880,000 tonnes. The breakdown by sector showed that retail trade generated 600,000 tonnes of edible food waste, food service sector generated 810,000 tonnes, and households generated 2,470,000 tonnes. Furthermore, the country included details on the treatment or disposal methods for food waste. In 2020, 42,000 tonnes of food waste went through co-digestion/anaerobic digestion, while 195,000 tonnes were composted/aerobic processed. Most of the food waste, 1,889,000 tonnes, was incinerated/combusted. There is no information available on the amount of food waste that went to landfill or sewer. Additionally, 489,000 tonnes of food waste were categorized as "other" in terms of disposal methods. In general, the data provided by Japan indicated that the retail and food service sectors accounted for a significant amount of food waste generation, while the manufacturing level also contributed a considerable portion of food loss.

In addition, Japan provided in the footnotes section, context information regarding the data and reporting of food waste in the country. For example, it mentioned that the 2020 data of incineration or combustion does not include information from households, as the source data for household waste will not be available until late spring or early summer of 2023. Japan began calculating the amount of food waste generated: edible parts in 2012. The next estimates for food waste in Japan are scheduled to be released in late spring or early summer of 2023. Overall, the data collected provide a comprehensive overview of food waste generation and management in Japan, including specific data for different sectors and disposal methods.

## Argentina food waste data

Argentina provided data on food waste generation and management, specifically based on the years 2015, 2017, 2019, and 2021. In 2015, the total food waste generated was 1,500,000 tonnes. This total comprises three categories. The first category is the amount of food waste generated by the retail trade, excluding motor vehicles and motorcycles, with the industry classification code ISIC 47. The specific amounts generated by this sector were not provided for the years 2015 and 2021. However, for the year 2019, the amount was listed as 123,434 tonnes, and for 2021, it was 65,440 tonnes. The second category is food waste generated by the food service industry, with industry classification codes ranging from ISIC 49-52, 55, 56, 84, and 85. No specific amounts were given for this category for any of the years. The third and final category is food waste generated by households, for which the specific amounts were not provided, except for the year 2017, which was listed as 9,500 tonnes.

In addition, Argentina provided in the footnotes section, context information regarding the data and reporting of food waste in the country. For example, it indicated that in 2015, the Ministry of Agriculture, Livestock and Fisheries made the first estimate on food losses and waste in Argentina, where seven food sectors were prioritized (meat -beef, poultry and pork-, cereals -wheat and corn; fruits -pepita, stone fruit and citrus; milk; oilseeds -soybean and sunflower-; and potato). The methodology used for the estimation of Argentina's baseline took as a reference the study conducted by the Swedish Institute of Food and Biotechnology (SIK) for the FAO (2011), in which a global measurement of food loss and waste was made. Conversion factors were established based on sources and informants in each sector, while the allocation factors and proportions of fresh and processed fruits and vegetables were derived from local sources by product group. The data is published [here](#). Overall, the data collected from Argentina includes the total food waste generated over time and provides some information on the distribution between different categories.

## Mexico food waste data

Mexico provided information on food waste generation and management for the years 2018 to 2021. The total food waste generated in the country increased from 20,418,214 tonnes in 2018 (34% of national food production) to 31,000,000 tonnes in 2019. The amounts generated by food service and households were both 11,000,000 tonnes in 2018, and retail trade equally generated 11,000,000 tonnes of food waste in 2019. However, it was indicated that there is no data available for 2020 and 2021 for some categories such as total food waste generated, total food waste generated by edible parts, and total food waste treated or disposed of.

It was indicated that in 2020, 135, 000 tonnes of food products were rescued, acquired and distributed through BAMx, while in 2021 149, 000 tonnes of foods were collected through BAMx and 190.8 tonnes from Itacate – CEDA. "Itacate" Program, implemented by the Central de Abasto (CEDA), in collaboration with the Secretariats of Economic Development (SEDECO) and Inclusion and Social Welfare (SIBISO) of the Government of Mexico City, seeks to reduce the waste of food, avoid contamination of products by their disposal in waste containers and use them as food for the vulnerable population of the city, through a food collection and distribution centre. Since 2020, 80,000 food rations have been provided in 600 soup kitchens and a collaboration agreement was also signed with the Women's Secretariat in order to provide food to specialized shelters for women victims of gender violence, their daughters and sons.

The Network of Food Banks of Mexico (BAMx) is a non-profit and non-partisan CSO (Civil Society Organization), made up of 53 Food Banks, with a presence in 24 states, which rescue food throughout the entire value chain to bring it to families, communities and institutions that need it and thus improve food and nutrition in Mexico.

### USA food waste data

The USA provided information on the generation and treatment of food waste only in the year 2019. The total food waste generated in this year was 51,931,211 tonnes. This waste was categorized into three main sources, namely Retail trade (ISIC 47), Food Service (ISIC 49-52, 55, 56, 84, 85), and Households. The Retail trade sector generated 5,713,773 tonnes of food waste, while the Food Service sector generated 22,168,122 tonnes and Households generated 24,049,316 tonnes. However, the country did not provide any specific figures for the edible parts. Moreover, for the next section focused on the treatment and disposal of food waste, the total food waste treated or disposed of was 51,931,208 tonnes, slightly lower than the total food waste generated. This waste was categorized into various treatment methods. The codigestion/anaerobic digestion method received 488,692 tonnes of food waste. The composting/aerobic process method received 2,998,878 tonnes, including 887,455 tonnes from households specifically. The incineration/combustion method received 8,753,415 tonnes. Most of the food waste, 35,954,539 tonnes, was sent to landfilling. A significant amount, 3,607,397 tonnes, was sent to the Sewer. Lastly, there was a portion of food waste, 128,286 tonnes, which was to land application.

In addition to the food waste generated by the mentioned sectors, there was also food loss generated at the Manufacturing level, totalling 21,842,689 tonnes. This figure provides insight into the amount of food waste that occurs during the production process. Overall, this data presents detailed information on the generation and treatment of food waste in 2019, highlighting its sources and disposal methods.

### Palestine food waste data

The country provided data on food waste generation and management over the years from 2005 to 2022. The total waste generated increased steadily from 728,060 tonnes in 2005 to 1,002,174 tonnes in 2016, with a slight decrease to 944,000 tonnes in 2017. In 2022, the figure refers specifically to the total food waste generated, comprising of waste generated by retail trade, food service, and households and is 394,565 tonnes. This amount was calculated based on estimations depending on the per capita production of waste (1 kg/cap/day for the west bank, and 0.75 kg/c/day for gaza strip). Moreover, the total food waste that was treated or disposed of amounted to 351,163 tonnes in 2022, as waste sent for landfilling. However, it should be clarified that the data for the years before 2022 refers to organic waste, which includes food waste, papers, and garden wastes. Therefore, for the year 2022, the figure specifically refers to food waste, which is solely valid with regard to the objective of the present data collection. Nevertheless, Palestine lacks specific details on the amounts of food waste treated or disposed of, as well as the data for food waste generated by retail trade, households, and the food service sector.

### Mauritius food waste data

Mauritius provided data on the total food waste generated in tonnes for the years 2018, 2019, 2020, 2021, and 2022. The total food waste generated in 2018 was 1.141 tonnes, which increased to 64.020 tonnes in 2019. In 2020, the total food waste generated was 237.707 tonnes, followed by 206.731 tonnes in 2021, and 177.545 tonnes in 2022. This data is based on the exact quantity of food saved from companies and redistributed to NGOs. "Food saved is food that cannot be sold by companies and thus would have gone to waste if not collected for donation to people in need". However, specific data regarding the amounts of food waste generated by retail trade, food service, and households was not provided. Additionally, no data was provided, such as amounts by treatment/disposal methods or food loss generated at the manufacturing level.

## Ecuador food waste data

The country provided information regarding food loss generated at the manufacturing level (331,205 tonnes) which corresponds to preliminary data subject to verification, which were obtained from the study "Estimation of the Food Losses Index (IPA) - Ecuador" worked by the Food and Agriculture Organization of the United Nations (FAO) and the Ministry of Agriculture and Livestock (MAG). The National Institute of Statistics and Census (INEC) collects statistical information on solid waste management of the Municipal Decentralized Autonomous Governments, however, the statistical operation in question does not have specific data on the requested information (food waste generated, food waste treated or disposed of), but the available variables that are related to the subject of consultation could be explored, such as characterization of solid waste produced (organic - inorganic), solid waste collected, differentiated collection, and final disposal. This information and all the variables investigated are available on INEC's web portal, at the following [link](#).

## Countries that submitted different data

Two countries, Nigeria and Costa Rica, provided data/information which did not correspond to that requested in the questionnaire.

Nigeria, for example, submitted an Excel file containing various tables of data on water and sanitation in Nigeria, collected during the Nigeria MICS survey in 2021. The tables cover topics such as the use of improved and unimproved water sources, time spent collecting water, availability of sufficient drinking water, household water treatment, handwashing facilities, type of sanitation facilities used, emptying and removal of excreta, disposal of child's faeces, and menstrual hygiene management. These data provide an overview of water and sanitation conditions in Nigeria and can be a valuable resource for understanding challenges and progress in this area but are not relevant to the present pilot data collection.

Costa Rica shared various initiatives and resources related to food waste reduction in the country, such as the Norma sobre Buenas Prácticas para la prevención de reducción de PDA (Good Practices for the Prevention and Reduction of Food Loss and Waste), the Guía para la Medición de Desperdicio de alimentos en cocinas institucionales o comerciales (Guide for Measuring Food Waste in Institutional or Commercial Kitchens), and the Red Costarricense para la Disminución de Pérdida y Desperdicio de Alimentos (Costa Rican Network for the Reduction of Food Loss and Waste). It also provided information on the national definition of food waste, the methodology for data collection, and the difficulties encountered in filling in the questionnaire, particularly the lack of national studies that prevent the questionnaire from being filled out as expected.

## Countries for which data is not yet available

Regarding the status of data collection for other countries, it should be noted that six countries responded stating that their data is not yet available. These include Ghana, the UAE, Saudi Arabia, Malaysia, Brazil, and Colombia. The UAE, however, informed about their initiatives and innovations in collaboration with key stakeholders aimed at reducing food waste and its impact in the country. Its Ministry of Climate Change and Environment is working with innovative tech companies to address this issue. Additionally, there is an emphasis on behaviour change to address food loss and waste. The regulatory and policy aspect of this initiative includes establishing a baseline for food loss and waste in the UAE. Malaysia, on the other hand, informed that its Ministry of Local Government Development has appointed a consultant to collect data to establish baseline data on Malaysia's Food Waste Index, which should be ready by June 2024. As for Brazil, the country plans to report data collected from street markets in three cities (North, Northeast and South regions); while Colombia is carrying out pilot

tests to measure food waste in the industry, commerce and service sectors and hopes to communicate the results once ready.

## The data collection status with other countries

In response to the request for data, six countries replied that they did not have data, comprising South Africa, Bahrain, Lebanon, Dominican Republic, Chile, and Uruguay. As for Chile, after evaluating the questionnaire, they concluded that they do not have information with the level of disaggregation necessary to be able to respond to the request. In general, retailers and producers of industrial and municipal waste do not specify this detail in the LER code lists that are used in the National Non-Hazardous Waste Declaration System [SINADER], so they do not have this information for the moment. Thus, they found that it is an opportunity for them to evaluate their LER lists used for the capture and reporting processes, with the idea of moving forward in structuring the information before future requests. Additionally, Uruguay informed that they are currently working on the National Strategy for the Prevention and Reduction of Food Loss and Waste. In this context, they are working specifically to improve and strengthen the information system on food loss and waste. Currently, the country does not have robust estimates or quantifications of Food Waste. The Universidad de la República (UDELAR) published a groundbreaking paper last year estimating food waste at household level: [Estimación del desperdicio de alimentos en los hogares uruguayos](#). However, this is an initial approach to the subject, and it is quite possible that the amount of food loss at the household level is underestimated. Moreover, it should be noted that eight countries did not respond to the data collection invitation or follow-up emails. These are Uganda, China, Thailand, Jordan, Oman, Qatar, and Paraguay.

## Difficulties encountered in completing the questionnaire

Feedback was provided by individuals from different countries, including Japan, Argentina, Mexico, Mauritius, Palestine, Ecuador, Costa Rica, and the USA. This indicated that it is difficult to obtain accurate statistical information on food waste in agrifood systems. It also indicated that there was a lack of registration and publication of such information, making it difficult to complete the questionnaire. The available information on each stage of the value chain varies in terms of quantity, quality, and precision. The feedback emphasized the need for a systemic approach to identify the causes of food waste, rather than addressing each stage of the supply chain separately. It also noted that the questionnaire only focuses on the waste itself and does not consider the potential for reusing or incorporating it back into the chain, such as through food banks in Mexico. There may still be some confusion, possibility of flexibility in terms of the alternative units in which it could be reported (kg per capita year, or ton/year, etc) in a country like Costa Rica. The comments also highlighted the difficulty in confirming the classification method used, as it differs from the one used in Japan. Furthermore, the definitions and analysis methods used do not align with the studies conducted in a country like Mexico. The remarks also mentioned the need for handling the different stages of the supply chain, the edible parts of food waste, and how it is treated and disposed of throughout the year separately. Overall, the countries comments acknowledged the complexities and discrepancies in gathering information on food waste in their agri-food systems and therefore provided some recommendations for improving the questionnaire.

## Country recommendations for improving the questionnaire

Countries provided feedback and recommendations for improving the questionnaire related to data collection for the SDG indicator 12.3.1(b), which focuses on reducing food waste and promoting sustainable production and consumption. These include a confusion regarding the ISIC (International Standard Industrial Classification) and how to interpret the linked materials. It was suggested that



there may be a need for clarification or additional instructions on how to understand and utilize the ISIC classification. In addition, a respondent was particularly puzzled about why there is a specific data request for household composting. It urged the inclusion of "land application" in the "food waste treated or disposed of" category. This respondent also advised to specify more clearly that lines 1 and 9 of the questionnaire should be the same, because some may interpret the term "generation" (line 1) as including other destinations like animal feed, rendering, etc. In addition, it was suggested that data collection should be done with main companies per size and then averaged over the entire industry. This recommendation implies the importance of including a comprehensive list of destinations to ensure accurate and representative data collection.

Overall, the feedback and recommendations received from countries highlighted areas where the questionnaire can be improved for more effective data collection on the SDG 12.3.1(b). These suggestions include providing clearer instructions on the ISIC classification, including a comprehensive list of destinations for data collection, and expanding the food waste treatment and disposal categories to encompass different waste management methods. Lastly, it was recommended that it is necessary to go through an awareness-raising and training process like the UNEP workshops in 2022 in order to standardize the criteria, techniques and methods with the actors involved.

## Concluding remarks

The pilot data collection work on food waste lasted approximately seven months and was carried out in collaboration with the UNEP regional offices for Africa, Asia-Pacific, Western Asia and Latin America and the Caribbean (LAC). As the subject is relatively new, there is currently a weak connection and lack of coordination between National Statistical Offices (NSOs) and food waste experts. This lack of coordination hampers efforts to collect data and achieve specific objectives in addressing food waste. It is therefore possible that other data exist at the local or sectoral level that have not yet been identified. Countries estimate food waste at different stages of the supply chain, and many do not currently have robust food waste estimates or quantifications. As such, data from seven of the 28 pilot countries could be used to report on SDG indicator 12.3.1(b).

However, this pilot data collection exercise offered an opportunity for many countries to provide updates to their list of focal points to consider for any future action and increase internal awareness on food waste data collection and the need for coordination between different agencies. The pilot exercise also demonstrated the importance of having single data collection tool to integrate a culture of standardization in data collection.