



Food and Agriculture
Organization of the
United Nations

Voluntary Code of Conduct for **Food Loss and Waste Reduction**



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Required citation:

FAO. 2022. *Voluntary Code of Conduct for Food Loss and Waste Reduction*. Rome. <https://doi.org/10.4060/cb9433en>

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ISBN 978-92-5-136030-9

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FOREWORD

Food loss and waste (FLW) has many implications for the most urgent challenges of our time. Significant levels of FLW occur along value chains linking agrifood production to food consumption. At the same time, hundreds of millions of people on the planet are undernourished and billions cannot afford a healthy diet. FLW has a great impact on the climate crisis, social-economic consequence and exerts immense pressure on the world's natural resources, ecosystems and biodiversity, putting at risk our ability of future generations to ensure food security and livelihoods without crossing critical thresholds of the sustainability of our shared planet.

Transformation of agrifood systems is central to achieving the 2030 Agenda for Sustainable Development. Poorly functioning agrifood systems and less science-based lifestyles generate FLW. The reduction of FLW is one of the concrete actions needed to transform our agrifood systems for people, planet and prosperity.

The Voluntary Code of Conduct for Food Loss and Waste Reduction (CoC), endorsed by FAO Members, sets out a generic framework of actions and guiding principles to reduce FLW, while supporting the transformation of agrifood systems to be more efficient, more inclusive, more resilient and more sustainable.

Governments can use the framework provided by the CoC as a basis for the development of strategies, policies and legislations, which are critical elements of intervention packages aimed at effectively and sustainably reducing FLW at the national and regional level. The framework can also serve for the formulation of programmes on FLW reduction and for the preparation of technical guidelines for use by practitioners.

The CoC was developed through a participatory and inclusive bottom-up process, which included consultations with the broad range of relevant stakeholders worldwide, and which led to the identification of globally-relevant, yet locally-adaptable, consensus principles and guidance as set out in the CoC.

This very timely and much needed international instrument will contribute to accelerate progress towards the SDG 12.3 target '*to 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*'. The urgency of the moment is clear, considering that we have 8 years left to achieve this target within a context that has become even more challenging by crises and stressors like the COVID-19 pandemic, economic downturns, the climate crisis, conflict and other humanitarian emergencies.

FAO Members must now take up the challenge of putting a systematic approach in place to implement the CoC. Working in collaboration with all stakeholders and partners, FAO stands firmly committed to supporting these efforts, in line with our goal to contribute to the 2030 Agenda through transforming agrifood systems for better production, better nutrition, a better environment and a better life for all, leaving no one behind.



QU Dongyu
FAO Director-General

ABBREVIATIONS AND ACRONYMS

AMR	antimicrobial resistance
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CFS	Committee on World Food Security
COAG	Committee on Agriculture
CoC	Voluntary Code of Conduct for Food Loss and Waste Reduction
CSO	civil society organization
FAO	Food and Agriculture Organization of the United Nations
FLI	Food Loss Index
FLW	food loss and waste
FWI	Food Waste Index
GDP	gross domestic product
GHP	good hygiene practices
GMP	good manufacturing practices
ICN2	Second International Conference on Nutrition
ICT	information and communications technology
NDC	nationally determined contribution
PPP	public-private partnerships
R&D	research and development
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SME	small and medium enterprises
UN	United Nations
UNEP	United Nations Environment Programme
UNSD	United Nations Statistics Division
USD	United States Dollars
WTO	World Trade Organization

INTRODUCTION

Background

1. By 2050, the world's population is projected to reach nearly 10 billion people with close to 70 percent of them residing in urban areas (United Nations, 2018). Together with income growth, these trends are expected to create a significant increase in the global demand for food and change consumption patterns towards more resource intensive and perishable food products.
2. More than 3 billion people around the world do not have access to healthy diets. Nearly 690 million suffer from hunger, while 2 billion consume unhealthy diets that cause micronutrient deficiencies and contribute to a substantial rise in the incidence of diet-related obesity and diet related non-communicable diseases, such as coronary heart disease, stroke and diabetes (FAO, IFAD, UNICEF, WFP and WHO, 2020). Furthermore, with an estimated 600 million cases of foodborne illnesses and 400 000 deaths annually across the globe, unsafe food is a threat to human health and economies, disproportionately affecting vulnerable and marginalized people, especially women and children, populations affected by conflict, and migrants (WHO, 2015).
3. Under current food consumption patterns, diet-related health costs linked to mortality and non-communicable diseases are projected to exceed USD 1.3 trillion per year by 2030. On the other hand, the diet-related social cost of greenhouse gas emissions associated with current dietary patterns is estimated to be more than USD 1.7 trillion per year by 2030 (FAO, IFAD, UNICEF, WFP and WHO, 2020).
4. Scaling up the global food system to feed the growing global population through the year 2050 and beyond is an overarching concern. However, under business-as-usual scenarios, the associated pressures on the natural resource base, and the environmental impacts of increasing production and satisfying food consumption patterns, would eliminate or put at risk any chance of achieving the goals of Agenda 2030 (United Nations, 2019).
5. Global food systems face a number of other inter-connected challenges. These include: lack of resilience to the impacts of climate change; barriers such as stringent quality requirements that hinder the participation of smallholder producers and small-scale agro-processors in local, national and global markets; and transboundary animal and plant pests and disease outbreaks. Further challenges comprise conflicts, protracted crises and natural disasters that disable agriculture livelihoods, undermine efforts to end hunger, food insecurity and malnutrition, and fuel displacement and migratory flows (FAO, 2017).
6. Within this context, developments in food systems are recognized to be among the key determinants of the extent to which most of the Sustainable Development Goals (SDGs) will be achieved (United Nations, 2019). Efforts are required to transition food systems onto a sustainable trajectory so they deliver safe, affordable and healthy diets to the world's rapidly growing population. At the same time, improvements should contribute to inclusive economic and social development, in ways that will not compromise the wellbeing and livelihoods of future generations through negative impacts on natural resources, ecosystems and the environment.

Food loss and waste: magnitude and causes

7. Food loss and waste (FLW) is a manifestation of poorly functioning food systems. It is widely recognized that significant levels of FLW occur in the food supply chain from production to consumption. Between the post-harvest and retail stages of the chain alone, up to 14 percent of food produced globally

undergoes quantitative food loss (FAO, 2019a), while 17 per cent of total global food production may be wasted at the retail, food-service and consumer stages (UNEP, 2021). Adding to this, although precise data are lacking, it is believed there are significant levels of quantitative food losses at the pre-harvest/catch/slaughter and harvest/catch/slaughter stages, and food quality losses across the entire food supply chain (FAO, 2011; Flanagan, Robertson and Hanson, 2019).

8. The causes of FLW range from micro-level or direct causes that generate FLW at specific stages of the food supply chain, meso-level or secondary causes across the food supply chain, and macro-level or systemic causes across the entire food system. Direct causes include inadequate inputs in production operations; poor scheduling and timing of harvesting operations; inappropriate production, harvesting and handling practices; and poor storage conditions and temperature management around perishable products. Other direct causes include inadequate conditions and marketing techniques at the retail stage, poor practices of food service providers and inappropriate consumer behaviour during food purchase, preparation and consumption (HLPE, 2014).
9. Secondary causes of FLW include the lack of or inadequate equipment, transport and storage capacity; poor organization, coordination and communication between food supply chain actors; inadequate infrastructure; and unsuitable conditions, practices and actions that generate FLW in downstream stages of the food supply chain. Other secondary causes arise from insufficient information, inability to anticipate market conditions, excessively stringent quality standards imposed by processors, retailers or target markets, and confusion arising from the limited understanding of different food date labels (HLPE, 2014).
10. Systemic causes lead to the emergence of secondary and direct causes of FLW along the food supply chain. Systemic causes include inadequacies in the institutional, policy and regulatory frameworks that are required to facilitate the coordination of actors, enable investments, and support the adoption of improved practices along the food supply chain (HLPE, 2014). As examples, FLW can result from inadequate policies that lead to unstable prices that in turn cause producers to leave produce unharvested in fields; excessively stringent food quality regulations that pose barriers against food producers and processors accessing markets for their products; and fiscal policies that lead to artificially distorted food prices that in turn reduce the attention consumers pay to avoid food waste.
11. Emergencies and crises such as pandemics, natural disasters and conflicts can disrupt local, regional and global food supply chains, which can lead to drastically increased levels of FLW.

Impacts of food loss and waste

12. FLW affects the sustainability of food systems, with negative impacts on the economy, food security and nutrition, and the environment. The annual market value of food that is lost or wasted at global level is estimated to be hundreds of billions of dollars. At the national level, the economic impact of FLW can manifest through a reduced gross domestic product (GDP) for the agriculture sector. The economic costs of FLW are also felt by households, which spend money on food that is eventually wasted, as well as by businesses along the food supply chain (HLPE, 2014).
13. Concerning the environment, FLW contributes to greenhouse gas emissions and represents a waste of resources used in food production, such as land, water and energy. FLW is responsible for an estimated 8 per cent of annual greenhouse gas emissions (FAO, 2015) and consumes one-quarter of freshwater used by agriculture each year (Kummu *et al.*, 2012). Furthermore, the production of food that is eventually lost or wasted uses significant expanses of land and contributes to the degradation of natural ecosystems and loss of biodiversity.

14. FLW can have an impact on food security and nutrition through reducing the global and local availability of food; through reducing food access for those food supply chain actors who face FLW-related economic and income losses; and through unsustainable use of natural resources on which future food production depends. FLW can also have an impact on food security and nutrition through quality and nutrient losses along food supply chains and on the stability of food supplies (HLPE, 2014).
15. Reducing FLW is, therefore, widely seen as an important way to reduce production costs and increase the efficiency of the food system, improve food security and nutrition and contribute towards environmental sustainability (FAO, 2019a). Reducing FLW also allays ethical and moral concerns some people have that FLW occurs while millions suffer from hunger and malnutrition, with adverse effects on the environment and the survival of future generations.

FLW reduction and the Sustainable Development Goals

16. FLW is a major global issue and is enshrined in SDG 12 (responsible consumption and production), which sets a specific target SDG 12.3 to “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” by 2030.
17. Improvements made to food systems to reduce FLW can contribute to achieving many other SDGs, such as SDG 2 (Zero Hunger); SDG 6 (sustainable water management); SDG 8 (decent work and economic growth); SDG 11 (sustainable cities and communities); SDG 12 (responsible consumption and production); SDG 13 (climate change); SDG 14 (marine resources) and SDG 15 (terrestrial ecosystems, forestry, biodiversity). At the same time, progress made on other SDGs such as SDG 5 (gender equality); SDG 7 (affordable and clean energy); SDG 9 (infrastructure, industry and innovation) and SDG 17 (partnerships), can facilitate the reduction of FLW (FAO, 2019a).

Request of the Committee on Agriculture

18. The idea to develop an international code of conduct for FLW reduction arose during a series of three Regional Dialogues on Prevention and Reduction of Food Losses and Waste in Latin America and the Caribbean, which were held from 2015 to 2017.¹ The issue was subsequently tabled at the twenty-sixth Session of the FAO Committee on Agriculture (COAG) in October 2018, during a discussion of a document on the development of sustainable food systems (FAO, 2018a). As one of its recommendations, the COAG Session requested FAO to take the lead, working with relevant actors, to develop voluntary codes of conduct for the reduction of FLW (FAO, 2019b).
19. In response to the COAG request, FAO prepared the present Voluntary Code of Conduct for FLW reduction (CoC). Framed within a food systems approach and aligned with the interconnected SDGs, the CoC addresses both food loss and food waste within the same document.

Process of development of the Code of Conduct

20. Following the request from COAG in 2018, the CoC was developed through an inclusive process under the overall direction and guidance of the COAG Bureau. This process involved:
 - i. A global e-consultation, which was hosted on the Food Security and Nutrition Network² and provided feedback on the outline of the CoC and the technical content of the different sections (19 July to 16 August 2019).

¹ The Dialogues were held in Santo Domingo, the Dominican Republic (29-30 September 2015), Saint George's, Grenada (17-18 November 2016), and Santiago, the Republic of Chile (7-8 June 2017).

² <http://www.fao.org/fsnforum/>

- ii. Regional multi-stakeholder consultation workshops for the identification of priority FLW issues addressed by the CoC. Three regional consultations were held:
 - A side-event at the 2nd All African Post Harvest Congress and Exhibition, which was organized and co-hosted by the African Union Commission, the University of Nairobi and other partners in Addis Ababa, the Federal Democratic Republic of Ethiopia (17 September 2019).³
 - A side-event at the First Regional Summit on FLW in Latin America and the Caribbean, which was organized by FAO, the Inter-American Development Bank and other partners in Bogotá, the Republic of Colombia (10 October 2019).⁴
 - The Regional Consultation on FLW in the Near East and North Africa, which was organized by FAO in Cairo, the Arab Republic of Egypt (16–17 December 2019).⁵
 - iii. A weeklong global e-consultation was held to obtain feedback on the draft document from the different stakeholders who deal directly or indirectly with FLW reduction (15–21 May 2020). Feedback was obtained through e-mail during the entire week and through a virtual workshop conducted on the last day.
 - iv. Review and finalization of the CoC by a working group comprised of representatives who had been nominated by the FAO Regional Groupings, and of non-State actors (private sector, civil society organizations, academic and research institutions) identified by FAO. The working group participated in an on-line workshop (30 June–1 July 2020) to review and agree on the final text that was presented to the 27th Session of COAG in 2020.
 - v. The COAG Session welcomed the proposed CoC, noted the importance of the CoC and the role it can play in FLW reduction globally, the development of sustainable food systems and achievement of the SDGs, in particular SDG target 12.3. The Committee provided a number of comments, queries and suggestions for the improvement of the document and requested FAO to prepare a revised document in consultation with Members and under the guidance of the COAG Bureau.
 - vi. FAO obtained comments and suggestions from Members on how to revise the CoC. Written comments and suggestions were obtained via e-mail during the period for receiving comments (7 to 23 December 2020, which was subsequently extended to 18 January 2021). In addition, Members provided comments and suggestions during a virtual consultation that took place from 12 to 13 January 2021. FAO prepared a revised version on the basis of these comments and suggestions.
 - vii. Members reviewed the final version of the document during virtual consultations held from 15 to 17 March 2021 and from 1 to 2 April 2021 to agree on the text before submission of the document to the 42nd Session of the FAO Conference.
21. A Global Advisory Panel, comprising independent technical experts provided inputs, technical advice and strategic guidance during the different phases of development of the CoC.

³ A report of the side event is available at: <http://www.fao.org/3/cb0655en/cb0655en.pdf>

⁴ A report of the side-event is available at <http://www.fao.org/3/cb0657en/cb0657en.pdf>

⁵ A report of the workshop is available at <http://www.fao.org/3/cb0656en/cb0656en.pdf>

Organization of the Code of Conduct

22. Article 1 presents the objective, nature and scope of the CoC. This is followed by an explanation of the terms used in the CoC (Article 2) and the guiding principles of the CoC (Article 3). In Article 4, actions are outlined to address the secondary and systemic causes of FLW, while Article 5 presents the direct actions to be taken by food supply chain actors at each particular stage in the food supply chain.

Article 1. Objectives, nature, scope and target audience

- 1.1. The objectives of this Voluntary Code of Conduct for Food Loss and Waste Reduction (CoC) are to:
 - 1.1.1. Present a set of internationally and regionally recognized, locally and nationally adaptable guiding principles and standards for responsible practices that Governments and other different stakeholders can apply to effectively reduce food loss and waste (FLW) while promoting sustainable and inclusive food systems, hence aiding the achievement of sustainable development.
 - 1.1.2. Provide Governments and other actors with voluntary guidance and a framework for developing global, regional and national strategies, policies, institutions, legislation and programmes on FLW reduction.
 - 1.1.3. Provide guidance against which different stakeholders can gauge the actions they take to reduce FLW.
 - 1.1.4. Facilitate joint action, the harmonization of approaches, and the assessment of progress, which together are essential for achieving SDG 12.3 and the other inter-related SDGs.
- 1.2. The CoC is voluntary and legally non-binding.
- 1.3. The CoC should be interpreted and applied in a way that is consistent with existing obligations under national and international agreements, and with due regard to voluntary commitments under applicable regional and international instruments. Considering its voluntary nature, nothing in this CoC should be read as limiting or undermining any legal obligations to which countries may be subject under international agreements..
- 1.4. This CoC is global in scope. Taking into consideration the national context and priorities, the CoC may be used by all countries and regions at all stages of economic development to reduce FLW in all sectors (crop, livestock, aquaculture, fisheries, forestry), related value chains and food systems, taking into consideration the country specific context.
- 1.5. The CoC closely follows the format of other FAO voluntary instruments that set out principles and internationally recognized standards for responsible practices. It is not meant to be a how-to-do manual comprised of technical prescriptions on how to address FLW in specific contexts. Rather, a generic framework is provided that should be supplemented by context specific technical guidelines to permit the implementation for practical application in particular situations.
- 1.6. It is recognized that the SDGs are interconnected, thus the guiding principles and actions in the CoC should be applied collectively as a coherent, inter-dependent whole. Furthermore, in view of the food system approach in the CoC, food loss and food waste are not treated separately, except where actions apply exclusively to food loss or to food waste.
- 1.7. The CoC is directed towards:
 - 1.7.1. Members, Government actors (national, subnational, local and municipal authorities, and parliamentarians);
 - 1.7.2. subregional, regional and global organizations, development partners, financial institutions, academic and research institutions, and civil society organizations (CSOs);
 - 1.7.3. all stakeholders along the food supply chain: farmers, including family farmers, fishers, producer organizations, the private sector, industry associations, processors, distributors, retailers, as well as consumers and consumer associations.

Article 2. Key terms

The main technical terms, as used in this CoC, are explained below. Where applicable, the bibliographic references on which the explanations are based are provided.

Cold chain

An uninterrupted series of activities from the point where a food product is produced to the point of consumption, along with associated equipment and logistics, which maintain a desired low-temperature range to preserve the quality and safety of the product throughout its shelf-life.

Civil Society Organization

Non-state actors that are inherently non-governmental member-based organizations and social movements, which have governance structure.

Ecosystem

Ecological system comprising all organisms in an area, and the physical environment with which they interact.

Ecosystem services

The multitude of benefits provided by nature to society.

Family farmers

Those involved in agricultural, forestry, fisheries, pastoral and aquaculture production that is managed and operated by a family and is predominantly reliant on family labour, including both women's and men's (FAO, 2014).

Food

Any substance, whether raw, semi-processed or processed, intended for human consumption. It includes drink, chewing gum and any substance used in the manufacture, preparation or treatment of food, but does not include cosmetics, tobacco or substances used only as drugs. Food products can be of animal or plant origin and are considered food from the moment that: (i) crops are harvest-mature or suitable for their purpose; (ii) animals are ready for slaughter; (iii) milk is drawn from the udder; (iv) eggs are laid by a bird; (v) farmed aquatic animals and plants are mature or ready to be harvested for food; and (vi) wild aquatic animals and plants are removed from the aquatic environment. (WHO and FAO, 2013); (FAO, 2019a)

Food loss and waste

Food loss and waste (FLW) is the decrease in quantity or quality of food along the food supply chain (FAO, 2019a). For reasons related to measurement and data unavailability when referring to the SDG Target 12.3, food loss and food waste in this CoC imply the following:

- Food loss: the decrease in the quantity or quality of food resulting from decisions and actions by food supply chain actors from the production stage up to, but excluding, retailers, food service providers and consumers.
- Food waste: the decrease in the quantity or quality of food resulting from decisions and actions by retailers, food service providers and consumers.⁶

⁶ There are other definitions used by some FAO Members and stakeholders defining all food that is discarded from the supply chain as food waste. Such an approach does not affect measuring and monitoring of FLW.

In early work where no distinction was made between food loss and food waste (as was the practice prior to 2011), the term “post-harvest loss” was used indistinctively with no precise definition.

Food material hierarchy

A ranking of recovery alternatives for dealing with material streams deemed surplus to the food supply chain, based on their impact or benefits, for example, from an environmental, social or economic perspective.

Food security

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 1996).

Food supply chain

The successive steps from the point of production of food to the consumer. It consists of the following stages: crop, livestock, aquaculture, fisheries production and harvest/slaughter/catch operations; post-harvest/slaughter/catch operations such as cleaning, grading, and sorting; storage; transportation; processing; wholesale and retail; and consumption at the household or food service provider level. In capture fisheries, the “production” step refers to the pre-catch phase.

Food supply chain actors

The actors that are involved in the food supply chain, such as primary producers (farmers, fishers, herders, foresters), processors, distributors, wholesalers, retailers, food service providers and consumers.

Food Systems

All the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food along with the outputs of these activities, including socioeconomic and environmental outcomes (HLPE, 2014). Food systems are constantly being shaped by different forces, drivers and structural changes and decisions by many different stakeholders that could affect their sustainability (CFS, 2021). Sustainable food systems are food systems that enable food safety, food security and nutrition for current and future generations in accordance with the three dimensions (economic, social and environmental) of sustainable development.

Food Loss Index

The Food Loss Index (FLI) focuses on food losses that occur from production up to (and not including) the retail level (Figure 1). It measures the changes in percentage losses for a basket of 10 main commodities by country in comparison with a base period. The FLI will contribute to measure progress towards SDG Target 12.3. The FLI used for SDG reporting purposes monitors changes in the food loss percentage over time and shows how much losses move from the baseline value of 100 in the base year, i.e. 2015. (FAO, 2019a).

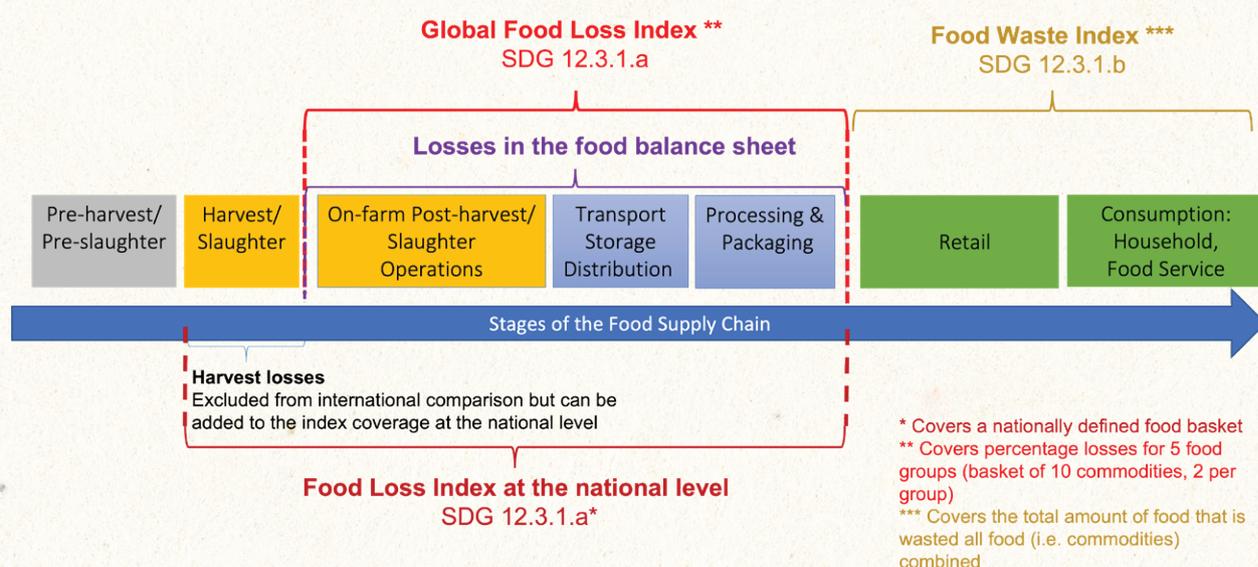
Food Waste Index

The Food Waste Index (FWI) tracks national food waste at retail, food service provider and consumer level (Figure 1). The FWI has three levels, offering increasing accuracy and usefulness of data, but also increasing in the resources required for measurement (UNEP, 2021):

- Level 1 uses modelling to estimate food waste, for countries that have not yet undertaken their own measurement.

- Level 2 is the recommended approach for countries. It involves measurement of food waste, undertaken by national governments or derived from other national studies undertaken in line with the framework described in the Food Waste Index Report.
- Level 3 provides additional information to inform policy and other interventions designed to reduce food waste generation. This includes the disaggregation of data by destination, edible / inedible parts, and reporting of additional destinations such as sewer, home-composting and (non-waste) animal feed.

Figure 1: Zone of applicability of the Food Loss Index (FLI) and the Food Waste Index (FWI)



Source: Adapted from FAO (2019a)

Food service providers

Those businesses, institutions and companies responsible for any meal prepared outside the home. This includes restaurants, school and hospital cafeterias, catering operations, hotels and other tourism and travel related services, institutional canteens, child care facilities, social services, street food vendors, and other out-of-home eating venues, as well as online food delivery platforms and many other formats.

Governments

Includes parliamentarians and relevant governmental ministries and national and subnational, including local and municipal, public institutions.

Nudging

Stimulating a specific product or behaviour choice by consumers in a non-coercive way by making changes to the surroundings in which choices are made, for example, using small-sized plates in self-serve settings, or avoiding displaying excessive quantities and varieties of food.

Private sector

The part of the economy that is run by individuals and companies and is not State controlled. The private sector encompasses: for-profit enterprises, companies or businesses (including food supply chain actors from production up to the retail and food service stage) that are not owned or operated by governments, regardless of their size and structure; as well as the associated services, such as inputs, financing, investments, insurance, marketing and trade.

Qualitative food loss

Decrease in attributes of food that reduces its value in terms of intended use – it results from decisions and actions by food suppliers in the chain (FAO, 2019a). It can result in reduced nutritional value and/or the economic value of food because of non-compliance with quality standards without affecting its safety.

Quantitative food loss

The decrease in the mass of food destined for human consumption as it is removed from the food supply chain as a result of decisions and actions of food suppliers in the chain. (FAO, 2019a)

Stakeholders

The different actors who operate in the food system and are directly or indirectly involved in FLW reduction, including, governmental actors, food supply chain actors, the private sector, producer organizations, civil society organizations, consumers and consumer organizations, academic and research institutions.

Article 3. Guiding Principles

- 3.1. The overarching guiding principle of the CoC is that actions to reduce FLW should contribute to Sustainable Development Goals. That is, actions should be economically, socially and environmentally sustainable and meet present needs without compromising the ability of future generations to meet their own needs.
- 3.1.1. In the economic dimension, FLW reduction activities should be commercially and fiscally viable, and should generate benefits or economic value-added for all stakeholders: decent jobs, income and wages for workers in the food supply chain, tax revenues for governments, profits for enterprises involved in the food supply chain, and improvements in food supply for consumers.
 - 3.1.2. Socially, FLW reduction should contribute to the commitment at the heart of the 2030 Agenda to “leave no one behind”. In this way, actions to reduce FLW should reach and positively impact all, including: women; youth; the elderly; people with disabilities; smallholder family farmers, herders and fishers and other small-scale food supply chain actors; rural dwellers; the urban poor; and indigenous peoples. FLW reduction interventions should also consider people in crises, post-conflict and emergency recovery situations, migrants, communities in Small Island Developing States (SIDS) and mountain areas, and informal supply chain actors.
 - 3.1.3. Environmentally, actions to reduce FLW should contribute to sustainable food consumption and production. In this regard, actions should raise awareness and promote adaptation to and mitigation of climate change, avoid degradation of terrestrial and aquatic ecosystems and biodiversity, and lessen the degradation and pollution of natural resources.
 - 3.1.4. FLW reduction should enhance the four dimensions of food security, which are availability, access, utilization and stability. At the same time, healthy and safe diets should be promoted and malnutrition curbed in all its forms. Actions to address FLW should also contribute to the progressive realization of the right to adequate food in the context of national food security.
- 3.2. The following guiding principles should be followed when implementing the CoC, taking into consideration international law and guidance contained in relevant international and regional instruments:
- 3.2.1. Human dignity: recognizing the inherent dignity and equal and inalienable human rights of all individuals.
 - 3.2.2. Non-discrimination: ensuring no one is subjected to discrimination under law and policies as well as in practice.
 - 3.2.3. Equity and justice: recognizing that equality between individuals may require acknowledging differences between individuals, and taking positive action towards their empowerment.
 - 3.2.4. Gender equality and equity: recognizing the vital role of women in achieving sustainable development and reducing FLW, and promoting equal rights and opportunities.
 - 3.2.5. Consultation and participation: engaging with and seeking the support of those who could be affected by decisions, prior to decisions being taken, and responding to their contributions. This should take into consideration the different views of parties, and ensuring active, free, effective, meaningful and informed participation of individuals and groups, including indigenous peoples.

- 3.2.6. Rule of law: adopting a rules-based approach through laws that are widely publicized in applicable languages, applicable to all, equally enforced and independently adjudicated, and that are consistent with countries' existing obligations under national and international law, and with due regard to voluntary commitments under applicable regional and international instruments.
- 3.2.7. Transparency: widely disseminating and publicizing policies, laws and procedures and decisions in applicable languages and in formats accessible to all.
- 3.2.8. Accountability: holding individuals, public agencies and non-state actors responsible for their actions and decisions according to the principles of the rule of law.
- 3.2.9. Cultural considerations: recognizing and respecting existing forms of organization, traditional, ancestral and local and indigenous people's knowledge and practices.
- 3.2.10. Ethical and responsible practices: adhering to applicable ethical standards, in order to prevent corrupt practices and unfair treatment, including of vulnerable and marginalized people and weaker groups.

Article 4. Actions to address secondary and systemic causes of food loss and waste

- 4.1. Measures that can be taken to address secondary causes of FLW include but are not limited to: research and development (R&D) to identify innovations that contribute to FLW reduction; awareness-raising and education to stimulate behaviour change; capacity-development in the form of education and training; investments in public infrastructure; investments by food supply chain actors and the private sector in market infrastructure, cold chains, food conditioning and processing infrastructure; investments for the redistribution of surplus food; and investments for the valorisation of non-edible parts, by-products and material that leaves the food supply chain as FLW.
- 4.2. Other measures to address secondary causes of FLW include: facilitating coordination and collaboration among the actors involved in a particular food supply chain; strengthening commodity, sector, location and industry associations; promoting and enhancing public-private partnerships (PPP) to facilitate R&D and innovation, infrastructure investments, access to finance, and value chain development. Furthermore, promoting collaboration between national and local governments, and strengthening multi-stakeholder platforms that facilitate awareness-raising, advocacy and the sharing of experiences, knowledge and information, also contribute to addressing secondary causes of FLW.
- 4.3. Measures to address the systemic causes of FLW involve setting up an adequate institutional, policy and regulatory framework. This type of framework is required to facilitate the coordination of actors, enable investments, and support and incentivize the improvement of practices and the adoption of good practices.
- 4.4. In order to guide the FLW reduction strategy and the selection of the appropriate interventions to address FLW, the following actions should be taken to assess, measure and monitor FLW:
 - 4.4.1. Governments, working with the private sector, producer organizations, academic and research institutions and other stakeholders, should build the evidence base to guide FLW reduction strategies and action plans. To this end, the aforementioned stakeholders should conduct surveys or assessments of the magnitude of FLW, the direct causes and underlying drivers. On this basis, interventions should be identified that will reduce FLW across specific food supply chains, commodity sectors or geographic regions. In all cases, the interventions identified to reduce FLW should be consistent with existing obligations under national and international law, including those related to trade under the World Trade Organization (WTO), and with due regard to voluntary commitments under applicable regional and international instruments.
 - 4.4.2. Governments should incorporate information on the magnitude and value of FLW in relevant national accounting frameworks such as Food Balance Sheets and agricultural gross domestic product (GDP) accounts.
 - 4.4.3. In order to measure quantitative food losses at the national level as part of the SDG 12.3 target, countries should use SDG indicator 12.3.1a, also referred to as the Food Loss Index (FLI). Countries are encouraged to use the annual questionnaire prepared by FAO to populate their report on the FLI. For countries that do not collect or estimate loss percentages, FAO, as custodian agency, should use the international food loss estimation model to obtain the estimate and request the countries to validate these estimates.

- 4.4.4. Countries should follow the FLI methodology and implementation strategy that they find most appropriate to collect the basic food loss data that will feed into the FLI. Options include conducting surveys based on representative sampling techniques (recommended),⁷ rapid value-chain appraisals based on case studies, and ad hoc estimates based on field trials. Countries can choose to go beyond the requirements of the FLI, for example, if they possess data for a larger number of commodities than required by the FLI, or, conversely, if data are available for fewer commodities the data can still be aggregated using the approach of the FLI.
- 4.4.5. In addition to quantitative measures, Governments, producer organizations, the private sector and other stakeholders can estimate other types of losses or the impact of losses as follows:
- 4.4.5.1. Qualitative food losses can be estimated indirectly through identification of the causes of quantitative losses and tracking the quantities and prices of different quality grades of the commodity in question.
 - 4.4.5.2. Economic losses can be estimated through an assessment of quantitative food losses and the monitoring of quantities and prices for different uses (for example, the quantities redirected to feed or compost) and quality grades of the food product.
 - 4.4.5.3. Environmental impacts related to food losses can be estimated using environmental impact factors applied within national accounting systems, if applicable.
 - 4.4.5.4. Nutritional losses related to the quantity of lost food can be estimated using nutritional content factors.⁸
 - 4.4.5.5. All the above methods should be updated based on the latest scientific evidence and technical assistance, promoting exchange of best practices.
- 4.4.6. In order to measure food waste at the national level as part of the SDG 12.3 target, countries should use SDG indicator 12.3.1b, also referred to as the Food Waste Index (FWI). The Food Waste Index provides a consistent methodology to measure food waste at the retail, food service provider and consumer stages of the food supply chain. The United Nations Statistics Division (UNSD) and the United Nations Environment Programme (UNEP), the custodian agency for the FWI, will collate data in the Environment Statistics Waste Questionnaire, to be shared with national governments every two years starting in late 2020. Countries should use the most appropriate methodology to collect food waste data for SDG 12.3 reporting, such as: waste compositional analysis, direct measurement, and mass balance for households; and waste compositional analysis or direct measurement for households, counting/scanning, interviews and surveys, or mass balance for the retail sector.
- 4.4.7. To ensure consistency across FLW data, Governments should use or create frameworks and incentives for the private sector, food supply chain actors, retail sector, consumer organizations and producer organizations and other relevant actors to collect and share FLW data using common data collection, compilation and reporting approaches.

⁷ The recommended sample surveys at the production level are especially appropriate to estimate losses experienced by small-scale producers, where a representative sample and trained enumerators are key to ensure unbiased and accurate results.

⁸ It is acknowledged that some qualitative losses (e.g. aflatoxin contamination) are not linked to quantitative losses. These qualitative losses cannot be inferred from the methodology but require additional analysis, and countries can monitor them either through ad hoc surveys or by adding a module on qualitative losses to post-harvest loss surveys.

- 4.4.8. Governments, with the support of development organizations and other relevant partners, should strengthen the systems that collect and provide access to data on FLW indicators and related statistics. The availability of adequate technical capacity should be ensured for the collection and analyses of information in support of FLW reduction planning and monitoring.
- 4.5. In order to set targets and identify the strategic direction, the following actions should be undertaken:
- 4.5.1. Within their national legislation and strategies, Governments should establish a baseline against which to monitor FLW reduction, and set time-bound targets that they plan to achieve in their FLW reduction efforts. Governments should link these targets to SDG 12.3 as well as to the metrics for the co-benefits of reducing FLW, such as improved food security and nutrition, environmental sustainability, abatement of greenhouse gas emissions and ecosystem conservation.
- 4.5.2. Based on the assessment of the levels and drivers of FLW, and with the involvement of all relevant stakeholders, including the food supply chain actors, private sector, civil society organizations, development agencies and academic and research institutions, Governments should take the lead and facilitate the development of a forward-looking national strategy and action plan. The strategy and action plan should address the underlying drivers of FLW, affirm commitment to addressing SDG 12.3, outline an overall vision and roadmap for achieving the set targets, and track progress towards agreed targets, outcomes and impacts. It should incorporate monitoring and evaluation systems to assess the impact and outcomes of interventions to reduce FLW. Within the context of this strategy, Governments should reach voluntary agreements with the private sector, producer organizations and other relevant stakeholders on concrete commitments to contribute to national targets, beyond possible legal minimums. In this regard, public-private partnerships (PPP) and other relevant structures should be set up to facilitate cooperation.
- 4.5.3. Governments, when developing strategies to reduce FLW, should consider:
- 4.5.3.1. The status of the food and agricultural systems, including its social and cultural dimensions, and its evolution over time in response to population growth, demographic changes, urbanization, consumer preferences, nutritional needs, climate change scenarios and other relevant factors.
- 4.5.3.2. The specific circumstance of the country, which might include factors such as trade-offs among stakeholders when implementing the FLW reduction strategy; the degree of food-import dependency or food production sufficiency, which would dictate the nature of policies put in place to reduce FLW; the level of emphasis to be placed on food losses as compared to food waste; whether disaster prone or in an emergency or post-emergency phase; and natural resource constraints.
- 4.5.4. Governments should allocate adequate resources to the development and implementation of the national FLW reduction strategy and action plan, and ensure that implementing agencies have adequate human, physical and financial capacity to engage in effective implementation, data collection and monitoring of FLW actions.
- 4.5.5. Development partners, including United Nations agencies and financial institutions, should assist countries, in particular developing countries and economies in transition, to develop and implement FLW reduction strategies by mobilizing resources and providing technical

support. These partners should put in place relevant FLW indicators in their agriculture related portfolio, and they should monitor the outcomes and impacts of their interventions on reducing FLW. They are also encouraged to work together to put in place harmonized FLW monitoring systems for all FLW-related projects and programmes.

- 4.6. In order to promote policy coherence and an appropriate institutional framework for FLW reduction, Governments should:
- 4.6.1. Mainstream FLW reduction in all policy frameworks that are related to food systems.⁹
 - 4.6.2. Align and foster coherence and coordination across the policies, institutions and legislation relevant to FLW reduction. This includes policies, institutions and legislation linked to:
 - 4.6.2.1. address climate change, including those related to implementation of the nationally determined contribution (NDC) to the Paris Agreement on climate change;
 - 4.6.2.2. commitments to sub-regional and regional strategies on FLW reduction; and
 - 4.6.2.3. commitments to international frameworks such as the Second International Conference on Nutrition (ICN2) Framework for Action, the United Nations Decade of Action on Nutrition, the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), the Committee on World Food Security (CFS) Global Strategic Framework for Food Security and Nutrition, and the New Urban Agenda.
 - 4.6.3. Define clearly in the appropriate legislation or strategies:
 - 4.6.3.1. the roles and responsibilities of agencies and levels of government – national, subnational, local, including in urban areas – that can most successfully deliver the services and actions required to effectively reduce FLW;
 - 4.6.3.2. the relevant national authorities to coordinate efforts to reduce FLW; and
 - 4.6.3.3. the expected role of the private sector, civil society organizations and other non-State actors.
 - 4.6.4. Ensure implementing agencies establish a coordination mechanism and work across institutions and relevant partners to provide technical assistance and regulatory oversight to actors along the food supply chain.
 - 4.6.5. Be cognisant that emergencies such as conflicts, pandemics and natural disasters can cause disruptions in the food system that can generate substantial levels of FLW. In collaboration with relief agencies, development organizations and other relevant partners and stakeholders, Governments should take measures to reduce FLW in the preparedness, response, recovery and rehabilitation phases of emergencies. Measures taken should be in line with the Sendai Framework for Disaster Risk Reduction 2015–2030 (United Nations, 2015), and could include:
 - 4.6.5.1. setting up, stocking and managing strategic emergency food reserves;

⁹ The range of issues related to food systems is broad and depends on each country. The range covered includes: rural development, urban planning, industry, investment, food safety, food security, trade, disaster risk reduction and emergency response, research, planning, finance, innovation, employment, machinery, equipment and tools used in all sectors, gender equality, energy, nutrition, climate change, food assistance, and waste management, *inter alia*.

- 4.6.5.2. setting up information systems to detect and monitor threats to food supplies;
- 4.6.5.3. increasing the resilience of and protecting infrastructure and other productive assets;
- 4.6.5.4. promoting the most efficient food supply chains, as dictated by the realities of the country and the specific locality of the FLW reduction interventions;
- 4.6.5.5. avoiding movement restriction measures and lockdown policies that hinder or completely jeopardize harvesting, processing, storage, distribution and logistics operations;
- 4.6.5.6. rebuilding livelihoods of affected populations, family farmers, small processors and producer organizations based on post-harvest handling, storage, processing and trade activities;
- 4.6.5.7. matching food supply with need for subsequent redistribution; and
- 4.6.5.8. transforming food that cannot be redistributed into non-food resources, such as feed, energy and fertilizer.

4.7. Governments should ensure that there is an adequate public infrastructure base to support FLW reduction. This comprises:

- 4.7.1. Physical infrastructure and supporting services, which includes: roads and other transportation networks; reliable energy supplies that prioritize renewable sources; water supply; fish landing sites; post-harvest handling and processing facilities, food storage systems, and wholesale and retail market facilities;¹⁰ strategic emergency food reserves linked to social protection programmes; slaughterhouses; agro-industrial parks and special economic zones. Investments should also target food safety and quality systems, while attention should be paid to ensure that telecommunications, information and communications technology (ICT) and market information systems, refuse disposal, separation and treatment infrastructure, and ports of entry are adequate for FLW reduction actions, as applicable.
- 4.7.2. Investments in institutions and services for:
 - 4.7.2.1. generating knowledge on FLW based on scientific principles and taking into account local, traditional, ancestral and indigenous knowledge;
 - 4.7.2.2. human capacity-development, including science-based education and training at different levels, such as universities and technical education institutions;
 - 4.7.2.3. research and development (R&D), innovation and technology transfer; and
 - 4.7.2.4. extension and other advisory services.

4.8. Policy and legal instruments:

- 4.8.1. Based on the strategy and action plan identified to reduce FLW (Articles 4.5.2), and the policy objectives to be achieved, Governments should set up adequate national

¹⁰ Refers to processing facilities, food storage systems and wholesale and retail markets set up by the public sector, as opposed to facilities that are set up by the private sector and supply chain actors as detailed in Article 5.

legislative frameworks, as well as context specific incentives, where appropriate, technical requirements and compensation and facilitation mechanisms that require or encourage food supply chain actors to adopt science-based practices and make adequate investments to sustainably reduce FLW.¹¹ Frameworks and actions should be designed to minimize trade-offs in reaching policy objectives and in satisfying economic, social and environmental sustainability. Measures put in place within such frameworks and actions should be consistent with existing obligations under national and international law, including those related to trade under the World Trade Organization (WTO), and with due regard to voluntary commitments under applicable regional and international instruments.

- 4.8.2. Governments should promote an enabling policy, legal, regulatory and institutional environment, including appropriate safeguards where necessary, that fosters responsible investments by relevant authorities and food supply chain actors to reduce FLW, in line, *inter alia*, with the relevant and agreed Committee on World Food Security (CFS) policy products, and in particular, investments that can contribute to local communities and indigenous peoples, and to inclusive rural sustainable development.
- 4.8.3. Taking into consideration the ultimate policy objectives to be achieved, Governments should put into place policy frameworks, and appropriate actions in order to reduce FLW and guide how food, material leaving the food supply chain as FLW, inedible parts and by-products could be reused and/or recycled, while ensuring all safety requirements are met. In order of priority, the options in this food material hierarchy are to:
 - 4.8.3.1. Prevent FLW from occurring in the first place within the food supply chains.
 - 4.8.3.2. Recover and redistribute any surplus or unsold / unmarketable food to food banks, charities or similar institutions or private sector entities, provided such food meets all food safety and nutritional requirements. In addition, surplus or unsold food could be transformed into new food products, ensuring that all safety and quality requirements are met and seeking the highest possible nutritional value.
 - 4.8.3.3. Divert surplus or unsold /unmarketable food to animal feed or transform it into non-food products. When diverted to feed it should be ensured that all safety and quality requirements are met.
 - 4.8.3.4. Recycle surplus food that is not redistributed or diverted as explained in Article 4.8.3.2 and Article 4.8.3.3, material that leaves the food supply chain as FLW, inedible parts and by-products through treatments such as rendering, composting and anaerobic digestion.
 - 4.8.3.5. Incinerate the material to generate energy (thermal treatment with energy recovery), taking measures to limit any toxic emissions into the atmosphere.
 - 4.8.3.6. Dispose the material by incineration (taking measures to limit toxic emissions into the atmosphere during incineration) and landfill.
- 4.8.4. The following measures should be put in place with regard to standards:
 - 4.8.4.1. Governments should have well-designed food safety legislation and effective procedures for their implementation. Where found to be out of date, or not

¹¹ These practices and investments are detailed in Article 5.

in conformity with international and regional obligations, the existing legal framework governing food safety and quality should be updated. Legislation consistent with internationally agreed standards, especially Codex Alimentarius, should be developed, where lacking, and risk-based legislation and procedures introduced to ensure compliance with FLW reduction efforts without endangering food safety.

- 4.8.4.2. Governments should ensure food safety measures provide clear and harmonized requirements for food date marking, taking into account Codex standards for labelling of packaged food (FAO and WHO, 1985 and subsequent revisions).
 - 4.8.4.3. Governments should support the development and implementation of appropriate, justified scientifically and technically based policies to facilitate market access and commercial trading, both locally and internationally based on relevant international obligations, including, in particular, World Trade Organization (WTO) relevant agreements. Governments should evaluate their impact on the levels of FLW, and take appropriate steps to reduce the FLW.
 - 4.8.4.4. Private standards developed by the private sector, industry associations and producer organizations should be based on food safety and quality government legal frameworks aiming at reducing and integrating FLW. Governments may consider supporting the work of the private sector, industry associations and producer organizations, civil society organizations and other relevant stakeholders towards promoting reduced FLW and towards integrating their FLW reduction initiatives into existing frameworks governing food safety and quality.
- 4.8.5. The following measures should be put in place with regard to linkages to markets and trade:
- 4.8.5.1. Governments should put in place regulatory frameworks to support inclusive market-oriented institutional arrangements that enable small-scale producers and processors to improve their production and trading practices with respect to food loss reduction. This may include arrangements such as producer-buyer contracts (e.g. contract farming), innovative mechanisms to promote horizontal coordination (e.g. producer associations, umbrella farming groups and corporate farming), and mechanisms to vertically integrate production with storage and financial systems (e.g. warehouse receipt systems).
 - 4.8.5.2. Governments should put in place legal frameworks that help business-to-business practices. Governments should encourage that private contracts and agreements should operate within these frameworks and where possible that the business-to-business parties can consider avoiding FLW. Governments should take steps to promote private contracts to operate within a sound legal framework and to deter unfair practices that could have the potential to generate FLW.
 - 4.8.5.3. Governments should institute mechanisms in public procurement of food to implement strategies to integrate FLW reduction measures.
 - 4.8.5.4. Governments should, where relevant and as appropriate, and in accordance with bi- and multi-lateral international agreements, foster and create incentives to support FLW reduction within national programmes.

4.8.5.5. Governments should improve the design and implementation of inter- and intra-regional commercial relationships, including within respective regional organizations. In this way, FLW generated by delays in customs inspection, breaks in the cold chain and additional handling can be reduced, which is particularly important in import-dependent countries. Any improvements made should avoid compromising food safety and plant and animal health.

4.8.6. Financial services and risk mitigation mechanisms:

4.8.6.1. Financial institutions and other relevant private sector actors are encouraged to create financial instruments, risk mitigation mechanisms and product lines dedicated to helping food supply chain actors to manage and cope with risks and fund the investments needed to reduce FLW.¹² These instruments, services and mechanisms could include: inventory credit systems, such as warehouse receipt financing systems; loan guarantees; blended finance, where public funds are used to catalyse investments by the private sector; promoting inclusive business models such as responsible contract farming; agricultural insurance schemes that provide a financial buffer against external shocks, such as those generated by extreme natural events and pandemics; public-private partnerships (PPP); and technical assistance facilities that strengthen the creditworthiness of potential borrowers through targeted capacity development.

4.8.6.2. Governments should encourage the provision of financial services to meet the financial operational needs of intended beneficiaries, particularly family farmers, indigenous peoples, small producers and producer associations, micro, small and medium enterprises and other small-scale actors and vulnerable groups.

4.8.7. Governments, where relevant and as appropriate, should consider putting in place the following measures and instruments to promote FLW reduction at specific stages of the food supply chain, ensuring in all cases that the needs of family farmers, indigenous peoples, small-scale producers and processors, producer organizations, micro, small and medium enterprises and vulnerable and marginalised groups are taken into consideration:

4.8.7.1. For food losses reduction (pre-harvest/catch/slaughter, harvest/catch/slaughter, post-harvest handling and storage, processing and distribution stages of the food supply chain):

4.8.7.1.1. targeted fiscal instruments to increase availability of, access to, and adoption of sustainable practices and technologies that are proven to reduce food losses;

4.8.7.1.2. incentives and reward systems for food loss reduction;

4.8.7.1.3. low-interest financing;

4.8.7.1.4. incentives for local manufacture of food loss reducing technologies; and

4.8.7.1.5. legal provisions for discounts on and donation of non-marketable surplus food.

¹² The actions and investments supply chain actors should make to reduce FLW are detailed in Article 5.

4.8.7.2. For food waste reduction:

4.8.7.2.1. Measures and instruments targeting retailers and food service providers: fiscal measures and instruments to promote donation of surplus food; pay-as-you-throw systems; bans on disposing food in landfills; legal provisions to discount or donate food that is near its expiration date but still safe for consumption; liability protection measures to promote food donation to food banks or similar structures; measures to orient retailers to refrain from sales promotions that encourage consumers to purchase excessive quantities of food; and legal provisions for separate collection of food waste.

4.8.7.2.2. Measures and instruments regarding food donation and redistribution: incentives to food banks and other receiving entities; guidelines for the establishment and operation of food banks and other receiving entities; principles governing food donation; definition of the obligations and responsibilities of food donors and receivers; guidelines on goods that can be donated; adequate regulatory and institutional frameworks and guidelines to ensure smooth operation of food donation systems, to ensure that donated food meets safety and nutritional standards, does not re-enter the market and targets the desired beneficiary populations; and measures to facilitate transportation and storage of donated food, including during emergency situations and crises.

4.8.7.2.3. Measures and instruments targeting households: legal provisions for collection of food waste separate from non-food waste; pay-as-you-throw systems.

4.9. Research and development (R&D) and innovation:

4.9.1. Governments should provide the enabling framework of policies and institutions to support science and evidence-based innovation in practices, products, technologies, infrastructure, services, social arrangements, and institutional/organizational and policy processes that lead to reduced FLW. Together with the private sector, civil society organizations and international organizations and academic and research institutions, Governments should invest in research and development (R&D) and promote innovations to reduce FLW, taking into consideration the needs of vulnerable groups and small-scale supply chain actors, including indigenous people, and building on traditional, popular and citizen knowledge through participatory processes and with the consent of the knowledge holders.

4.9.2. Governments should ensure dialogue and cross-sector exchange involving R&D agencies, extension and advisory service providers, academia, the private sector, producer organizations, family farmers and consumers to ensure that investments in R&D and innovations respond to demand and needs and are relevant to the local context.

4.9.3. In order to support R&D and stimulate innovation by the private sector and academic and research institutions, Governments should:

4.9.3.1. Offer research grants for developing innovative practices and technologies, ensure

an adequate institutional and regulatory framework (for example, institutions to enforce intellectual property rights), and support knowledge exchange and training to facilitate adoption and transfer.

- 4.9.3.2. Create platforms to bring together relevant stakeholders who can jointly identify issues to be covered by R&D, solutions and innovations.
- 4.9.3.3. Set up specific public-private partnerships, where appropriate, to facilitate the development, commercialization, adaptation, transfer and adoption of innovations.
- 4.9.4. Governments, the private sector, civil society organizations, academic and research institutions and development agencies should consider the following key FLW issues, challenges and areas for R&D and innovation:
 - 4.9.4.1. The causes and magnitude of FLW; solutions to reduce FLW (including appropriate technologies along the food supply chain, sustainable bulk and retail packaging options, and renewable energy sources for powering operations directed at reducing FLW); transformation of and addition of value to by-products, non-edible parts and material that leaves the food supply chain as FLW.
 - 4.9.4.2. The impact of FLW on the environment, greenhouse gas emissions, climate change and natural resources; the current and projected impact of climate change on FLW; and innovations needed to mitigate these impacts.
 - 4.9.4.3. Leveraging breakthroughs in ICTs and digital innovations (for example block chain, Internet of Things, big data, and Artificial Intelligence) to reduce FLW.
 - 4.9.4.4. Social innovations combined with technological interventions, taking into consideration specific challenges (such as climate change, conflicts, human migration and pandemics), as well as the needs of specific groups (such as family farmers, small-scale producers and processors, the elderly, youth, women, migrants, people with disabilities and indigenous peoples).
- 4.9.5. Governments, the private sector, civil society organizations, academic and research institutions, and development agencies should consider the following stage-specific issues for R&D and innovation to reduce FLW:
 - 4.9.5.1. For the pre-harvest/catch/slaughter and harvest/catch/slaughter stages: identification and development of varieties and breeds with specific attributes (such as pest and disease resistance, heat tolerance, feed efficiency, nutrient density, drought and flood resistance, and adaptation to climate change) that reduce susceptibility to FLW along the food supply chain; biocontrol of pests and diseases through sustainable means; improving practices, tools and equipment for applying inputs and harvesting operations; and developing production practices that improve product quality and shelf life. Furthering R&D involving modern technologies (including locally accepted biotechnology) can be considered in their potential contribution to these goals.
 - 4.9.5.2. For the post-harvest handling, storage and processing stages: resource-efficient, low-waste or waste free, technologies for adding value and extending shelf life while protecting nutritional and other quality attributes and environmental sustainability; prevention and control of post-harvest pests; improvements

in product, process and facilities design; and improving drying and storage technologies for smallholders.

4.9.5.3. For the transportation and distribution stages: improvements in logistics, and introduction of clean, energy-efficient, low-carbon systems, particularly in cold chain systems.

4.9.5.4. For the food service provider and consumption stages: studies to better understand consumer behaviour.

4.10. Awareness-raising, education and training:

4.10.1. Working together with the private sector, civil society organizations, consumer associations, development agencies and other actors, Governments should take a leading role to raise the awareness of and educate the general public, policy-makers, legislators, consumers and other food supply chain actors on: the importance of FLW reduction; their civic responsibility to support FLW reduction; links between FLW and economic, social and environmental dimensions; and avenues for reducing FLW. These efforts, whose purpose is to change social norms and make avoidable wasting of food unacceptable, should develop and exploit adequate channels for awareness raising and education, including:

4.10.1.1. awareness-raising and education campaigns to begin at the youth level and be based on science;

4.10.1.2. harnessing the power of different media (radio, newspaper, television, video, social media), ICTs and digital innovations;

4.10.1.3. harnessing formal and informal education channels, paying particular attention to the younger members of the population;

4.10.1.4. information sharing at community level, including local communities, cultural associations, indigenous peoples and religious communities;

4.10.1.5. multi-stakeholder platforms and communities of practice dealing with FLW;

4.10.1.6. national food-based dietary guidelines;

4.10.1.7. on-package information, ensuring that such information does not interfere with the clarity of mandatory labelling; and

4.10.1.8. point-of-sale information, including direct communication from sales people to consumers.

4.10.2. Governments, civil society organizations, and actors involved in food recovery and redistribution programmes should support awareness-raising and behavioural change of consumers targeted in these programmes, with a view to improve these consumers' understanding of the origins of redistributed food and allay any concerns, stigmas or cultural concerns.

4.10.3. Countries, United Nations agencies, international and regional organizations, civil society organizations and other relevant stakeholders should observe the International Day of Awareness of Food Loss and Waste,¹³ in an appropriate manner and in accordance with

¹³ A resolution adopted by the UN General Assembly on 19 December 2019, to designate the 29 September as the International Day of Awareness of Food Loss and Waste (United Nations, 2020).

national priorities. The theme of the Day should be set in collaboration with all relevant stakeholders.

4.10.4. Governments, academic institutions, producer and civil society organizations, and other relevant actors should invest in science-based education and training to equip food supply chain actors with the technical, business management and entrepreneurial skills required to reduce FLW (as outlined in Article 5). To this end Governments should:

4.10.4.1. Strengthen the institutional frameworks to support training and science-based education on FLW reduction to build capacity in science-based knowledge and practices that are proven to lead to reduction in FLW. Possible avenues could include: extension and other advisory services; dedicated academic or industry programmes on FLW; integration of FLW modules into the curriculum of institutions that address issues related to food systems; field schools and vocational training centres.

4.10.4.2. Ensure all human capacity-development programmes are context-specific, build on local and traditional knowledge and practices, as applicable, and address constraints women, family farmers, indigenous peoples, small-scale producers and processors and other vulnerable groups face in accessing such programmes.

4.10.4.3. Ensure capacities are developed across the entire food supply chain to facilitate coordination and use of improvements across the chain.

4.11. Producer, commodity, sector, location and industry associations:

4.11.1. Food supply chain actors, including family farmers and small and medium enterprises, and the private sector should work towards constituting themselves into producer, commodity, sector, location and industry associations.¹⁴

4.11.2. Governments and development organizations should facilitate the creation and strengthening of these associations and support them in the various roles they play that contribute to FLW reduction. These roles can include:

4.11.2.1. disseminating science-based knowledge of technologies, management practices, innovations, and best practices among their members;

4.11.2.2. strengthening the capacities of their members to understand and meet market requirements and apply practices that minimize FLW;

4.11.2.3. improving value chain and sector coordination;

4.11.2.4. representing the interests of their members in policy dialogue; and

4.11.2.5. helping family farmers, small producers, and micro, small and medium enterprises to achieve economies of scale in buying inputs, marketing products, and making the investments that are needed to reduce FLW.

¹⁴ These associations include producer organizations, cooperatives, associations of small and medium enterprises (SME), chambers of commerce and industry and various other groupings.

4.12. Inclusive value chain development:

- 4.12.1.** Input suppliers, producers, processors, distributors, retailers and other food supply chain actors, as applicable, should work together to take concerted measures to address FLW across the food supply chain in which they are operating.
- 4.12.2.** Governments and development organizations should provide facilitation and information to help development of productive and fair partnerships among food supply chain actors working individually or within associations. This would promote coordination and information flow along the chain and contribute to FLW reduction. Facilitation of linkages is particularly important to ensure inclusion of family farmers, indigenous people, small producers, micro, small and medium enterprises and other small-scale actors.

4.13. Fostering multi-stakeholder collaboration:

- 4.13.1.** Governments should provide a framework and employ consultative and participatory processes to encourage all relevant stakeholders, including the private sector, civil society organizations, indigenous peoples and local communities, academic and research institutions, producer organizations, industry associations and consumer organizations to work holistically and collaboratively towards improving food systems so as to reduce FLW. Special care should be taken to involve all vulnerable and marginalized groups.
- 4.13.2.** Countries and development partners should:
 - 4.13.2.1.** Support, promote and coordinate multi-stakeholder FLW reduction initiatives at global, regional, local and sectorial levels.
 - 4.13.2.2.** Support partnerships and cooperation on FLW issues among countries, including South-South and triangular cooperation and collaboration between developed and developing countries.

Article 5. Practices and investments to address direct causes of food loss and waste

- 5.1. The direct causes of FLW can be addressed through improved practices, technical innovations and investments implemented by the food supply chain actors and other stakeholders involved in a particular stage in the supply chain.
- 5.2. Producers, processors, distributors, wholesalers, retailers and food service providers should:
 - 5.2.1. Set targets and specific goals to reduce FLW, and develop an action plan to address the underlying drivers of FLW. Actions should be guided by the analysis of the magnitude and causes of FLW in their operations (Article 4.4.1) and the business case for reducing FLW. Although not necessarily bound by the SDGs, where possible, targets should be consistent with SDG 12.3, as established at the national level. These actors should reach voluntary agreements with national and subnational authorities concerning concrete commitments to contribute to national targets to reduce FLW (Article 4.5.2).
 - 5.2.2. Ensure that their products meet safety and quality requirements. They should prioritize food safety and quality in their operations, and comply with sanitary and phytosanitary measures to ensure food is safe and will not lead to foodborne diseases.
 - 5.2.3. Avoid business-to-business practices that might lead to FLW, such as last minute order cancellations, unilateral or retroactive changes to contracts, and inflexible and unreasonably high product standards.
 - 5.2.4. Keep records to facilitate planning, monitoring and control of their operations, and the implementation of measures that contribute to reducing FLW.
 - 5.2.5. Reduce unnecessary packaging where appropriate. If packaging must be used, use packaging technologies and configurations that contribute to reducing FLW and are effective in maintaining the safety, nutritional value and quality of the product.¹⁵ Priority should be given to packaging materials that are environmentally sustainable, i.e. reusable, recyclable, biodegradable or compostable.
 - 5.2.6. Understand and apply the different options to handle surplus or unmarketable food, material that leaves the food supply chain as FLW, by-products and non-edible parts, as explained in Article 4.8.3.
 - 5.2.7. Use energy efficiently in operations undertaken to reduce FLW, prioritizing renewable energy sources.
 - 5.2.8. Use water efficiently in operations undertaken to reduce FLW.
 - 5.2.9. Include FLW reduction strategies and good practice in staff education and training programmes and customer guidelines.
 - 5.2.10. Understand the impact of their sourcing strategies (for example, sourcing locally, sourcing from markets with difficult physical access and sourcing from distant markets) on the levels of FLW, and the measures that might be put in place to reduce FLW in each case.
 - 5.2.11. Seek the latest information of relevance to FLW, such as information on markets, prices, weather forecasts, good practices, available technologies, financing options and innovations.

¹⁵ Included are: technologies such as active, intelligent and smart packaging; and configurations such as re-sealable and easy-to-empty packages and single-serve pack sizes.

- 5.3. At the pre-harvest/catch/slaughter stage private sector companies, farmers, herders, fishers and producer organizations should:
- 5.3.1. Make timely and appropriate use of inputs, equipment and infrastructure, and apply science-based practices in line with national requirements and applicable regulations.
 - 5.3.2. Take into account culturally relevant settings.
 - 5.3.3. Engage in production planning aligned to meeting market requirements.
 - 5.3.4. Use more efficient equipment in production operations.
 - 5.3.5. Understand safety and quality specifications of the intended market.
 - 5.3.6. Be able to grade produce according to applicable domestic or national standards and international standards, or, in the case of herders and livestock farmers, be able to understand the grading systems and adjust their production systems accordingly.
 - 5.3.7. Reduce the need for external inputs through efficiency and the use of ecosystem services.
 - 5.3.8. Protect animal health, preventing major animal diseases, swiftly controlling and eradicating them to minimize its associated losses.
 - 5.3.9. Apply animal welfare practices in order to avoid losses caused by stress and injuries on animals during production, transport and slaughter.
 - 5.3.10. Apply good pest and disease management in line with internationally agreed standards, practices and recommendations.
 - 5.3.11. Use antimicrobials in a prudent and responsible manner in order to reduce antimicrobial resistance (AMR).
 - 5.3.12. Use agrochemicals and veterinary treatments in an adequate manner and when necessary in order to keep residues in food within permissible limits and reduce environmental and occupational health and safety risks.
 - 5.3.13. Use adequate inputs (seeds, planting materials and fingerlings, feed and feed additives, veterinary drugs and antibiotics, pesticides and fertilizers), equipment and infrastructure for production operations.
- 5.4. At the harvest/catch/slaughter stage, private sector companies, farmers, herders, fishers and producer organizations should:
- 5.4.1. Apply proper scheduling and timing of operations for harvesting crops, catching or harvesting aquatic animals and plants, slaughtering animals, milking and egg collection.
 - 5.4.2. Harvest crops, slaughter animals and catch or harvest aquatic animals and plants under appropriate conditions, at the correct stage of maturity, and applying adequate techniques, tools and equipment (such as fishing gear and vessels, containers to pack the harvest, facilities for temporary storage, abattoirs and milking equipment).
 - 5.4.3. Handle products appropriately, avoiding rough, careless handling.
 - 5.4.4. Manage environmental conditions (temperature, humidity) around perishable products.
- 5.5. At the post-harvest handling and storage stage private sector companies, farmers, herders, fishers and producer organizations should:

- 5.5.1. Apply good handling practices based on, among others, applicable general and commodity specific food safety practices, including during packaging, transportation, loading and unloading.
 - 5.5.2. Apply post-harvest treatments appropriately and when necessary. Chemical treatments should be applied with minimal environmental and occupational health and safety risks and in line with applicable regulations.
 - 5.5.3. Ensure adequate temperature management for perishable products.
 - 5.5.4. Use appropriate packaging containers for transport and storage of the harvested materials.
 - 5.5.5. Use appropriate technologies for primary processing operations.
 - 5.5.6. Use adequate tools (containers for transport and storage), equipment, facilities and infrastructure (such as landing sites, milk collection and cooling centres, abattoirs, and cold chains).
- 5.6. At the processing, preservation and packaging stage private sector companies, food manufacturers, cottage-industry operators, farmers, herders, fishers and producer organizations should:
- 5.6.1. Apply good hygiene practices (GHP), good manufacturing practices (GMP) and relevant Codex codes of practice for concerned commodities (at both the primary processing and food manufacturing level) and comply with applicable regulations.
 - 5.6.2. Be competent in the operations required to transform and package products.
 - 5.6.3. Use sustainable processing and preservation operations that maintain the nutritional and other quality attributes of finished products.
 - 5.6.4. Apply good cleaning and sanitation practices so as to reduce food loss from contamination.
 - 5.6.5. Label (unit serving sizes and date markings) adequately packaged products in customized units and formats to reduce waste at the consumer level.
 - 5.6.6. Use appropriate equipment and facilities that are equipped with reliable power and potable water supplies and are of adequate capacity.
 - 5.6.7. Have access to and be able to operate tools for quality control, process management and demand forecasting.
- 5.7. At the distribution stage, distributors and wholesalers should:
- 5.7.1. Apply good sourcing techniques and good hygiene, handling and storage practices.
 - 5.7.2. Use adequate storage facilities, wholesale markets and cold chain systems.
 - 5.7.3. Implement efficient and timely logistics operations that reduce the time for distribution and commercialization of perishable products, as this provides benefits in reduced food losses, fuel use and environmental pollution.
 - 5.7.4. Track shipments, monitor inventories and employ data sharing to reduce excess or out-of-date stock.
 - 5.7.5. Monitor temperature and humidity conditions around products.
 - 5.7.6. Where relevant, employ reverse logistics to pick up unsold goods intended for donation after making deliveries.

- 5.7.7. Develop channels and business models for faster turnover of products with short shelf life.
- 5.8. Retailers should:
 - 5.8.1. Apply good product handling and stock management.
 - 5.8.2. Maintain optimal conditions within the retail outlet.
 - 5.8.3. Work with their suppliers to ensure that:
 - 5.8.3.1. products are packaged appropriately to extend shelf-life;
 - 5.8.3.2. product sizes and packaging are appropriate and customized to reduce consumer waste; and
 - 5.8.3.3. products are labelled adequately to reduce food waste at the consumer level.
 - 5.8.4. Consider reducing prices on packaged perishable items approaching best-before and use-by dates, and unpackaged items that are close to the end of their shelf life.
 - 5.8.5. Develop procurement guidelines to avoid large surpluses.
 - 5.8.6. Monitor inventories.
 - 5.8.7. Refrain from sales promotions that encourage consumers to buy excessive quantities of food.
 - 5.8.8. Control inappropriate buyer practices, such as finger pressing and rummaging through produce.
 - 5.8.9. Improve forecasting to better anticipate stock needs.
 - 5.8.10. Work with producers to help absorb seasonal gluts.
 - 5.8.11. Use adequate inventory management systems, in-store merchandizing, physical infrastructure for the retail outlet, cold storage, and transport facilities and equipment.
- 5.9. Food service providers should:
 - 5.9.1. Offer incentives, such as discounts and rewards to consumers to reduce food waste.
 - 5.9.2. Design menus and methods for safe food handling, preparation and serving (including alternative portion sizes) to reduce food waste.
 - 5.9.3. Manage inventory and stock adequately and adopt purchasing practices that better fit needs based on historical trends and waste data, communicating and collaborating with suppliers as required.
 - 5.9.4. Apply nudging measures to stimulate patrons to select products and make behavioural choices that lead to less food waste.
 - 5.9.5. Offer take-away solutions, such as doggy bags, to patrons. These solutions should be accompanied by guidance on proper food storage and food safety practices as well as guidance on proper re-use, disposal or recycling of take-away containers.
 - 5.9.6. Explore avenues, such as online solutions, to sell surplus meals and food nearing the end of shelf life at a discounted rate at the end of service.

- 5.9.7. Prioritize cooking to order over preparation in advance.
- 5.9.8. Use adequate inventory and stock management systems, as well as infrastructure for food handling, preparation, serving and food delivery.

5.10. Consumers and consumer organizations should:

- 5.10.1. Understand the cost food waste imposes on the household budget, the negative impacts of FLW on the environment, waste of production and logistic resources. It is a moral and civic responsibility to work towards reducing FLW. This could be achieved through targeted education and efforts by consumer organizations for the understanding and consumer acceptance of misshaped but edible produce, and those having external visual defects that do not affect their utility.
- 5.10.2. Consider the preferences for “cosmetic” superficial, visually defect free fresh fruits and vegetables lead to increased food waste.
- 5.10.3. Understand the technical options for reducing food waste, including:
 - 5.10.3.1. shopping strategies;
 - 5.10.3.2. understanding how to interpret food date labels;
 - 5.10.3.3. packaging options adapted to different conditions of use;
 - 5.10.3.4. food preservation and utilization practices, and how to preserve the safety, quality and nutritional value of food and minimize deterioration during home storage, including during refrigeration;
 - 5.10.3.5. techniques that allow the use of all edible parts of the food;
 - 5.10.3.6. recipes to reuse leftover foods and trimmings;
 - 5.10.3.7. meal planning and preparation practices;
 - 5.10.3.8. use of doggy bags to take home leftovers
 - 5.10.3.9. considering prioritizing the consumption of the most perishable items; and
 - 5.10.3.10. application of Food Based Dietary Guidelines in guiding shopping and meal preparation.
- 5.10.4. Consider prioritizing in-season raw produce over out-of-season items.
- 5.10.5. Understand how their procurement strategies (for example, buying locally, buying from markets with difficult physical access, and buying from distant markets) might affect the levels of FLW, and the measures they should put in place to reduce FLW.
- 5.10.6. If impossible to prevent food waste, know how to sort and use the material (for example as animal feed or in home composting) or dispose of it appropriately.

Article 6. Implementation, monitoring and evaluation

- 6.1. Without prejudice to the voluntary nature of this CoC, all stakeholders are encouraged to promote, support and use it according to their respective individual or collective needs, mandates, abilities and relevant national contexts.
- 6.2. Governments are encouraged to take the lead in promoting the use of the CoC. Governments are encouraged to bring the CoC to the attention of all stakeholders it refers to, so that these stakeholders understand their shared responsibilities in working together to ensure achievement of the objectives of the CoC. Governments are encouraged: to set up multi-stakeholder platforms and frameworks at the local, national and regional levels, or to use those existing, to coordinate implementation of the CoC; to monitor implementation in their jurisdictions; and to evaluate the impact on FLW reduction and associated food security and nutrition, socio-economic and environmental benefits. This process should be inclusive, participatory, gender sensitive, implementable, cost effective and sustainable.
- 6.3. Development partners, relevant specialized United Nations agencies and programmes, international financial institutions and regional organizations are encouraged to support voluntary efforts by Governments to implement this CoC. Such support could include technical cooperation, financial assistance, institutional capacity-development, knowledge sharing and exchange of experiences, policy assistance and transfer of technology. In view of the importance of properly assessing the impact of interventions towards FLW reduction, these agencies and organizations are encouraged to put in place harmonized FLW monitoring systems for all their FLW related projects and programmes.
- 6.4. FAO, in accordance with its role within the United Nations system, will fully support Governments in the implementation of the CoC, working in collaboration with other relevant organizations.
- 6.5. Private sector enterprises involved in agriculture and food systems are invited to promote the use of the CoC as relevant to their context and circumstances.
- 6.6. Producer organizations are invited to adhere to the applicable parts and spirit of the CoC in all their crop, livestock, forestry, fisheries and aquaculture production activities to minimize FLW.
- 6.7. Civil society organizations with relevance to agriculture and food systems are invited to integrate the guidelines in this CoC in their policies and programmes and to advocate for use of the CoC.
- 6.8. Academic and research institutions are invited to promote integration of the guidelines into their activities, and facilitate knowledge exchange and skills development to contribute to FLW reduction and sustainable food systems development.
- 6.9. The CoC should be considered a dynamic text that will be brought up to date as required, taking into account technical, economic, social and environmental progress. FAO will periodically review its relevance and effectiveness and update the CoC when necessary and in consultation with Members.
- 6.10. As a framework for actions on reducing FLW, this CoC can supplement technical guidelines and codes of good practice to permit practical application. Further development, at the national level, of technical guidelines and codes of good practice could, for example, focus on specific food commodity sectors (such as grains, roots and tubers, fruits and vegetables, milk, meat and fish).

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ISBN 978-92-5-136030-9



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CB9433EN/1/06.22