Assessment Framework of the Regulatory Enabling Environment for Food Loss and Waste Prevention

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Reimagining our food systems to sustain our future

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List of Abbreviations and Acronyms

AI	Artificial Intelligence
BP	Best Practice
CEDAW	Convention on the Elimination of all Forms of Discrimination against Women
CFS	Committee on World Food Security
EPA	Environmental Protection Agency
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FLAPP	FAO Food Loss App
FLI	Food Loss Index
FLW	Food Loss and Waste
FWI	Food Waste Index
GDP	Gross Domestic Product
GHG	Greenhouse Gas
ICN2	Second International Conference on Nutrition
ICT	Information and Communications Technology
IFC	International Finance Corporation
IoT	Internet of Things
IT	Information Technology
KPI	Key Performance Indicator
LCA	Lifecycle Assessment
NDC	Nationally Determined Contributions
NGO	Non-governmental Organization
PAYG	Pay-as-you-go
R&D	Research and Development
SDG	Sustainable Development Goal
SMART	Specific, Measurable, Achievable, Relevant, Time-bound
SME	Small- and Medium-sized Enterprises
SOP	Standard Operating Procedure
UN	United Nations
UNEP	United Nations Environment Programme
US	United States
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VAT	Value-added Tax
WB	World Bank
WRAP	Waste and Resources Action Programme
WRI	World Resources Institute

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Abstract

Food loss and waste (FLW) represent significant challenges with profound socio-economic and environmental implications, including global food insecurity, economic losses, and greenhouse gas emissions. Recognizing the need for systematic action, this document introduces a comprehensive Assessment Framework for the Regulatory Enabling Environment for FLW Prevention. Complementing the "Best Practices for Food Loss and Waste Regulatory Enabling Environment: Guideline for Government," this framework offers governments a practical tool to evaluate and improve strategies to reduce FLW.

Built upon the Target-Measure-Act (TMA) approach, this framework provides a structured checklist to assess national policies, regulations, and practices. It offers actionable insights to enhance alignment with global benchmarks, including Sustainable Development Goal (SDG) 12.3. By addressing critical gaps and identifying opportunities, this framework enables the development of evidence-based interventions tailored to national and regional contexts. It emphasizes stakeholder engagement, infrastructure readiness, and fiscal measures, underscoring the importance of a holistic approach to FLW prevention. This document serves as a practical guide for policymakers to develop tailored FLW interventions that enhance food system resilience, reduce environmental impacts, and achieve global sustainability goals.

Introduction

The Food Loss and Waste (FLW) Checklist accompanies the "Best Practices for Food Loss and Waste Regulatory Enabling Environment: Guideline for Government" (Tutundjian & Maroun, 2024) document by offering governments, policymakers, and practitioners a practical tool to assess and enhance strategies aimed at reducing FLW.

FLW is a critical global issue with profound social, economic, and environmental impacts. Current data show that approximately 40% of food produced worldwide is lost or wasted, leading to economic losses exceeding $1 trillion annually and contributing significantly to greenhouse gas emissions, freshwater use, fertilizer consumption, and land use (WWF, 2021; WB, 2020; Flanagan et al., 2019). Moreover, a substantial portion of the global population suffers from food insecurity, making it imperative to address FLW comprehensively.

The assessment framework is rooted in internationally recognized best practices (BPs) identified through a review of key documents from leading international organizations, major FLW frameworks, and reduction strategies. Designed as an addendum to the "Best Practices for Food Loss and Waste Regulatory Enabling Environment: Guideline for Government," this document complements and enhances the guidelines provided by offering a detailed, actionable checklist for governments to follow. It assists government institutions in conducting a thorough self-assessment of their current initiatives aimed at preventing and reducing FLW.

The checklist is structured around the Target-Measure-Act approach, offering a series of guiding questions that delve into each aspect of government efforts to manage FLW, with the objective of preventing and reducing food that exits the food chain and ends up in landfills. By providing this detailed checklist, the document ensures that government entities have a comprehensive tool to evaluate and improve their policies, strategies, and actions related to FLW. Users of the checklist are encouraged to review the accompanying guideline document to gain a more complete understanding of the regulatory and enabling environment necessary for effective FLW management. Together, these documents provide a robust framework for governments to develop, implement, and refine their FLW reduction initiatives.

The development of this checklist involved a mixed-methods approach to analyze existing policies, regulations, and practices affecting FLW. For validation, feedback on the identified BPs and assessment framework was solicited from attendees of the "Circular Food Economy" workshops in Nepal and Malawi, including policymakers, private sector, and civil society representatives from Nepal, Bangladesh, Malawi, and Mozambique. The list of BPs and framework were also presented at the "Reducing Food Loss and Waste: Dual Impact Actions to Address Climate Change and Improve Nutrition" workshop in Aspen, organized by USAID, USDA, and the Aspen Global Change Institute. Discussions from the Aspen workshop further informed this analysis.

The desk study, workshop discussions, questionnaire results, and the discussion at the Aspen workshop provided a robust foundation for the research, enabling a comprehensive understanding of the policy and regulatory environment surrounding FLW. The findings were synthesized into evidence-based recommendations of BPs for policymakers and this accompanying assessment framework, which together aim to inform more effective global FLW reduction strategies. These were used to create a comprehensive checklist that serves as a situational analysis tool for evaluating the enabling environment for FLW prevention.

By completing this self-assessment, decision-makers will gain valuable insights into the effectiveness of existing strategies and identify areas for improvement. The information gathered will serve as a solid foundation for developing a robust action plan to enhance national FLW reduction efforts. This tool is

intended to ensure that the strategies are well-aligned with the goals and are effectively contributing to Sustainable Development Goal (SDG) Target 12.3.

Structure and Use

Structure

As previously mentioned, the checklist structure is based on the Target-Measure-Act approach. As such, it is split into three main sections: (a) Target, (b) Measure, and (c) Act. Each section is further divided into subsections that include questions related to that overall section.

The checklist begins with setting clear targets, which involve establishing a national definition of food loss and food waste to ensure clarity and consistency in measurement and reporting. This section of the checklist also emphasizes the importance of having an FLW reduction strategy, which outlines the specific approaches and policies to be implemented at the national level. Additionally, it identifies the government commitments to FLW reduction targets as part of international pledges, such as nationally determined contributions (NDCs) and participation in international initiatives on FLW. Lastly, this section ensures that all critical areas are addressed, defined, and identified to establish a good base for measuring and coordinating an effective response to reducing FLW.

The second section, "Measure," is designed to ensure that FLW reduction efforts and targets that have been set in the previous section are supported by accurate and consistent data collection and analysis. It begins with the establishment of a national policy or instruction to measure FLW, which provides a framework for standardized measurement across the country. This is followed by the development of national baseline measurements to establish a starting point for assessing progress over time. Measurement alone cannot track progress; therefore, the next segment of monitoring, evaluation, and reporting emphasizes the importance of tracking and evaluating the effectiveness of FLW reduction strategies, reporting the findings, and encouraging transparency and accountability. Finally, it is important to identify and engage all relevant parties involved in FLW initiatives, ensuring a coordinated and collaborative approach. This is covered in the last segment of the "Measure" section, which outlines stakeholder mapping.

The final section of the checklist, "Act," encompasses the questions around the planned and ongoing key actions necessary to reach the targets set for FLW reduction, how to encourage stakeholders, and what is needed in the enabling environment. An important implementation tool is the application of fiscal measures that incentivize waste reduction and promote sustainable practices. It is also important to have a supportive policies, regulations, and instructions to create an enabling environment for FLW mitigation. Ensuring adequate, accessible, and affordable infrastructure is crucial for efficient food distribution and storage, which in turn reduces spoilage and waste. The sections on donation and/or redistribution of safe food and development of alternative markets emphasize the different valorization options for surplus food. The need for innovative methods and technologies are covered in the research and development (R&D) and technology and AI sections. Additionally, the checklist includes extension/education programs for producers, handlers, processors, and packagers to enhance their skills and knowledge. Lastly, it emphasizes outreach/education programs targeting consumption points such as retail, food services, and households to raise awareness and encourage responsible consumption practices.

Preparation

Gathering information and answers to the checklist questions is based on a mixed methods approach. This includes but is not limited to reviewing available laws, regulations, action plans, strategies, frameworks and reports, as well as engagement with different stakeholders and some targeted site visits.

Prior to commencing a situational analysis using this assessment framework, a timeline should be set for the completion of the checklist. The timeline should also include time for the findings to be shared with stakeholders for their feedback. The length of time should also take into consideration if the team working on the checklist has other work commitments to complete that will not allow them to work in a continuous manner.

The work associated with completing the checklist (gathering the appropriate information) will take time and resources. It is advisable that a team (i.e., more than one person) is put together to complete the work. The leading agency should designate a capable individual with the required capacity and resources to pool other stakeholders and form an efficient team to complete the assessment. It is also recommended that the stakeholders involved in the situational analysis are not all from the same entity but represent different entities to ease the data gathering exercise. The team should be well versed in gathering all types of data from different sources and able to analyze and assess both qualitative and quantitative data.

Gathering Information

Information gathered from the checklist can be done in parallel by different members of the assessment team, as different questions from the checklist need to be answered by one or more authorities. The team gathering the information must review the "Best Practices for Food Loss and Waste Regulatory Enabling Environment: Guideline for Government" document in addition to this addendum. The team must be familiar with the questions and information required prior to meeting stakeholders to maximize the use of their time and minimize the need for repeated site visits or interviews. Any information that is not available should be noted by the team as a "data gap," and the team needs to discuss internally and with relative institutions and stakeholders if the assessed component with no data is relative to the local context or not. If relative, then the team needs to identify it as a "data gap," and if not relative then as "not applicable."

During data collection and specifically when assessing and reviewing FLW-related interventions, the team should also consider other contextual factors. These factors include the status of agri-food systems, such as dependency on food imports and local production sufficiency. Governments should consider social and cultural dimensions like population growth, demographic shifts, urbanization trends, consumer preferences, and nutritional needs. Constraints on natural resources, as well as the impacts of climate change and vulnerability to disasters, trade-offs among different stakeholders, and prioritization of national goals, such as reducing food losses versus food waste and increasing local production, should all be considered.

Focus group discussions and in-depth interviews with key stakeholders can help address any information gaps identified after the initial desk review. Organizing a stakeholder workshop is an effective method to gather additional insights, as is conducting in-depth interviews and focus groups with key informants or potential stakeholders and carrying out surveys if needed with both public and private sector entities as well as civil community groups.

After Checklist

Once in the information gathering exercise is complete, the team should consolidate all the data collected from various sources, such as desk studies, interviews, surveys, and workshops. This ensures that the information is organized coherently, facilitating easy access and analysis. Next, review the consolidated data to identify common themes, patterns, and any conflicting information, which helps in understanding the overarching trends and discrepancies within the dataset. Evaluate the validity and relevance of the information to ensure it is up-to-date and applicable to the current context of the situational analysis by cross-checking data against other sources.

Information gathered from each section of the Target-Measure-Act framework should be analyzed within the local context to identify:

What are the opportunities?

When determining opportunities, it is important to examine how existing infrastructure, current policies, regulations, and partnerships can facilitate the needed actions and interventions. Moreover, we should also assess resource availability by determining what financial, technological, and human resources are currently accessible and exploring possibilities for reallocating or acquiring additional resources to support identified initiatives. Different opportunities will arise for the different stakeholders and sectors within the food supply chain, such as efficiency improvements, opportunities for partnerships, community engagement, and educational programs.

What are the gaps?

Once opportunities have been determined, it is important to identify the existing gaps that require attention to facilitate and support current and future interventions to address FLW. The process of identifying gaps in all evaluated aspects in the checklist is required to understand the deficiencies in existing policies, infrastructure, practices, and interventions. By the end of this step, the assessment team should be able to pinpoint missing or outdated regulations, areas lacking enforcement, gaps in funding, adequacy of economic incentives, deficiencies in knowledge and skills, technological gaps, and infrastructure deficiencies and bottlenecks, as well as gaps in communication, coordination, and partnership mechanisms that hinder effective FLW management.

Consequently, the team can identify areas where current actions are insufficient or where new initiatives are needed to enhance the effectiveness of FLW prevention and reduction efforts. This information helps in identifying potential interventions and developing targeted evidence-based strategies, leading to a more effective and sustainable approach to managing food loss and waste.

Analysis of existing interventions

Before identifying potential interventions and areas of action, it is important to examine the appropriateness, effectiveness, and efficiency of existing interventions. For each intervention identified during the analysis under the three sections of the checklist, it is recommended to do a deep dive to assess the socio-economic benefits and costs at the macro and micro level. Benefits and cost of interventions vary depending on the scope and magnitude of the intervention, which component of the food value chain is targeted, who is financing it, and more. An environmental analysis, including carbon footprint, biodiversity impact, land footprint, water footprint, and air and water quality impact should also be carried out. A lifecycle assessment (LCA) will determine the potential environmental impacts of resources from cradle to grave, which will assist in determining hotspots along the supply chain and identifying trade-offs. The trade-offs on different stakeholders and supply chain stages need to be examined. Each intervention affects stakeholders differently—while one intervention may be beneficial for some, it may also be a burden to others. Further to this, the administrative, financial, technological, and infrastructure burdens of implementing any type of intervention or action must also be taken into consideration, as they may differ from one stakeholder to another.

After completing the above socio-economic, environmental, and trade-off assessments and identifying the various constraints, we suggest the team utilizes the European Union (EU) assessment framework for food waste interventions, which examines the effectiveness, efficiency, sustainability over time, transferability and scalability, and intersectoral cooperation of each intervention (Caldeira et al., 2019).

First, the quality and design of the intervention should be assessed. Is the objective of the intervention clear and to the point? Does it identify the problem, the KPIs, and the monitoring plan and tool? Next, the effectiveness and efficiency are assessed. KPIs are monitored before, during, and after implementation to assess whether the objectives are met, and if financial, human, and material resources are used efficiently.

Sustainability over time ensures that the benefits of the actions are maintained in the long run. This ensures that the intervention is environmentally, financially, and socially sustainable. Next, transferability and scalability of the action should be determined to establish if the intervention can be adapted and implemented in different contexts or scaled up. Finally, intersectoral cooperation is essential for continued collaboration between different sectors and stakeholders.

Once the assessment of each intervention is complete it will be easy for the user of this document to assess whether it is feasible to continue, improve, or scale up these interventions.

What are potential interventions?

Based on the gathered information, the team can identify the priority areas for improvement and propose a comprehensive list of potential interventions to address identified gaps and hotspots in a transparent and effective manner.

It is recommended to complete a deep dive for each identified potential intervention to assess the socio-economic benefits and costs at the macro and micro level. Environmental impact should be assessed, as well as trade-offs, administrative, financial, technological and infrastructure burdens, and potential barriers and constraints as mentioned above for existing interventions. Based on the results of this analysis, the team can identify suitable interventions and prioritize them.

When designing interventions, it is important to make sure they are Specific, Measurable, Achievable, Relevant, and Time-bound (SMART), that the required financial and human resources are clearly specified, and that a monitoring system to track progress and make adjustments as needed is proposed.

Findings and recommendations report

Once the data is reviewed and assessed, summarize the key findings by drafting a comprehensive situational analysis report. This draft report should be clear, concise, and well-structured, highlighting the current state of FLW and identifying opportunities, areas of concern, and recommended interventions and their expected outcome.

The information should then be presented to key stakeholders in an organized workshop. The objective of the workshop will be to present the aim of the situational analysis, including the steps, the findings, and the conclusions for needed intervention, and open the floor for discussions regarding gaps of information, confirmation of data, and discussions of the way forward to develop effective reduction strategies. This is a vital tool for the project team and stakeholders to have a shared understanding of the current FLW landscape.

Finally, use the insights gained from the workshop and the data-gathering exercise to write a report outlining the current situation of the FLW prevention regulatory framework of the county. The report can then be used to develop evidence-based strategies, action plans, and effective interventions for FLW reduction.

Definitions

Food: globally adopted definition as per the Procedural Manual of the Codex Alimentarius Commission (FAO and WHO, 2019), food is "any substance (processed, semi-processed, raw) **intended for human consumption**. It includes drinks and substances used in the manufacture, preparation or treatment of food. It doesn't include cosmetics, tobacco or substances used only as drugs."

Food loss and waste (FLW): definitions of FLW are not always consistent, with variations between classifications by the European Parliament, the United States Environmental Protection Agency (US EPA), the Food and Agriculture Organization (FAO), the United Nations Environment Programme (UNEP), and the Food Loss and Waste Accounting and Reporting Standard (UNEP, WRAP and WRI) (Breewood H., 2019). For this document, we adopt the "food Loss" definition of FAO, who is the custodian of the Food Loss Index (FLI), and the "food waste" definition of UNEP, who is the custodian of the Food Waste Index (FWI). Below each definition we list some of the other used definitions for the readers' information:

> **Food loss**: the decrease in the quantity or quality of food resulting from decisions and actions by food suppliers in the chain, excluding retailers, food service providers, and consumers. Empirically, the term refers to any food that is discarded, incinerated, or otherwise disposed of along the food supply chain (which starts with harvest/slaughter/catch and runs up to but excludes the retail level) that does not re-enter the supply chain for any other productive use, such as for feed or seed. (FAO, 2019)
>
> *Other Definitions*:
>
> US EPA: food loss often refers to unused product from the agricultural sector, such as unharvested crops. For purposes of SDG Target 12.3, food loss occurs from production up to (and not including) the retail level (US EPA, 2021).
>
> UNEP: food loss is defined as all the crop and livestock human-edible commodity quantities that, directly or indirectly, completely exit the post-harvest/slaughter production/supply chain by being discarded, incinerated, or otherwise discarded, and that do not reenter in any other utilization (such as animal feed, industrial use, etc.), up to, and excluding, the retail level. Losses that occur during storage, transport, and processing, also of imported quantities, are therefore all included. Losses include the commodity as a whole with its non-edible parts otherwise removed from its edible mass at the production, post-harvest, and processing stages of the food chain (FAO, 2022).
>
> **Food waste**: refers to the decrease in the quantity or quality of food resulting from decisions and actions by retailers, food service providers, and consumers (FAO, 2022).
>
> *Other Definitions*:
>
> US EPA: food waste often refers to food not ultimately consumed by humans that is discarded or recycled, such as plate waste (i.e., food that has been served but not eaten), spoiled food, or peels and rinds considered inedible. For purposes of SDG Target 12.3, food waste occurs at the retail, food service, and residential levels and is managed by landfill, controlled combustion, sewer, litter, discards and refuse, co/anaerobic digestion, compost/aerobic digestion, and land application (US EPA, 2021).
>
> UNEP: food waste is defined as food and the associated inedible parts removed from the human food supply chain. "Wholesale food remains under the Food Loss Index and therefore should not be reported under the Food Waste Index." (UNEP, 2024)
>
> EU: food waste is all food (as defined in Article 2 of Regulations [EC] No. 178/2002) that has become waste.

Wasted food: food intended for human consumption that exists the supply chain at any point (this includes food loss and food waste).

Other Definitions:

> US EPA: uses the overarching term "wasted food" instead of "food waste" for food that was not used for its intended purpose because it conveys that a valuable resource is being wasted, whereas "food waste" implies that the food no longer has value and needs to be managed as waste.

Excess food: surplus food or food that is donated to feed people (US EPA, 2021).

Food produce considered unsuitable for direct consumption: crops otherwise left in the field, spent grains, fruit trimmings, vegetable peels, ugly produce, ripe produce, bycatch fish, animal by-products, and unsold animal products.

FLW accounting and reporting standard: allows for the measurement and reporting of FLW, and to define food loss and food waste according to their purpose of measurement (edible vs. inedible food, destinations). Food is categorized as edible and inedible food. The food that is not consumed and inedible is sent to possible destinations (animal feed, biomaterial/processing, co-digestion/anaerobic digestion, composting/aerobic process, controlled combustion, land application, landfill, not harvested/plowed-in, refuse/discards/litter, sewer/wastewater treatment) (Hanson et al., 2016).

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 (FAO, 2022).

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 (FAO, 2022).

Food banks: are nonprofit humanitarian aid organizations that collect, organize, and distribute food to nonprofit agencies and individuals to alleviate hunger and reduce food insecurity among those in need. Food banks often work with intermediaries like food pantries and soup kitchens. They receive food donations from producers, retailers, and individuals, and sometimes purchase additional supplies. In addition to ensuring that the donated food is safe, nutritious, and meets dietary requirements, food banks also strive to provide culturally appropriate and dignifying food options to overcome the stigma that some cultures associate with food banks. (Borusiak & Knežević, 2024).

Social supermarkets: a specific type of social enterprise and retail format designed to address poverty and material deprivation. They offer a limited assortment of products, primarily food, at significantly reduced prices or free of charge to people on low incomes. These nonprofits collect surplus food that would otherwise go to waste from producers, retailers, and individual donors and redistribute it to those in need. By doing so, they help reduce food insecurity, promote social inclusion, and provide environmental benefits through waste reduction. Social supermarkets operate on volunteerism and reinvest any profits into social projects (Borusiak & Knežević, 2024).

Food sharing initiatives: organized by social work institutions or individuals, they involve collecting unwanted and overproduced food from households and businesses and redistributing it to those who will consume it. Distribution can be through offline methods requiring storage space and clear communication on acceptable food types. Community refrigerators are a common method, though they face regulatory challenges in some countries due to differing perceptions of food safety risks. For example, the European

Commission's 2017 guidelines emphasize traceability and compliance with food hygiene regulations, but uncertainties remain for food sharing initiatives about the logistics and responsibility for ensuring food quality and safety (Borusiak & Knežević, 2024).

Food sharing platforms: digital solutions that facilitate the redistribution of surplus food, promoting sustainability by reducing waste and enhancing social inclusion. These platforms operate under three models: "sharing for money," which involves selling discounted food from businesses to consumers; "sharing for charity," where nonprofits distribute donated food to those in need; and "sharing for community," which allows individuals to share food with each other for free. These platforms use apps and websites to streamline the process, making it easier for providers and consumers to connect and share resources efficiently (Borusiak & Knežević, 2024).

Food markets: markets are referred to as primary, secondary, and alternative when discussing food. All markets offer routes for food products to be sold, but their structure, focus, and purpose all differ.

Pay-as-you-go (PAYG) programs: financial models geared towards small operations and low-income users to make technologies more accessible and affordable. Within these programs, users can pay in increments for the services and technologies they use, rather than a large upfront investment. This model aims to lower the financial barrier to acquiring technologies and has been used by financing agencies such as FAO, the World Bank (WB), the International Finance Corporation (IFC), and others. (Ockwell et. al 2019)

Primary markets: the conventional and mainstream channels through which food products and produce are sold and distributed to consumers (e.g., supermarkets, grocery stores, wholesalers, and food service providers). Farmers and manufacturers use primary markets by directly selling their products to consumers or through other businesses such as retail shops. These markets usually have established large-scale distribution systems driven by demand and consumer needs (Deloitte, 2016).

Secondary markets: cater to surplus production, produce, and food that have not been sold in the primary market due to its appearance, or produce nearing expiry dates. The primary aim of these markets is to reduce food waste by redistribution of edible food that cannot be distributed and sold through primary markets. Examples include discount stores, food banks, and charities (FAO, 2019).

Alternative markets: serve the same purpose as primary markets but are considered non-traditional channels that offer producers direct sales to consumers. They usually emphasize local and organic products and tend to support artisan producers, small- and medium-sized enterprises (SMEs), small scale farmers, and organic growers. Examples include online platforms that only cater to small scale producers, farmers markets, farm-to-table initiatives, and other community-supported agricultural activities (Cicatiello, 2020).

Waste-to-value market: encompasses byproducts of food or waste materials not traditionally consumed and otherwise discarded (e.g., inedible and leftover parts of animals, fish, and plants; expired produce). These virtual or physical markets provide a platform for producers to connect with innovators who create value from these non-edible food components. Examples of valorization include producing jams from bruised fruits or creating animal feed from food scraps. Upcycled products like these illustrate the potential for converting waste into valuable commodities supporting a circular economy that maximizes the intrinsic value of materials and minimizes waste. (Tutundjian & Maroun, 2024).

FLW Enabling Environment Assessment Framework

As demonstrated in several countries, adopting the Target-Measure-Act approach is essential for effectively addressing FLW, as it provides a structured and measurable framework for countries to follow. Each phase of the approach plays a crucial role in ensuring that efforts are well-directed, tracked, and impactful. This assessment framework is broken down into three distinct sections in accordance with the Target-Measure-Act approach. Each section includes a set of key focus areas for the evaluator to assess.

A. Target

Setting explicit targets is the critical first step and involves establishing clear and ambitious goals for preventing and reducing FLW. By committing to such targets, both public and private entities can direct their attention and resources towards mitigating FLW. Sustainable Development Goal (SDG) 12.3, which aims by 2030 to reduce food waste by 50% in addition to reducing food loss, offers a global benchmark for countries to align national targets with.

In addition to assessing if there are any clearly defined FLW reduction targets that the government has committed to, this section aims to assess how ambitious these targets are, if they aligned with SDG 12.3, and if timeframes and geographic boundaries are stipulated.

A.1. National definition of food loss

This segment determines if there is a nationally unified definition of food loss that has been published.

Food Loss	√		Food Waste		

- What is the definition?
- Which definition is it consistent with?
  - FAO
  - US EPA
  - UNEP
- Where is the national definition published? (Identify all sites where it is published)
- Has it been widely shared?
  - How?
  - With whom - including public entities, private entities, others?

A.2. National definition of food waste

This segment determines if there is a nationally unified definition of food waste that has been published.

Food Loss			Food Waste	√	

- What is the definition?
- Is the definition consistent with international ones?
  - UNEP
  - FAO
  - US EPA
  - EU
- Where is the national definition published? (Identify all sites where it is published)
- Has it been widely shared?

- How?
- With whom - including public entities, private entities, others?

A.3. FLW reduction strategy

This segment assesses the status and depth of the countries ambitions for addressing FLW by evaluating the scope and depth of the strategies and plans it has in place. The FLW strategy may be an independent strategy, or it may be part of another national strategy such as a waste management strategy, environmental strategy, food security strategy, or others.

Food Loss	√		Food Waste	√	

- Is there a national FLW strategy?
  - If yes, is it a standalone strategy or part of a national waste management strategy?
  - What is the title of the strategy?
  - Which entity issued the strategy?
  - Year of publication and strategy timeframe?
  - In no, is there any strategy/action plan that addresses the issue of FLW (e.g., sector, industry, or region FLW strategy)[1]?
- Does the strategy include or refer to an action plan? Is it part of the strategy or separate document? Does it cover same timeframe?
- What are the defined objectives in the strategy and/or action plan?
- Does the FLW strategy and/or action plan set clear reduction targets? If yes:
  - What are the targets?
  - Are targets consistent with SDG 12.3 target of halving food waste by 2030 and reducing food loss? Or is it more or less than the SDG target?
  - Are there sub-targets?
- Is there a defined baseline year? What year?
- Are targets and sub-targets clear and measurable?
  - Is there a specified timeframe for each target and sub-target?
  - Are geographic boundaries specified (regions, cities, etc.)?
  - Do they target specific food categories?
  - Are they based per lifecycle stage (i.e., supply chain elements [production, processing, logistics, manufacturing] and consumption points [wholesale and retail, food services, households]?)
- Does the strategy call for private entities to set parallel reduction targets? All private sector entities, or specific ones?
- Does the strategy and/or action plan call for legally binding targets for FLW reduction? If yes, has this been done? If not, what are the plans?
- Does the strategy and/or action plan call for introducing a law pertaining to FLW reduction? If yes, has this been done? If not, what are the plans?
- Does the Strategy and/or action plan refer to the Target-Measure-Act approach and encourage public and private sector entities to pursue it?
- What are the interventions proposed by the strategy and/or action plan?

[1] If there is only a sector, industry or region strategy, answer the questions of this subsection as they relate to it.

- Does the strategy and/or action plan identify the responsible implementing agency or agencies?
  - Who are they?
  - Are the FLW scope and targets included in their individual mandates?

- Does the strategy and/or action plan identify the stakeholders within the value chain?
  - Who are they?
  - Was a stakeholder mapping exercise carried out during the development of the strategy and/or action plans?
  - Were these stakeholders engaged during the development of the strategy (e.g., public consultation, workshops, etc.)? In what way?
  - Do stakeholders have access to a platform to give feedback or suggestions on FLW strategies and policies?

- Does the strategy and/or action plan define the roles and responsibilities for these stakeholders within the value chain? All of them? Has this been shared with them?

- Has the government allocated sufficient financial resources to develop and implement the strategy and action plan? (Note: for developing countries, international organizations and donors can also be considered in this point)

- Does the strategy and/or action plan address how it will ensure the implementing agencies have the necessary capacity for effective execution, data collection, and monitoring?

- Does the strategy and/or action plan address how it will take measures to reduce FLW in the preparedness, response, recovery, and rehabilitation phases of emergencies (e.g., conflicts, pandemics, natural disasters)? Are measures in line with the "Sendai Framework for Disaster Risk Reduction 2015–2030" (United Nations, 2015)?

- Does the strategy include a monitoring framework or plan?
  - Are there clearly defined key performance indicators (PKIs)?
  - Does it call for establishing a monitoring system?
  - Does it identify who is responsible for monitoring and the reporting requirements?
  - Does it recommend and/or define periodic measurements? How frequent?
  - Does it require data to be publicly accessible?
  - Does it identify the budget required for monitoring?

- Is the strategy being shared and communicated to the public?
  - How?
  - With whom - including public entities, private entities, others?

- Is the strategy regularly updated and refined over time? Or, if recent, is there a plan to regularly update the strategy? Elaborate on the details of the process and frequency.

A.4. Government commitments to FLW reduction target as part of international pledges (e.g., NDC)

Food Loss	√		Food Waste	√	

- Is FLW included in the Nationally Determined Contributions (NDCs) of the country?
  - Is it under mitigation, adaptation, or both?
  - Are there any specific targets related to FLW?
  - If yes, what are they?
  - Are there any proposed FLW projects? What are they?

- Is FLW included in any of the following international frameworks that the country is committed to? If yes, in what way?
  - Second International Conference on Nutrition (ICN2) Framework for Action
  - United Nations Decade of Action on Nutrition

- Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)
- Committee on World Food Security (CFS)
- Global Strategic Framework for Food Security and Nutrition
- New Urban Agenda
- Global Methane Pledge

- Is the country participating in any FLW commitments to sub-regional and regional strategies on FLW reduction? Which ones?

A.5. Participation in international initiatives on FLW

Food Loss	√		Food Waste	√	

- Is there government participating in any of the following international initiatives related to FLW?
  - FAO Technical Platform on the Measurement and Reduction of Food Loss and Waste: (https://www.fao.org/platform-food-loss-waste/in-action/countries/en)
  - UNEP Food Loss and Waste Protocol Multi-Stakeholder Partnership: (https://www.flwprotocol.org/)
  - EU Platform on Food Losses and Food Waste (https://food.ec.europa.eu/safety/food-waste/eu-actions-against-food-waste/eu-platform-food-losses-and-food-waste_en)
  - EU Food Loss and Waste Prevention Hub (https://ec.europa.eu/food/safety/food_waste/eu-food-loss-waste-prevention-hub/)
  - Food is Never Waste Coalition (https://foodsystems.community/emerging_coalition/coalition-on-food-is-never-waste/)
  - The #123 Pledge of the Food is Never Waste Coalition (https://www.fao.org/platform-food-loss-waste/news/news-detail/123-food-loss-and-waste-pledge-for-climate-action/en)
  - Collaboration Initiative on Food Losses and Waste launched at MACS-G201 (https://www.macs-g20.org/about-macs/macs-activities/collaboration-initiative-on-food-losses-food-waste-launched-at-macs-g20)
  - International Food Waste Coalition (https://internationalfoodwastecoalition.org/)
  - FAO Save Food (https://www.save-food.org/)
  - Global Methane Pledge (https://www.globalmethanepledge.org/)

B. Measure

The saying "what gets measured gets managed" is particularly true for FLW. Accurate measurement of FLW within specified scopes is foundational for identifying hotspots and prioritizing intervention areas. This phase of the Target-Measure-Act framework focuses on utilizing standardized tools and methodologies to quantify FLW to enable the development of targeted and effective mitigation strategies and monitor progress.

Among the areas this section aims to assess is whether the country has carried out any FLW quantification efforts, the scope of these measurements, and their alignment with international methodologies and indices. Review government's medium- and long-term measurement, monitoring and reporting plans, and how they plan to use and disseminate results.

B.1. National policy or instruction to measure FLW

Food Loss	√		Food Waste	√	

- Is there a national policy that requires the establishment of a national baseline for food loss?
  - Does the policy or instruction provide the methodology to measure food loss or does it offer guidance on which standards or methodologies to use?
  - If yes, which methodology?
    - FLW Standard
    - FLI Methodology
    - List any other that is applicable.

- Is there a national policy that requires the establishment of a national baseline for food waste?
  - Does the policy or instruction provide the methodology to measure food waste, or does it offer guidance on which standards or methodologies to use?
  - If yes, which methodology?
    - FLW Standard
    - FWI Methodology
    - List any other that is applicable.

- Is there a national policy or instruction mandating municipalities to measure and report food waste within their jurisdiction?
  - Does this mandate apply to all municipalities or certain ones? If so, which ones?
  - Is the methodology they need to follow specified?
  - Are there guidelines, tools, and templates provided to guide them?
  - Is there a reporting system set? Elaborate on details if yes.

- Is there a national policy or instruction mandating businesses to measure and report FLW?
  - Does this requirement apply across the board or only to certain industries? If so, which ones?
  - Is the methodology they need to follow specified?
  - Are there guidelines, tools, and templates provided to guide them?
  - Is there a reporting system set? Elaborate on details if yes.

- Has the government fostered voluntary agreements with the private sector, producer organizations, and/or other relevant stakeholders on concrete commitments to contribute to national targets beyond the possible legal minimums? Elaborate if yes.

B.2. National baseline measurements

This segment examines if there is an established baseline for FLW in the country that is based on surveys carried out according to internationally recognized methodologies and can be used to identify hotspots and monitor progress.

B.2a Baseline for food loss

Assesses if there is a national baseline for food loss established according to internationally recognized methodologies and if the data is reported to FAO and UNEP.

Food Loss	√		Food Waste		

- Does a baseline for food loss exist?

If a baseline exists:

- What is the baseline year?
- Which organization(s) implemented the measurement to establish the baseline?
- Which organizations did they engage?
- Which methodologies were used to measure food loss?
  - What is the sample size?
  - Was the measurement based on the International FLW Standard[2]?
- Does the survey cover all six food baskets?
  - Did it include two commodities from each basket?
  - Does the measurement cover all points within the value chain?
- Are there quality control mechanisms to ensure the data quality?
  - What quality control mechanisms are in place throughout the data collection and reporting cycle?
  - How often are these mechanisms reviewed and updated to improve data quality?
- Does the report present the food loss in volume?
  - If so, what is the volume?
  - Does the report present this value in context of total value of food made available in the market?
  - What percentage of the total food locally produced does this loss represent?
  - What percentage of the total food imported does this loss represent?
  - Is the methodology for calculating it based on scientific existing data?
    - If so, list the sources.
- Does the report present the food loss in value?
  - If so, what is the value?
  - Does the report present this value in context of total value of food made available in the market?
  - What percentage of the total food locally produced does this loss represent?
  - What percentage of the total food imported does this loss represent?
  - Is the methodology for calculating it based on scientific existing data?
    - If so, list the sources.
- Is there a calculation of the environmental impact of the food loss:
  - Greenhouse gas (GHG) emissions
  - Water footprint
  - Land footprint
  - Biodiversity

[2] Quantification methods in Food Loss and Waste Accounting and Reporting Standard online: https://flwprotocol.org/flw-standard/; Guidance on FLW Quantification Methods. Online : https://flwprotocol.org/wp-content/uploads/2016/05/FLW_Protocol_Guidance_on_FLW_Quantification_Methods.pdf; Foods Loss Index (FAO, 2018).

- Is there a calculation of the socio-economic impact of food loss?
- What are the main destinations of this food loss?
- Has there been any study of the direct causes and underlying drivers of food loss?
  - If yes, were these studies carried out nationwide? Or only for specific regions?
  - Were these studies carried out for all food baskets or only for specific commodities? Which ones?
- Are the documents publicly shared and available? How and where?
  - If yes, how are they shared and where can they be accessed?
  - If no, who has access to them?
- Is there a next measurement cycle planned?
  - If so, when?

<u>If no baseline exists:</u>

- Is there a plan for establishing one?
  - Which agency is leading this effort?
  - What is the planned timeline?
  - Has a budget been allocated?

- Does the government incorporate information on the magnitude and value of food loss into relevant national accounting frameworks such as food balance sheets and agricultural gross domestic product (GDP) accounts?

- Does the government fill and submit food loss related information within FLAPP (the FAO food loss application)?

- Does the government fill and submit the annual questionnaire prepared by FAO to populate the report on the Food Loss Index[3].

- Has the government developed frameworks and introduced incentive schemes for the private sector, food supply chain actors, producer organizations, and other relevant stakeholders to collect and share food loss data using common data collection, compilation, and reporting approaches?

B.2b Baseline for food waste

Examines if there is an established baseline for the food waste in the country that is based on surveys carried out according to internationally recognized methodologies, for which sectors, and if can it be used to identify hotspots and monitor progress.

Food Loss			Food Waste	√	

- Does a baseline for food waste exist?
  - Is the baseline national?
  - If no, are there regional, city-level, or sector level (retail, food services, households) measurements?
    - Which regions, cities, sectors have a baseline established?
    - Which regions and/or consumption points do not have a baseline?

<u>If yes, for each of the established baselines, answer the following</u>:

- What is the baseline year?
- Which organization(s) implemented the measurement to establish the baseline?
- Which organizations did they engage?
- Which methodologies were used for each consumption point?
  - What is the sample size?
  - Does the measurement cover seasonality?

[3] https://www.fao.org/fileadmin/user_upload/faoweb/statistics/questionnaires/FAO_SDGLoss_QUEST_2019.xlsx

- Was the measurement based on the International FLW Standard 4?

- Does the measurement cover edible, inedible, or both types of food?
- Does the measurement include all categories of food sold in the country?
  - If so, what are these categories (meat and seafood, milk and dairy, fruit and vegetables, cereal and grains, etc.)?
- Are there quality control mechanisms to ensure the data quality?
  - What quality control mechanisms are in place throughout the data collection and reporting cycle?
  - How often are these mechanisms reviewed and updated to improve data quality?
- Does the report present the food waste in volume?
  - If so, what is the volume?
  - Does the report present this value in context of total kilograms per person per year?
  - How does this value compare to the world average?
  - Is the methodology for calculating it based on scientific existing data?
    - If so, list the sources.
- Does the report present the food waste in value?
  - If so, what is the value?
  - Does the report present this value in context of total value of $ per person per year?
    - For the households' baseline, does it indicate what percentage of household expenditures it represents?
  - Is the methodology for calculating it based on existing scientific data?
- Is there a calculation of the environmental impact of the food loss:
  - GHG emissions
  - Water footprint
  - Land footprint
  - Biodiversity
- Is there a calculation of the socio-economic impact of the food wasted?
- What percentage does the food waste represent of the total food purchased?
- What are the main destinations of this waste?
- Has there been any study of the direct causes and underlying drivers of food waste?
  - If yes, for which consumption points were these studies carried (retail, food services, households)?
  - Was the study done on a national scale or for specific segment (e.g., school cafeterias) or geographic area (e.g., towns)?
- Are the documents publicly shared and available?
  - If yes, how are they shared and where can they be accessed?
  - If no, who has access to them?
- Is there a next measurement cycle planned?
  - If so, when?

If no baseline exists:

- Is there a plan for establishing one?
  - Which agency is leading this effort?
  - What is the planned timeline?
  - Has a budget been allocated?

- Does the government incorporate information on the magnitude and value of food waste in relevant national accounting frameworks?

[4] Quantification methods in Food Loss and Waste Accounting and Reporting Standard online: https://flwprotocol.org/flw-standard/; Guidance on FLW Quantification Methods. Online: https://flwprotocol.org/wp-content/uploads/2016/05/FLW_Protocol_Guidance_on_FLW_Quantification_Methods.pdf ; Foods Waste Index (UNEP, 2024).

- Has the government developed frameworks and introduced incentive schemes for the private sector, retail sector, consumer organizations, and other stakeholders to collect and share food waste data using common data collection, compilation, and reporting approaches?

B.3. Monitoring, evaluation, and reporting

This segment examines what plans have been put in place to monitor national FLW reduction targets, the interventions taken, and how results and progress will be evaluated and reported.

Food Loss	√		Food Waste	√	

- Is there a national plan for monitoring, evaluation, and reporting progress on food loss and waste reduction targets?

- Is the scope of the measurement for the monitoring, evaluation, and reporting progress on food loss and waste reduction targets as per the FLW Protocol[5]?
  - Does the plan cover food loss? All elements of the agro-value chain, or specific elements?
  - Does the plan cover food waste? All consumption points, or specific ones?
  - Does the plan cover edible, inedible, or both types of food?
  - Does it include all destinations?
  - Does the plan track redistribution and valorization of waste as per FLW hierarchy (which version of FLW hierarchy)?

- Are there monitoring, evaluation, and reporting plans at a region, city, or sector-specific level? If yes:
  - Does the plan cover food loss? All elements of the agro-value chain, or specific elements?
  - Does the plan cover food waste? All consumption points, or specific ones?
  - Does the plan cover edible, inedible, or both types of food?
  - Does it include all destinations?
  - Does the plan track redistribution and valorization of waste as per FLW hierarchy (which version of FLW hierarchy)?

- Are local authorities and/or waste management companies required to report the food waste they collect from households, retailers, and food service providers?

- Is there an assigned responsible institution to collect data, measure, monitor, evaluate, and report on national, regional, or sector-specific FLW reduction targets and interventions?

- Is there an earmarked public budget for monitoring, measuring, evaluating, and reporting on national FLW reduction targets and interventions?

- Is there a government policy and/or instruction requiring that measurement and monitoring reports are made public?
  - Does this requirement apply to all measurement and monitoring reports (both by public entities and private entities)? (Note: this is meant to help raise awareness of the issue, celebrate progress, enable benchmarking and motivate further action where progress is not being made)
  - Are there instructions on where to publish the reports? For example, should the reports be published on the website of the responsible ministry, institution, or private sector entity, or a designated national website?
  - Are there mandated instructions that measurement results be submitted to the FLI, FWI, FLAPP and Environmental Statistics Waste Questionnaire (UNSD/UNEP, 2022)?
  - Is there a designated or centralized process for submitting these results?

[5] Scope as of the FLW Accounting and Reporting Standard (Hanson et al., 2016), includes the specification of: Timeframe, Material Type, Destination, Lifecycle Stage, Geography, Organizational Boundaries.

- Is there a government initiative to ensure the sharing of measurement and monitoring reports and updates on food loss and waste data and progress?

- Are businesses required to measure and report (and keep an ongoing record of) the food waste they discard?
  - If yes, which businesses?
  - Does the plan cover food loss? All elements of the agro-value chain, or specific elements?
  - Does the plan cover food waste? All consumption points, or specific ones?
  - Does the plan cover edible, inedible, or both types of food?
  - Does it include all destinations?
  - Does the plan track redistribution and valorization of waste as per FLW hierarchy (which version of FLW hierarchy)?
  - Are there any financial incentives for businesses to measure and report?
  - Does this requirement apply to all businesses or only those that generate above a certain threshold?

Gather information on the Plans:

- Document title
- Timeframe
- Responsible institution
- Scope of responsibility
- Earmarked budget
- Monitoring methodology (census, sampling, mandatory industry measurement reports)
- Monitoring methods used
- Monitoring frequency

- Is there a government policy and/or instruction requiring that measurement and monitoring reports (of businesses) are made public?
  - Does this requirement apply to all measurement and monitoring reports (both by public entities and private entities)? (Note: this is meant to help raise awareness of the issue, celebrate progress, enable benchmarking, and motivate further action where progress is not being made)
  - Are there instructions on where to publish the reports? For example, should the reports be published on the website of the responsible ministry, institution, or private sector entity, or a designated national website?
  - Are there mandated instructions that measurement results be submitted to the FLI, FWI, FLAPP and Environmental Statistics Waste Questionnaire (UNSD/UNEP, 2022)?
  - Is there a designated or centralized process for submitting these results?

- Is there a government initiative to ensure the sharing of measurement and monitoring reports and updates on food loss and waste data and progress?

B.4. Map of stakeholders

This segment examines the stakeholders involved in the FLW value chain and their interconnectedness.

Food Loss	√		Food Waste	√	

- Is there a map of all stakeholders involved in the FLW value chain?
  - Who carried out the mapping exercise?
  - When was the mapping carried out?
  - Are there any stakeholders missing from the map?
  - Who are they?
  - Is this map regularly updated?
    - If so, how often?

- Is there data available for each supply chain stakeholder?
  - Number of locations
  - Size of stakeholder
  - Amount of food exiting the food chain in volume and value

▪ How does that amount exiting the food chain compare with the total production (for loss) and/or consumption (for waste)? ▪ Are the stakeholder entities with the largest shares of food exiting the food chain identified? ▪ How is this data accessible? ▪ Is this data regularly updated? - If so, how often?
o Who are key influencers for each stakeholder category?
o Is there data on the different organizations working on addressing the FLW challenge?
o Has an assessment been done to identify how different sectors within the food value chain are interconnected?
o What business or trade bodies exist in the country? ▪ Which of these include members from the supply chain, retailers, or food service providers? ▪ Does the government have access to member lists to identify which stakeholders are members of each trade body? ▪ Do any of the trade bodies have programs related to FLW, or waste management in general?

C. Act:

The final step in the Target-Measure-Act framework focuses on the implementation of interventions to address identified hotspots and underlying drivers of FLW. This phase is about translating targets and insights gained from measurement into concrete actions. It involves a range of strategies from technological solutions and management practices to behavioral changes and policy interventions. Without governments taking action to address the challenge of FLW, no progress is expected to materialize just by setting targets and measurements.

This section focuses on assessing areas of government action to facilitate creating an enabling environment for FLW prevention and reduction including incentivizing the private sector and the general public to take action. However, it does not assess action taken by the private sector or the general public.

C.1. Fiscal measures

This segment aims to identify the existing fiscal measures within the current regulatory system that provide financial incentives that encourage action across the food supply chain, consumption points, and waste management to prevent and reduce FLW. Financial incentives can come in the form of financial support, tax breaks, or credits.

C.1a Fiscal measures for food loss reduction

Assesses financial incentives that can encourage action to reduce food loss during harvesting, processing, production, storage, and transportation.

Food Loss	√		Food Waste		

- Are there any government grant funds, bonds, low-interest loans, loan guarantees, or impact investment funding dedicated to reducing food loss? Elaborate on what exists, identifying if any of the following are included:
  - Start-up financing for testing new technologies and business models
  - Financing scaling up proven technologies and business models
  - Pay-as-you-go (PAYG) programs to make technologies affordable for smaller operations (e.g., solar powered refrigeration units and mobile processing)
  - Financial support for establishing voluntary collective action structures
  - Depreciation allowances for equipment used to upcycle and/or valorize food waste.

- Does the country have any tax incentives to reducing food loss? Elaborate what exists, identifying if any of the following are included:
  - Reduced taxes or VAT rate for donation of surplus and unmarketable food
  - Reduced taxes or VAT rate for participation in food recovery programs to redistribute, upcycle, and/or valorize surplus and unmarketable food
  - Tax credits for investments in technologies and processes that reduce food waste, such as improved storage facilities and advanced refrigeration systems

- Does the country have any other fiscal measures that encourage food loss reduction?

- Analyze the above incentives for each stage of the agro-food supply chain including crops, animals, and aquaculture (production, processing, logistics, manufacturing), or only for certain elements?

- Are there policies in place that prevent unfair trading practices such as last-minute order cancellations by buyers of food commodities, or unilateral or retroactive changes to contracts? Elaborate.

- Are there philanthropic institutions in the country funding food loss prevention activities? Which ones?

- Are there philanthropic institutions that currently do not cover food loss but could potentially be convinced to do so?

- Are there foreign development programs in the country? Are any of them related to or address food loss?

- Are public-private partnerships and other relevant structures in place to facilitate cooperation and financing of infrastructure and measures that reduce food loss?

C.1b. Fiscal measures for food waste reduction

Assess financial incentives that can encourage action to reduce food waste within retail, food service, and households.

Food Loss			Food Waste	√	

- Are there any government grant funds, bonds, low-interest loans, loan guarantees, or impact investment funding dedicated to reducing food loss? Elaborate on what exists, identifying if any of the following are included:
  - Start-up financing for testing new technologies and business models
  - Financing scaling up proven technologies and business models
  - PAYG programs to make technologies affordable for smaller operations (e.g., solar powered refrigeration units)
  - Financial support for establishing voluntary collective action structures
  - Depreciation allowances for equipment used to upcycle and/or valorize food waste.

- Does the country have any tax incentives to reducing food loss? Elaborate what exists, identifying if any of the following are included:
  - Reduced taxes or VAT rate for donation of surplus and unmarketable food
  - Reduced taxes or VAT rate for participation in food recovery programs to redistribute, upcycle, and/or valorize surplus and unmarketable food
  - Tax credits for investments in technologies and processes that reduce food waste, such as improved storage facilities and advanced refrigeration systems
  - Landfill disposal fees
  - Incineration taxes

- Does the country have any other fiscal measures that encourage food waste reduction?

- Are these financial incentives across consumption points (wholesale and retail, food services, household) or only for certain elements?

- Are there policies in place that prevent unfair trading practices such as last-minute order cancellations by buyers of food commodities, or unilateral or retroactive changes to contracts? Elaborate.

- Are there philanthropic institutions in the country funding food waste prevention activities? Which ones?

- Are there philanthropic institutions that currently do not cover food waste but could potentially be convinced to do so?

- If there are foreign development programs in the country, are any of them related to food waste?

- Are public-private partnerships and other relevant structures in place to facilitate cooperation and financing of infrastructure and measures that reduce food waste?

C.1c. Fiscal measures to encourage FLW valorization

Assess financial incentives that can encourage action to recover and valorize organic waste, including food.

Food Loss	√		Food Waste	√	

- Are there financial incentives or tax breaks for organic FLW valorization?
  - What are the provided financial incentives?
  - Are they accessible to all actors within the food system?
    - Farmers/herders/fishers/foragers
    - Processors
    - Manufacturers
    - Logistics providers
    - Wholesale markets
    - Retail
    - Food service
    - Waste management companies
    - Individuals

- Identify which valorization activities are covered by financial incentives:
  - Upcycling of surplus and unmarketable food into food for human consumption
  - Upcycling of surplus and unmarketable food into feed for animals/insects
  - Recycling of surplus and unmarketable food for industrial use
  - Composting organic waste, including surplus and unmarketable food
  - Turning organic waste, including surplus and unmarketable food, into biochar
  - Utilizing organic waste, including surplus and unmarketable food, for energy production (biofuels)

C.2. Policies, regulations, and instructions are in place that support FLW reduction

This segment aims to examine the current policy framework to identify what is mandated as relates to food and organic waste, thereby identifying how this impacts food waste and opportunities for optimization. Given that instructions under different policies can impact food loss and waste, more than one policy needs to be assessed. Also consider policies and laws under development or submitted for approval.

Food Loss	√		Food Waste	√	

- Has there been any comprehensive assessment of all current laws and policy frameworks to identify if they have any clause that impacts food systems and that may encourage or discourage FLW?

- Have there been any modifications made to incorporate FLW reduction measures (to align action across policies, institutions, and legislations)?

- Are there efforts to align national policies with international best practices and standards for FLW prevention, reduction, and valorization?

C.2a. Anti food waste law

- Is there a comprehensive anti-food waste law in place or under development? If yes:
  - Who is the issuing agency?
  - Who is the regulatory authority?
  - Is there a penalty for non-adherence?
  - Does it set reduction targets?
  - Does it cover the full supply chain from farm to fork to bin?
  - Does it clearly define the roles and responsibilities of national, subnational, and local agencies coordinating FLW reduction efforts? Note identified roles and responsibilities.
  - Does the legislation outline any expected contributions of the private sector, civil society organizations, and other non-state actors? Note expected contributions.
  - Is it incentive-based or penalty-based?
  - For laws under development or being approved, what is the timeline for enactment?

C.2b. Waste Management Legislation

- Is there a legal framework (e.g., policy, strategy, law) for waste management in place or under development, or a separate legislation under environmental law or municipality policies?
  - If yes, who is the issuing agency?
  - Who is the regulatory authority?
  - Is there a penalty for non-adherence?
  - Does it cover biodegradable waste, surplus food, food byproducts, and secondary use of waste?
  - Is wasted food classified as waste or a byproduct?
  - Does it include the definitions of different waste streams? Is FLW defined? What else is included (e.g., biodegradable waste, composting etc.)?
  - Does the strategy identify priority actions or interventions related to organic waste?
  - Does the policy include any restrictions to waste landfilling?
  - Are there charges for waste sent to landfills? If yes, what are they? Give details of the charges in relation to organic waste.
  - Are there applicable waste collection charges? If yes, are they applicable to organic waste?
  - For laws under development or being approved, what is the timeline for enactment?
- Is waste segregation at source required according to the laws and applicable practices?
  - Is organic waste segregated and disposed of separately?
  - Is there a requirement to send organic waste to specific destinations? If so, list them.
  - Any other requirements concerning organic waste?
  - Does it require FLW to be separated from other organic waste and disposed of separately?
  - If yes, identify requirements for FLW.
- If no segregation at source, is the waste segregated at another location? Specify where, how, what, and any requirements?
- Does the waste management policy include a clear hierarchy for waste management?
  - Are there provisions for the recovery of food produce and products for human use?
    - If yes, what are they?
    - Are there special provisions in the legislation for products with damaged packaging and/or incorrect labeling that are still safe for human consumption?
    - Does the regulation address the issue of foods that have passed their "best before" date?
    - If no, is there a separate policy, guideline, or instruction that provides a legal framework for the recovery, redistribution, and upcycling of food produce and products for human use?
  - Are there provisions for recovery of food produce and products for animal feed?
    - If yes, what are they?
    - If no, is there a separate policy, guideline, or instruction that provides a legal framework for the recovery, redistribution and upcycling of food produce and products for animal feed?
- Does the strategy include and define "termination rules" for food?
  - How are "ready-to-dispose" foods defined?
  - Does it specify how and where these foods should be disposed of and eliminated? If yes, elaborate.
  - Is the regulation for food termination different for imported and locally-produced food?
- Does the waste management legislation clearly define the roles and responsibilities of national, subnational, and local agencies coordinating FLW reduction efforts? Elaborate on the roles and responsibilities of each.
- Does the waste management legislation outline the expected contributions of the private sector, civil society organizations, and other non-state actors? Specify the expected contributions.

C.2c. Agricultural or food policy legislation

- Is there an agricultural/food policy or law in place or under development?
  - Who is the issuing agency?
  - Who is the regulatory authority?
  - Does it address FLW? If yes:

- Does it set reduction targets?
- Does it identify FLW reduction measures?
- Does it cover the full supply chain from farm to fork to bin?
- Does it identify responsible authorities?
- Is it incentive-based or penalty-based?

- Does it address the use of agrochemical in food production (e.g., pesticides, herbicides, hormones, antibiotics, fertilizers, chemical additives, etc.)? If yes, elaborate on parameters:
  - Do they fall with globally accepted ones?
  - Can the parameters increase safety concerns that can lead to unnecessary disposal of food items?
- Who is the responsible regulatory authority?
- Is there enforcement?
- Is there a penalty for non-adherence?

- For laws under development or being approved, what is the timeline for enactment?
- Does it clearly define the roles and responsibilities of national, subnational, and local agencies coordinating FLW reduction efforts? Elaborate on the roles and responsibilities of each.
- Does it outline the expected contributions of the private sector, civil society organizations, and other non-state actors? Specify the expected contributions.

C.2d. Food Safety Legislations

This segment assesses the food and feed regulations meant to ensure public health. It aims to identify whether these regulations are comprehensive and adequate but not overly stringent, which may lead to the unnecessary disposal of perfectly fit food and feed.

- Are there requirements for food safety, hygiene, traceability of food products, official controls, withdrawal, and recall clearly defined and enforced in existing policies and legislation?

- Under which guidelines and laws are food safety regulations covered?
  - List these laws and for each one specify the following:
    - Who is the issuing agency?
    - Who is the regulatory authority?
    - Is there a penalty for non-adherence?
    - Are the food safety guidelines accessible and easy to read and follow?
    - Do the policies define and describe the responsibilities of all food business operators for the food safety of products under their direct responsibility?
    - What are food safety and hygiene requirements for food donation and redistribution activities?
    - What are food safety and hygiene requirements for food recovery and upcycling to new food products?

- Are there policies, national standards, and/or written guidelines that regulate food contaminants and adulterants?
  - List these policies.
  - Do they assert thresholds?

- Are there policies, national standards, and/or written guidelines on food packaging that prevent the use of contaminants that can migrate into food from food packaging?
  - List these policies.
  - Indicate the requirements.

- Are there any policies, instructions, or guidelines pertaining to utilizing food scraps and unmarketable food for animal feed?
  - List these policies and for each one answer:
    - Is it a separate law or guidance, or under another law? If under another law, which one?
    - Who is the issuing agency?
    - Who is the regulatory authority?

- Are there requirements for food safety, hygiene, traceability of animal feed products, official controls, withdrawal, and recall clearly defined? Elaborate on each component?
- What are food safety and hygiene requirements for utilizing FLW for animal feed?
- Do the policies define and describe the responsibilities of all food business operators for the food safety of products under their direct responsibility?
- Are legislations in the existing policies enforced?
- Is there a penalty for non-adherence? Is it applied?
- Are the food safety guidelines accessible and easy to read and follow?

- Are there any other entities or private sector groups that have their own food safety regulations?
  - List the entities and the relative regulations, and answer:
    - Are they based on the national legislations?
    - Do they address FLW?
    - Is there a regulating authority that ensures safety is in line with the national requirements?

- Does it clearly define the roles and responsibilities of national, subnational, and local agencies coordinating FLW reduction efforts? Elaborate on the roles and responsibilities of each.

- Does it outline the expected contributions of the private sector, civil society organizations, and other non-state actors? Specify the expected contributions.

- Do charities have to comply with all food safety and hygiene requirements applicable to food producers, food retailers, food service providers?

C.2e. Labeling regulatory framework

This segment assesses whether the labelling system in the country establishes a standardized labelling system that reduces consumer confusion about product safety and quality, which can reduce the discard of safe food.

- Is there a government policy/standard in place or under development with labelling instructions for food items? If yes,
  - Who is the issuing agency?
  - Who is the regulatory authority?
  - Is there a penalty for non-adherence?
  - What does this policy standard cover? Size, features, and format of packaging? Date labels ("use by" dates, etc.)? Storage guidance? Freezing instructions? Defrosting instructions? Tips for use of leftovers? Other?
  - Does it standardize date labels for perishable food and other food items?
  - Is it applicable only for locally produced food items, or also enforced on imported items?
  - Does it include labelling information required for recovered and redistributed food (e.g., minimum shelf life available when donating food, if food is safe beyond indicated date and for how long)?
  - For laws under development or being approved, what is timeline for enactment?

- Does it clearly define the roles and responsibilities of national, subnational, and local agencies coordinating FLW reduction efforts? Elaborate on the roles and responsibilities of each.

- Does it outline the expected contributions of the private sector, civil society organizations, and other non-state actors? Specify the expected contributions.

- Does it outline the expected contributions of the private sector, civil society organizations, and other non-state actors?

- If no government labeling policy or standard exists:
  - Is there a government instruction that standardizes date labels for perishable food and other food items? Is it applicable only to locally produced food items, or also enforced on imported items?
  - Is there a designated international food labelling standard adopted as guidance for labelling locally produced food?

- If any of the above policies/standards/government instructions exists, have there been any public education programs to ensure manufacturers, retailers, and consumers fully understand the meaning of the various labels (e.g., “use by,” “best before”).[6]
- Is there a national guidance or standard (or a designated international one to follow) for freezing and defrosting labelling for locally produced food and/or prepacked food sold at retailers?
- If such a guidance or standard exists, have there been any education programs to ensure manufacturers, processors, and retailers understand it?
- Are charities required to comply with food information requirements to consumers?

C.2f. Public Procurement Legislation

This segment assesses legislations governing public procurement for food to identify if it incorporates factors to encourage FLW reduction. Government public procurement can be for school feeding programs, government cafeterias, public universities, military, public hospitals, etc.

- Which entities handle government public food procurement?
- What kind of food procurement is occurring in the country?
- Is there any available information on the magnitude of food procurement? Elaborate on available data.
- Is there an overarching or unified procurement legislation for all entities involved in public food procurement?
- Review all government public food procurement regulations under these entities and:
  - Identify the clauses that may exacerbate food loss and/or food waste
  - Identify the clauses that may reduce food loss and/or food waste
- Are there any educational programs for public procurement offices on FLW reduction and the role of sourcing and procurement?
- Is there a guideline, handbook, or set of instructions for procurement officers on how to reduce food loss and/or food waste through better procurement practices? What considerations are taken into account?

C.2g. Regional Agreements

- Does the government have commercial agreements that are aligned to the FLW reduction agenda by aiming to streamline and optimize inspections and delays in customs?

C.2h. Others

- Are there any other existing or underway policies, laws, and/or instructions in the country that include clauses related to the food system that may encourage or discourage FLW?
- For each legislation, Identify:
  - Name of legislation
  - Who is the issuing Agency?
  - Who is the regulatory authority?
  - What clauses it includes that address food?

[6] "The 'use by' date is related to food safety, indicating that the food should be consumed by that specified time. In contrast, the 'best before' date pertains to food quality, implying that the food remains safe to eat beyond this date, although its optimal quality may have passed."

- How do these clauses impact FLW?

C.3. Adequate, accessible, and affordable infrastructure

This segment assesses the status of various infrastructure facilities to enable identifying structural weaknesses that can lead to food spoilage and food loss and waste.

Food Loss	√		Food Waste	√	

- How are road conditions in the country?
  - Assess urban road network.
  - Assess rural road network.
  - Assess road network connecting rural areas—particularly agricultural areas—to urban consumption points.
  - Are there any projects and/or plans for upgrades? Elaborate.

- Is there a rail network in the country?
  - Does it connect rural agricultural areas to urban ones?
  - How reliable is it?
  - Is it utilized for transporting food produce? If yes, which agricultural produce? If no, can it be?
  - Does it include cooled and/or refrigerated compartments?
  - Are there any projects and/or plans for upgrades? Elaborate.

- Land, air, and seaports:
  - Which food commodities and produce are being exported or imported through each of those ports?
  - What quantities of food produce is passing through each port (export and import)?
  - Is there any data on the food being destroyed for not meeting specification requirements? Analyze available data for trends.
  - Is there any data on the food being destroyed due to spoilage resulting from long custom processing time?
  - Is there a maximum time for processing food produce? Elaborate on any instructions on this.
  - Is there storage and cooling facilities for food produce at the port?
  - What is the condition of the cooling facilities in terms of building structure, cleanliness, hygiene, and air-temperature control? Are they well-sealed?
  - Are the cooling facilities adequate for the type of produce passing through?
  - Is the road connectivity between agricultural producing areas and ports adequate?
  - Is the road connectivity between ports and urban areas adequate?

- Are there adequate warehousing and distribution cold storage facilities throughout the agro-food chain? Consider what is available in each of the following value chain stages for all food categories (crop, aquaculture, and livestock):
  - Production sites
  - Processing and handling sites
  - Warehousing and distribution centers
  - Distribution fleets
  - Wholesale and retail locations
  - Households

- Are existing storage facilities clean, hygienic, well-sealed, and air-temperature controlled?

- Are there standard operating procedures (SOPs) for these facilities to increase efficiency, ensure food safety, and reduce spoilage?

- Are existing storage facilities energy-efficient and low-carbon? Are these permanent and/or mobile?

- Are there any refrigerated truck box producers and/or suppliers in the country?
  - Is it affordable?
  - Is there the option to lease them for consignment?

- Are there any cold/thermal packaging producers and/or suppliers in the country?

- Is it affordable?

- Is there adequate water infrastructure to provide access to clean water for businesses along the food supply chain and consumption points (including informal retailers) for handling and cleaning food?
  - Which stages of the food supply chain or consumption points do not have adequate water infrastructure?
  - Which is the main issue: quantity or quality of water?
  - Are there alternative government schemes or support to ensure access to clean water?

- Is there adequate energy infrastructure to provide the required cooling capabilities?
  - Which stages of the food supply chain or consumption points do not have adequate energy infrastructure?
  - Are there alternative government schemes or support to ensure access to energy?
  - Are equipment and technologies for off-grid energy systems available in the market?
    - Which ones?
    - Are they affordable and accessible?
    - Is there local expertise to construct and maintain them?

- Is there IT infrastructure in place in the country?
  - Does it cover the entire country?
  - Is it affordable and accessible to all?

- Are there aggregation, processing, and preservation facilities in the country?
  - Are these facilities permanent, seasonal, and/or mobile?
  - Are they adequate?
  - Are they accessible to all agricultural areas where needed?
  - Are they energy efficient and low carbon?

- Are there food testing facilities to test for food safety and measure quality?
  - Are these facilities public or privately run?
  - What tests do they provide?
    - Visual examination and grading
    - Adulterant and contaminant analysis
    - Microbiological testing of total bacterial count
    - Chemical parameters
    - Micronutrient analysis
    - Nutritional and proximate analysis
    - Organoleptic test
    - Residual and toxins analysis
  - Are they adequate?
  - Are they affordable to all?
  - Are there SOPs for these facilities to increase efficiency, ensure food safety, and reduce spoilage?

- Adequate thermal processing infrastructure for processing food waste for animal feed to control microbial contaminants:
  - Are there SOPs for these facilities to increase efficiency, ensure food safety, and reduce spoilage?

C.4. Donation and/or redistribution of safe food

This segment assesses the enabling environment for food donation and/or redistribution of safe food.

Safe produce that may be considered unmarketable include surplus food, unsold food nearing expiration, cosmetic imperfections that do not affect food safety (e.g., visually imperfect produce or packaging, ugly produce, ripe produce), and crops otherwise left in the field.

Food Loss	√		Food Waste	√	

- Is there any form of food redistribution happening in the country? If so, which of the following main types are present?
  - Food banks

- Social supermarkets
- Food sharing initiatives
- Food sharing platforms

- Are there policies in place that allow for the donation of excess food that is still safe to consume?
  - Does it specify the parameters for what constitutes safe food for redistribution?
  - How rigorous or mild are these parameters? Identify areas that need improvement.
  - Is there a list of food items that are deemed acceptable to donate?
  - Is there a list of items that are not acceptable to donate?
  - Does it cover all possible surplus food providers in the supply chain (farmers, food producers, importers, wholesalers, retailers, food services and catering businesses, individuals, and households)? If it doesn't cover all, which food surplus providers does it cover?
  - Are the applicable liability laws and concerns over safe handling clearly stipulated, accessible, and known?
  - Does the policy or addendum to the policy include clearly defined procedures for the transfer of excess food from the donor to the recipient to facilitate traceability?
    - Registration requirement for donors.
    - Registration requirement for recipients.
    - List of mandatory information the donor must keep records of.
    - List of mandatory information the recipient must keep records of.
    - Reporting requirement of food donation for donors.
    - Reporting requirement of received food donation for recipients.
    - Labelling requirements by donors.
  - Does it address how liability is determined when food safety issues arise? Elaborate.

- Are there policies in place that allow for the donation of unmarketable food that is still safe to consume?
  - Does it specify the parameters for what constitutes safe food for redistribution?
  - How rigorous or mild are these parameters?
  - Identify areas that need improvement.
  - Is there a list of food items that are deemed acceptable to donate?
  - Is there a list of items that are not acceptable to donate?
  - Does it cover all possible surplus food providers in the supply chain (farmers, food producers, importers, wholesalers, retailers, food services and catering businesses, individuals, and households? If it doesn't cover all, which food surplus providers does it cover?
  - Are the applicable liability laws and concerns over safe handling clearly stipulated, accessible, and known?
  - Does the policy or addendum to the policy include clearly defined procedures for the transfer of unmarketable/unsold food from the donor to the recipient to facilitate traceability?
    - Registration requirement for donors.
    - List of mandatory information the donor must keep a record of.
    - Reporting requirement of food donation for donors.
    - Labelling requirements by donors.
  - Does it address how liability is determined when food safety issues arise? Elaborate.

- What are the policies in place pertaining to food redistribution organizations and platforms that accept and gather surplus food donations with the purpose of redistributing it to individuals or nonprofit organizations (e.g., food banks, community centers, soup kitchens, food pantries, etc.)?
  - Does it facilitate the establishment of these institutions?
  - Does it provide incentives to them?
  - Are special licenses required?
  - Does the policy or addendum to the policy include clearly defined procedures for accepting the transfer of unmarketable/ unsold food from the donor?
    - Registration requirements for recipients.
    - List of mandatory information the recipient must keep a record of.
    - Reporting requirement of received food donation for recipients.
  - Does it address how liability is determined when food safety issues arise? Elaborate.

- What procedures exist for food control and inspection, sampling, and laboratory analysis of donated food? Elaborate.

- Are there any policies and or financial barriers that limit the redistribution and donation of food?
  - What are these policies?
  - Who is the issuing authority?
  - Who is the regulatory authority?
  - Do they apply to all potential food providers in the supply chain (farmers, food producers, importers, wholesalers, retailers, food services and catering businesses, individuals, and households)?
  - How can these policies be improved to align with the FLW valorization hierarchy?

- Are there policies in place that allow for the establishment of secondary markets for produce that is still safe for human consumption but may be difficult to market?
  - What are these policies?
  - Who is the issuing authority?
  - Who is the regulatory authority?
  - Does it specify the parameters for what constitutes safe food for redistribution through secondary markets?
  - How rigorous or mild are these parameters?
  - Identify areas that need improvement.
  - Is there a list of food items that are deemed acceptable to donate?
  - Is there a list of items that are not acceptable to donate?
  - Does it set clearly defined procedures in place to facilitate traceability?
    - Registration requirement.
    - List of mandatory information for which records need to be kept.
    - Reporting requirement.
    - Labelling requirements.
  - How can these policies be improved to align with the FLW valorization hierarchy?

- What are the policies in place that mandate the destruction of food?
  - Who is the issuing authority?
  - Who is the regulatory authority?
  - Can it lead to the destruction of food items that are still safe for human consumption?
  - Can it lead to the destruction of food items that are still safe to valorize?
  - Does it mandate any record keeping?
  - How can these policies be improved to align with the FLW valorization hierarchy?

- Are there any financial incentives encouraging the redistribution and donation of food (e.g., liability limitations, tax breaks) that make it easier for food suppliers to donate safe (but unsold) food to charities or those in need?
  - Are there government programs and funding that support opening and maintaining food redistribution centers that supply food for free (e.g., food banks, soup kitchens, food pantries, community centers)?
  - Are there government initiatives to facilitate the establishment of secondary markets for produce that is still safe for human consumption but that may be difficult to market?
  - Are there government incentives targeting secondary markets?

- Are there any published guidelines on food donation?[7]
  - Where are these guidelines published?
  - How are they publicized?

- Are there any published guidelines for food recovery and redistribution?[8]

[7] For an example refer to the European Union guidelines on food donation published by the European Commission in 2017: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017XC1025(01)&from=EN.

[8] For an example refer to the Practical Guide for Food Recovery and Redistribution in Europe and Central Asia published by FAO in 2016: www.fao.org/uploads/media/Food_recovery_and_redistribution_guide.pdf. Additionally, FAO has developed a webpage which includes links to guidelines developed by different countries to address recovery and redistribution of safe and nutritious

- Where are these guidelines published?
- How are they publicized?

- Has a stakeholder mapping exercise of those involved in food redistribution and donation been done?
  - When was the mapping carried out?
  - Is there a publicly available document?
  - Has a coordination mechanism been established to facilitate coordination among stakeholders?
    - How effective is it?
    - Are all relative stakeholders part of it?
    - Who is facilitating it?

C.5. Alternative markets

This segment assesses the existence of alternative markets for food produce considered unsuitable for direct consumption and how they are governed. By alternative markets we are not necessarily only referring to a physical market where food produce considered unsuitable for direct consumption is traded, but also to businesses or initiatives that collect this produce to utilize it.

Food Loss	√		Food Waste	√	

- Other than food donation and redistribution of unmarketable/unsold food, is there any other intervention to recover, upcycle, and valorize unsold/unmarketable food, food scrapes, and/or organic waste happening in the country? If yes, which one(s):
  - Upcycling into food products
  - Upcycling into feed
  - Industrial uses
  - Composting
  - Biochar
  - Waste-to-energy
  - Other

- Are there policies or instructions in place that allow for food valorization? If yes, which one(s):
  - Upcycling into food products
  - Upcycling into feed
  - Industrial uses
  - Composting
  - Biochar
  - Waste-to-energy
  - Other
  - Do these policies/instructions include clear guidance on requirements applicable for different valorization activities? Specify guidance for each.

- Are policies in place that allow for the establishment of alternative markets for produce considered unsuitable for direct consumption?

- Is there sufficient infrastructure to support the collection, transportation, and processing of food considered unsuitable for direct consumption?
  - Identify main gaps.

- Are there alternative markets for produce considered unsuitable for direct consumption? If yes:
  - What are these markets?

food: Recovery and redistribution of food | Technical Platform on the Measurement and Reduction of Food Loss and Waste | Food and Agriculture Organization of the United Nations (fao.org)

- Processing and value addition to develop food products safe for human consumption (e.g., process fish skin into healthy snacks, process pulp from vegetable and fruit juicing into crackers, etc.).
- Processing and value addition to develop animal feed.
- Processing and value addition to produce non-food or feed items (e.g., citrus peels to produce essential oils, orange peel to produce fabric).
- Composting and organic fertilizers.
- Waste-to-energy, including bioenergy production.
- Other

- Are there logistical solutions in place to connect producers with alternative markets efficiently?
- Are there networks or platforms facilitating collaboration among businesses, non-governmental organizations (NGOs), and government entities involved in food valorization?
- Are there mechanisms in place for tracking and reporting the quantities and types of food being valorized in alternative markets?
- How much organic waste do these markets require?
- Are these markets/businesses private or government run?
- Are these markets/businesses financially sustainable?
- How is the effectiveness of these alternative markets monitored and evaluated?
- Has there been any research carried out in the country on consumer trends and market demand for products made from upcycled or valorized food?
- Are there success stories or case studies captured and shared to raise awareness and promote best practices?

- Are there certifications or standards in place for products made from upcycled or valorized food?
  - For which produce?
  - Are these certifications recognized and trusted by consumers and businesses alike?

- Are there government or government-supported programs to identify financially viable alternative markets or uses for produce considered unsuitable for direct consumption?

- Is there a guideline that provides information and technical advice for businesses on the different options for utilizing organic waste, the requirements for each, potential market and return on investment, and links to actual case studies and success stories?

- Are there government initiatives for businesses and start-ups to facilitate the establishment of valorization pilots and activities? This can include financial support, tax breaks, technical support, facilitating business set-up processes, etc.
  - What kind of government support?
  - For what kind of valorization?
  - What are the conditions for qualifying?
  - Are the private sector, research, and academia fields aware of these initiatives?

- Are there government incentives such as tax breaks or financial incentives for these alternative markets? Elaborate.

C.6. Research and Development (R&D)

This segment aims to assess the level of government support for research and development in the country for emerging innovations that aim to prevent, reduce, and valorize organic waste.

Food Loss	√		Food Waste	√	

- Are there government initiatives that bring together and encourage partnerships between academic institutions, research centers, and businesses for the development of innovative solutions that address FLW?
  - What are these initiatives?
  - Is there an active platform that facilitates dialogue and collaboration?

- Are there government investments in government R&D for reducing FLW? If yes, for what?

- Are there any ongoing research and innovation programs in the country for developing new methods and technologies for FLW reduction? If so, map out efforts and the corresponding organizations.

- Is there government support (technical and/or financial) for agrifood research to develop technologies and innovations that prevent, reduce and valorize FLW? If yes, identify which areas:
  - To develop and test digital and smart agricultural technologies that optimize farm management (e.g., harvest timings, resource management, and crop monitoring).
  - To develop and test precision agriculture technologies to improve yield and reduce waste.
  - To develop technologies and innovations that minimize postharvest losses at the farm and/or processing and manufacturing facilities.
  - To develop technologies and innovations that decrease losses during storage and transportation.
  - To develop technologies and innovations that delay spoilage, preserve food quality, and extend the shelf life of products.
  - To develop innovative packaging solutions.
  - To develop valorization technologies for organic waste (e.g., conversion to processed foods, industrial products, animal feed) along with incentive schemes for manufacturers and businesses.
  - Research to bridge data gaps and/or standardize the reporting of FLW data to enhance the ability to compare results, set benchmarks, and offer clearer guidance for stakeholders.
  - To evaluate the causes and underlying drivers of FLW.
  - To evaluate the environmental impacts (including land, water, biodiversity, and climate) of FLW.
  - To evaluate effectiveness of FLW interventions and innovations.
  - To develop and assess policies and regulations that impact FLW reduction.
  - Other

- For each identified area above that is supported by the government, identify the kind of support extended by the government:
  - Funding and financial support in the form of:
    - Seed funding or grants for startups participating in FLW accelerator programs.
    - Investment matching private investments with public funds.
    - Financial support for running pilot projects and field trials to validate technologies and business models.
    - Tax incentives
  - Technical assistance in the form of:
    - Facilitating access to expert mentorship (industry experts, researchers, experienced entrepreneurs).
    - Technical advisory services.
  - Access to government-owned research facilities, laboratories, and technical resources.
  - Incubation facilities that provide:
    - Co-working spaces
    - Laboratories
    - Specialized equipment
  - Capacity building and training: on FLW reduction techniques, business development, regulatory requirements, and compliance, intellectual property rights, financial management, and market strategies.
  - Opportunities to attend and participate in industry conferences, trade shows, and expos related to FLW.
  - Assistance with market research and/or access to local and international markets (e.g., facilitating introductions to potential customers and distributors).
  - Public recognition programs, awards, and competitions.

- Is the government supporting (technically and/or financially) incubator or accelerator programs for FLW?
  - If yes, which of the following accelerators?
    - Early-stage accelerators supporting startups in the ideation and initial development phases.
    - Growth-stage accelerators supporting startups with a validated product and market traction to scale.
    - Sector-specific accelerators focused on specific stages in the food supply chain such as production, processing, distribution, or consumption.
    - Impact accelerators supporting startups with a strong social or environmental mission.
    - Thematic accelerators centered around specific themes within FLW.

- University-linked accelerators that focus on leveraging academic research and innovation to solve FLW challenges
- Geographic-focused accelerators targeting startups and businesses operating in specific geographic regions within the country.
- Tech-driven accelerators targeting startups and businesses working on cutting-edge technologies such as artificial intelligence (AI), Internet of Things (IoT), blockchain, and biotechnology.

- For each applicable startup:
  - What is the scope of the start-ups/businesses working on FLW that is supports (e.g., innovative valorization methods for organic waste, innovative packaging, food donation systems, food waste analytics, etc.)?
  - Is the accelerator funded or operated by the government?
  - Which government agency is responsible for it?

- Is there support for securing intellectual property rights for innovations in FLW reduction and valorization?
  - Are there programs to help researchers and businesses navigate the patenting process? Elaborate.

- Are there initiatives or agreements to collaborate with regional and/or international research institutions and organizations on FLW reduction and valorization?

- Are there opportunities for knowledge exchange and technology transfer from international partners?

C.7. Utilization of technology and artificial intelligence (AI)

This segment aims to assess the extent of utilization of technological innovations and AI within the agri-food system to optimize operations, enhance efficiency, and reduce spoilage, as well as the level of government support for the adoption and implementation of such technologies.

Food Loss	√		Food Waste	√	

- Is there government support for the adoption and implementation of technologies and AI to optimize operations to improve efficiency and reduce waste?

  <u>Farmers</u>:
  - What types of government grants or subsidies are available to farmers for adopting new agricultural technologies?
  - Are there specific training programs sponsored by the government to learn and implement new technologies?
  - Is there support to integrate smart farming technologies, such as IoT devices and precision agriculture tools, into existing farming practices?
  - Is there support for small-scale and marginalized farmers to have access to these technological advancements?

  <u>Supply Chain</u>:
  - Are there government initiatives to promote the use of digital tools to improve supply chain efficiency and transparency?
  - Do government regulations promote or hinder the implementation of new technologies?
  - Does the government support collaboration and partnerships between tech companies and supply chain actors?

<u>Retail</u>:
- What type of government funding is available for retailers to purchase and adopt new technological solutions?
- Does the government promote and support the digital transformation of retail operations, such as e-commerce and inventory management systems?
- Does the government address data privacy and security for retailers adopting digital technologies?

<u>Food Service</u>:
- Do government policies encourage the adoption of digital tools and tech innovations?
- Are there grants or financial assistance programs to help food service providers invest in new technologies?

- Are there grants or government programs to support training and capacity building for the use of new technologies?
- Does the government ensure and emphasize the need for food safety and quality standards when adopting new technologies?

- Are technology innovations used to facilitate farmers' access to better data and technical information to help with production efficiency and better scheduling of harvesting time?
  - What specific technologies are being implemented to provide farmers with real-time weather data?
  - Does the technology provide forecast data and weather alerts?
  - Do these technologies enhance production efficiency for farmers? How?
  - Do technologies promote environmentally friendly farming practices?
  - Are there mechanisms in place for farmers to provide input on the usability and functionality of the tools?
  - Is there online or available support to assist farmers in adopting the innovation?

- Does the country have information and communications technology (ICT) platforms that connect farmers to markets to enable them to better schedule harvesting time and rapidly respond to changes in supply and demand?
  - What are these platforms?
  - Are there mobile apps to allow farmers to have information on hand?
  - Are they open access?
  - Do they provide a platform to facilitate collaboration among stakeholders?

- Are technological innovations and digital tools employed to enhance communication and information flow along the supply chain, thereby:
  - Streamlining food transportation through real-time updates on road and traffic conditions?
  - Facilitating the scheduling of pickup and delivery times?
  - Improving demand and supply predictions to expedite food delivery?
  - Manage potential disruptions in the supply chain using predictive analytics?
  - Enhancing coordination of essential processes between suppliers and customers for more efficient and informed operations?
  - Identifying secondary and alternative markets for safe, surplus, or otherwise unmarketable food, connecting producers with new buyers?

- Are technology innovations and digital solutions used to optimize postharvest handling, processing, and storage to increase operational efficiencies while reducing losses? This includes but is not limited to:
  - Upstream communication tools with customers tied to planning tools to optimize the movement of produce to reduce losses.
  - Tools that facilitate analysis of historical data and predict future trends in demand and supply to optimize production and inventory levels.
  - Temperature management technologies to maintain optimal conditions within facilities to ensure freshness and safety.
  - Tools to assess ripeness and identify waste.
  - The use of remote video auditing to ensure best practices are being implemented.
  - Optimized inventory management systems in warehouses, wholesale, and retail.
  - Automated systems to assess the quality and safety of food products at various stages of the supply chain.
  - The use of robotics and automation technologies to streamline food processing and packaging operations.

- Are technological innovations and digital solutions used in the retail sector to improve operational efficiencies while reducing food waste? This includes but is not limited to:
  - Software solutions designed to streamline communication between suppliers, retailers, and consumers.
  - Technologies integrated with existing retail management systems.
  - Technologies to facilitate real-time data sharing and collaboration among supply chain stakeholders.
  - Tools to assess ripeness and identify waste.
  - Technologies help ensure compliance with food safety and quality standards.
  - Technological tools to optimize inventory management and reduce food waste.
  - Temperature management technologies to maintain optimal conditions within facilities to ensure freshness and safety.
  - Tools to enable retailers to respond more effectively to consumer preferences and feedback.

- Tools to monitor the environmental footprint of the retail facility.

- Are technological innovations and digital solutions used in the food service sector to improve operational efficiencies while reducing food waste? This includes but is not limited to:
  - Digital tools to track inventory levels to prevent over-ordering and under-utilization of food items.
  - Predictive analytics software solutions used to forecast demand and optimize inventory levels.
  - Digital solutions to standardizing portion sizes and track order patterns to adjust portion sizes and menu offerings accordingly.
  - Temperature management technologies to maintain optimal conditions within facilities to ensure freshness and safety.
  - Software solutions designed to streamline communication between suppliers, retailers, and consumers.
  - Technologies to facilitate real-time data sharing and collaboration among supply chain stakeholders.
  - Digital tools to streamline supply chain operations, ensuring timely delivery and reducing waste from delayed shipments.
  - Digital tools to monitor and measure food waste in the kitchen.
  - Open access platforms to share information about food waste and methods to reduce it and stay connected to stakeholders.

- Are there apps operational in the country for redistributing surplus food from retailers and food service providers? Is there government support to help them expand?

- Are there technologies aimed at helping consumers reduce food waste, such as apps for meal planning and food storage tips?
  - Have these contributed to changing consumer behavior and reduced waste at the consumption level?

- Are there any financial incentives to facilitate the adoption of technology innovations (along the supply chain and at consumption points) that improve operational efficiencies to maintain food quality and reduce wastage? (e.g., financial aid and/or tax breaks for local technology producers, reduced taxes on imported technologies).

C.8. Extension and education programs

This segment assesses the level of government support for extension services, awareness, and education programs that focus on reducing FLW by building capacity around best practices, innovative technologies, and sustainable methods to improve food handling, storage, distribution, and organic waste management.

Food Loss	√		Food Waste	√	

- Is the government supporting organizations (technically and/or financially) or other institutions to carry out extension/education programs for farmers, fishers, animal farmers, foragers, workers, handlers, processors, manufacturers, and transporters on best practices to reduce damage and minimize loss during harvesting, handling, storage, and transportation? If yes:
  - Does it include building skills according to internationally agreed upon standards, practices, and recommendations, including:
    - Best practices for different pest and disease management such as integrated pest management, proper fumigation treatments, use of antimicrobials, use of agrochemicals, and veterinary treatments.
    - Best animal welfare practices to avoid stress and injuries that can reduce the shelf life of meat from animals.
    - Proper harvest timing and techniques for different crops, including harvesting crops at the optimal maturity level and utilizing suitable handling practices and equipment to maximize yield and minimize crop damage.
    - Handling and storage practices to reduce damage such as using liners in wood and basket containers and reducing the size of sacks or crates to minimize product damage.
    - Enhancing operations and reducing technical malfunctions and errors at the farm and during processing operations.
    - Handling practices during loading and unloading to reduce damage.

- Optimal drying and storage best practices to minimize contamination and extend shelf life. This includes training on the use of storage containers that protect against temperature variations, humidity and precipitation, and insect and rodent infestation.
- Improved milking practices to reduce spills.
- Requirements of different food products for cool and/or dry, and hygiene conditions to reduce spoilage and contamination.
- Best practices in cleaning and sanitation in various facilities (storage, handling, processing, packaging, slaughter, drying) to reduce losses due to contamination.
- Safety and quality specification of national and international markets and how to grade produce according to national and international standards.
- Sourcing and food design impacts on FLW.
- How to optimize handling and distribution of unmarketable food.
- Liability laws and concern over safe handling of food donations.
- Latest technology and innovation to reduce FLW at the various stages (storage, handling, processing, packaging, slaughter, drying)
- Other government-led education campaigns.

- For each of the provided programs above, identify:
  - The type of training:
    - Workshops: hands-on training sessions that provide practical skills and knowledge
    - Seminars and webinars: expert-led in-person and virtual discussions and presentations
    - Field days: on-site demonstrations of best practices and new technologies in real-world settings
    - Online courses: digital learning modules
    - Certification programs: structured courses that offer official recognition and credentials upon completion
  - Training title
  - Who does it target?
    - Farmers
    - Fishers
    - Animal farmers
    - Herders and foragers
    - Workers and handlers
    - Processors
    - Manufacturers
    - Transporters
    - Researchers
    - Extension personnel
    - Practitioners
  - Who is the responsible institution?
  - How frequently is it provided?

- Are there guidelines, best practice guides, manuals, or educational material available?
  - Document title
  - Who does it target?
    - Farmers
    - Fishers
    - Animal farmers
    - Herders and foragers
    - Workers and handlers
    - Processors
    - Manufacturers
    - Transporters
    - Researchers
    - Extension personnel
    - Practitioners
  - Who is the responsible institution?
  - When was it published?
  - Is it a public document that is accessible?

- How is it being shared with the target audience?

- Are there extension programs that provide continuous support and advisory services by professionals? If yes,
  - Do these extension programs cover all value-chain players, or only certain ones?
    - Farmers
    - Fishers
    - Animal farmers
    - Herders and foragers
    - Workers and handlers
    - Processors
    - Manufacturers
    - Transporters
  - Are these extension programs national in scope, or do they cover specific regions?
  - Who is the responsible institution?
  - How accessible and effective is the extension?

- Are there empowerment projects to educate and empower women in rural regions? Elaborate.

- Is the government conducting or supporting organizations (technically and/or financially) and institutions in outreach and education programs targeting wholesalers, retailers, and food service providers on best practices to reduce waste? If yes:
  - Does it include building skills according to internationally agreed upon standards, practices, and recommendations on:
    - Temperature management, product handling, proper storage, and stock rotation.
    - Optimized inventory management systems to better track inventory, match forecasting to order, and rotate stock following a "first-in–first-out" method.
    - Optimal practices to minimize food quality degradation (handling produce gently and stacking properly to avoid bruising, ensuring displays promote air circulation and maintain conditions suitable for keeping products fresh, storing high-ethylene-producing items separately from those sensitive to ethylene) and contamination (e.g., not using unclean water on products).
    - Liability laws and concern over safe handling of food donations.
    - Optimal packaging (e.g., portion size, quality), labelling, serving options, and placement of products and signs to nudge consumers to prevent and reduce food waste.
    - Economic, environmental, and social impacts of FLW.
    - Others
  - For each of the provided programs above, identify:
    - The type of training:
      - Workshops: hands-on training sessions that provide practical skills and knowledge
      - Seminars and webinars: expert-led in-person and virtual discussions and presentations
      - Field days: on-site demonstrations of best practices and new technologies in real-world settings
      - Online courses: digital learning modules
      - Certification programs: structured courses that offer official recognition and credentials upon completion
    - Training title
    - Who does it target?
    - Who is the responsible institution?
    - How frequently is it provided?
  - Are there guidelines, best practice guides, manuals, or educational material available?
    - Document title
    - Who does it target?
    - Who is the responsible institution?
    - When was it published?
    - Is it a public document that is accessible?
    - How is it being shared with the target audience?

○ Are there any groups or associations of farmers, fishers, foragers, food handlers and processors, manufacturers, food distributors, wholesalers, retailers, food service providers, or informal vendors in the country? ▪ Which ones? ▪ Does the government have any programs to reach out to and build the skills of their staff and members in best practices in food harvesting, handling, preserving, storing, and transporting?
○ Are there any government supported programs aimed at developing educational campaigns targeting consumers to reduce household food waste? Elaborate.
○ Is the government conducting or supporting organizations and institutions in executing educational campaigns about food labels pertaining to expiration dates?
○ Is the government conducting or supporting organizations and institutions in executing educational campaigns designed to change social norms, making food loss and waste socially unacceptable for everyone, including higher-income consumers?
○ Does the school curriculum include lessons on food waste reduction? If so, for which age groups?
○ Are there agricultural schools, vocational centers, and university faculties in the country? If yes: ▪ Does the curriculum cover FLW and BP to reduce food loss? ▪ How comprehensive is the material?
○ Is there an effort to identify, document, and share success stories and best practices on FLW?
○ Are there any other private sector or international organizations carrying any awareness and educational programs to reduce FLW? Elaborate. ▪ Who are they? ▪ What is the program? ▪ Who are they targeting? ▪ Timeline of the program?
○ Is the government conducting or supporting organizations and institutions in carrying out educational campaigns designed to build skills and capacity on FLW? Elaborate. ▪ Who are they? ▪ What is the program? ▪ Who are they targeting? ▪ Timeline of the program?
○ Does the government have any ongoing collaboration with media, ICT, and digital outlets on facilitating outreach on FLW?
○ Does the government have any ongoing collaboration with influencing community platforms such as cultural associations, religious leaders, indigenous groups, sports associations etc. on outreach for FLW reduction.
○ Does the government have or support any recognition programs to encourage organizations and or individuals to address FW? If yes: ▪ What are they? ▪ Who do they target? ▪ How frequently is the event? ▪ Is it national?

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About Thriving Solutions LLC

Thriving Solutions is a social enterprise established by two Arab women dedicated to decarbonizing our economy, safeguarding biodiversity, advancing food-nutrition-water security, and supporting SDG 2030 and ESG priorities, with a focus on the Arab region. Our services help companies and municipalities implement nature-based solutions and adopt innovations that eliminate waste and pollution, regenerate ecosystems, transition to circular food systems, and sequester carbon.

Assessment Framework of the Regulatory Enabling Environment for Food Loss and Waste Prevention

This report was developed by Thriving Solutions in collaboration with Feed the Future Food Systems for Nutrition Innovation Lab (FSN-IL) at Tufts University. The report introduces a comprehensive Assessment Framework that supports governments in evaluating and enhancing their regulatory and policy environments for FLW prevention.
Complementing the "Best Practices for Food Loss and Waste Regulatory Enabling Environment: Guideline for Government", the framework provides a practical Target-Measure-Act-based checklist for assessing national policies, identifying gaps, and designing evidence-based, context-specific interventions. It empowers policymakers to align national actions with Sustainable Development Goal (SDG) 12.3, strengthen institutional collaboration, and accelerate the transition toward more resilient and sustainable food systems.

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