



Pioneers in the Fight Against Food Waste:

Implementation of Food Waste Deterrence Policies in South Korea, France, and Peru



The **Global FoodBanking** Network®



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About the Harvard Law School Food Law and Policy Clinic

FLPC serves partner organizations and communities by providing guidance on cutting-edge food system legal and policy issues while engaging law students in the practice of food law and policy. FLPC focuses on increasing access to healthy foods; supporting sustainable food production and food systems; and reducing waste of healthy, wholesome food. For more information, visit chlpi.org/FLPC.

About The Global FoodBanking Network

Food banking offers a solution to both chronic hunger and the climate crisis. GFN works with partners in over 50 countries to recover and redirect food to those who need it. In 2023, our Network provided food to more than 40 million people, reducing food waste and creating healthy, resilient communities. We help the food system function as it should: *nourishing people and the planet together*. For more information, visit foodbanking.org.

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ABSTRACT

Given the high rate of global food waste and the accompanying social, economic, and environmental challenges posed by this global issue, a growing number of countries are taking action to reduce food waste. This study examines similarities and differences between “food waste deterrence policies” (policies that restrict or ban food waste disposal or require food donation) in three countries that have enacted such a policy: South Korea, France, and Peru. The analysis looks at the country context of the policy enactments, the development of the policies over time, and any published literature on their impact. The study also used semi-structured interviews of key informants in each country to understand stakeholders’ perspectives on each law’s successes and challenges. The goal of this study was to gather insights into the opportunities, obstacles, and best practices around implementing food waste deterrence policies that could help inform the development of effective food waste deterrence measures in other locations in the future.

INTRODUCTION

Food loss and waste is a significant global food system challenge with social, environmental, and economic repercussions. An estimated one-third of the global food supply is lost or wasted as it moves through the supply chain, equating to 1.3 billion tons of edible food annually.¹ From an environmental lens, food that is ultimately lost or wasted has a sizeable carbon footprint of 3.6 gigatons,² using roughly 28% of agricultural land³ and accounting for eight percent, or 70 billion tons, of total global greenhouse gas emissions.⁴ An estimated 8-10% of all anthropogenic greenhouse gas emissions are attributed to food loss and waste.⁵

Much of the food that is wasted ends up in landfills, where it emits methane, a greenhouse gas that is 28 times more effective than carbon dioxide at trapping heat in the atmosphere over a 100-year timeframe.⁶ The methane created from landfills is the solid waste sector’s most significant contribution to greenhouse gas emissions.⁷ Studies project that these emissions will surge more than 60% by 2050 due to the anticipated growth in the global population unless improvements are made.⁸

At the same time, the number of undernourished people in the world is increasing. Although rates of food insecurity remained relatively stable between 2015 and 2019, food insecurity sharply increased during the COVID-19 pandemic.⁹ In 2021, nearly 30% of the global population (approximately 2.3 billion people) were moderately or severely food insecure.¹⁰ Of this number, an estimated 924 million people face food insecurity at severe levels.¹¹

Collectively, the damage from food loss and waste costs approximately US \$940 billion per year.¹² The international community has sought to address this problem and mobilize the reduction of food waste, especially within the framework of the *2030 Agenda for Sustainable Development*. Sustainable Development Goal 12.3 calls for halving per capita global food waste at the retail and consumer level and reducing food losses along production and supply chains (including post-harvest losses) by 2030.¹³

Food Waste Deterrence Policy Designs¹⁴

The term “food waste deterrence policies” refers to laws and policies that aim to achieve lower levels of food waste and higher rates of food recycling and redistribution, specifically by making food waste financially burdensome for food waste generators. These policies are relatively new, with the earliest such policies generally dating from the early 2000s, and with rapid uptake since 2016. Food waste deterrence policies can take many forms, such as restricting food waste from being sent to landfills, mandating food donations, or financially penalizing those who waste food. Some of the policies that fall into this category include:

- **Organic Waste Disposal Ban:** A law or policy prohibiting covered entities from sending organic waste to landfills.
- **Mandatory Recycling Law:** A version of an organic waste disposal ban that prohibits covered entities from sending organic waste to landfills and requires those entities to subscribe to an organic collection service or send food waste to a compost or anaerobic digestion facility.
- **Food Donation Requirement:** A law or policy that requires covered entities to donate some or all their surplus food that remains safe for consumption.
- **Waste Disposal Surcharge or Landfill Tax:** Laws or policies that charge entities or individuals a landfill tax per unit of trash (specifically organic matter or food waste) over and above general landfill tipping fees. These are usually geared towards businesses.
- **Pay-As-You-Throw Policies:** Laws or policies that charge entities, households, or individuals a fee based on the amount of organic waste sent to landfills. While many waste collection systems charge a fixed fee, pay-as-you-throw policies charge individuals based on the amount of waste generated.
- **Food Waste Tax Penalties:** Laws that restrict entities from claiming a “business loss” (tax deduction or credit) for wasted food if that food could have been donated. Failing to prove that the disposed food was unfit for donation means the entity forgoes the opportunity to write off the loss.

Fortunately, thoughtful public policies can address the troubling mismatch between rates of food waste and rates of food insecurity. Among a suite of effective policy interventions, policies that restrict or ban food waste disposal or require food donation (collectively known as “food waste deterrence policies”) are emerging as a promising means to increase the financial burden of wasting food and ensure that food is put to its most beneficial uses.

Increasingly, countries around the world are using this new type of policy to deter the disposal of organic matter into landfills. Policy designs vary from tax penalties on food waste, to food waste disposal bans or fees for organic waste disposal, to food donation requirements. In the status quo, throwing away surplus food is relatively inexpensive, whereas donating, composting, or other forms of food waste recycling can be cumbersome, costly, and require additional infrastructure. Food waste deterrence policies change the balance by creating prohibitions or fiscal incentives to keep food out of landfills and encouraging a cultural shift towards treating surplus food as a valuable resource.

Food waste deterrence policies typically require the diversion of food waste following a hierarchy. The hierarchy prioritizes prevention, then human and animal consumption, followed by the use of collection services to send food scraps to a composting or anaerobic digestion facility.¹⁵ Many policies integrate a food donation requirement to ensure that surplus food safe for human consumption is rescued and redistributed rather than recycled (such as through composting or energy recovery). These food donation requirements are sometimes implemented as a stand-alone policy.

The following study examines food waste deterrence policies from three countries in three different regions of the world. The analysis looks at the country context in which the policies were enacted, the development of the policies over time, and published literature on implementation and impact. The study also reports on stakeholders' perspectives on each law's successes and challenges, based on interviews with key informants in each of the three countries. This study aims to gather insights into the opportunities, challenges, and key learnings around implementing food waste deterrence policies that could help inform the development of effective food waste deterrence measures in other countries.

The analysis begins by providing an overview of the research approach and discussing the limitations and constraints of the methodology. Case studies are then presented on the food waste deterrence policies enacted in the Republic of Korea (South Korea), France, and Peru, discussing the policy design; government infrastructure support; involvement of stakeholders in the planning and implementation process; implementation and enforcement challenges; and any targets, indicators, and monitoring of the efficacy of those policies. Finally, the analysis moves to synthesizing key learnings, including summarizing the main findings from the case studies, implications for policymakers in other countries, and recommendations for future research coming out of these initial case studies.

METHODOLOGY

South Korea, France, and Peru are regarded as international leaders in food waste policy, as each has enacted a different type of food waste deterrence policy from the list above. These countries were chosen for this study because of their regional differences, the differences in the type of food waste deterrence policies implemented, and because the relevant policies were implemented more than five years ago, allowing time for analysis of impact. South Korea was chosen for this study because of its food waste management policies, specifically its ban on food waste disposal in landfills. Peru was selected because it enacted a food donation requirement. France was chosen because it has enacted two types of food waste deterrence policies: an organic waste source separation and mandatory recycling law as well as a food donation requirement.¹⁶

From February to September 2023, the study team reviewed laws, regulations, and literature related to the implementation of food waste deterrence policies in South Korea, France, and Peru. Through this process, we identified and documented each country's food waste deterrence policy measures and implementation methods. We also used this process to identify potential stakeholders who could provide a variety of perspectives on their respective country's implementation of food waste deterrence policies. We then conducted in-depth, semi-structured interviews with key informants, including representatives from government, food recovery organizations and other non-governmental

organizations, industry insiders, and local researchers using tailored interview guides created by the study team to gather insights on common barriers, challenges, innovative practices, and opportunities to reduce food waste through donation requirements or food waste disposal laws. All interviewees were informed of the scope and purpose of the case study. During initial interviews, we also inquired about other stakeholders and used those leads to include additional perspectives. For each country, five to six interviews (typically one hour) were conducted with individual stakeholders or groups of stakeholders. In total, seventeen interviews were conducted with 26 stakeholders recruited via email, and interviews were conducted via Zoom or phone.¹⁷

LIMITATIONS

While we strove to incorporate a variety of stakeholder perspectives, this study does not purport to provide a representative sample of all relevant stakeholder perspectives. Across all three countries, multiple governmental agencies play roles in regulating food donation and food waste disposal, a diverse range of food recovery organizations recover and redistribute food, and various actors in the food industry may or may not be regulated depending on the type of food business, size, and other factors. While we interviewed a variety of representatives from each country, we did not interview the full spectrum of stakeholders whose views would be relevant to this report. In addition, our analysis does not capture the experience of other categories of stakeholders, such as food donation recipients.

We also worked from tailored interview guides developed by the study team based on each stakeholder's history in the food waste reduction space. While this tailoring helped inform our understanding of each country's food waste deterrence policies, it may have introduced some bias in the responses.

This report captures available data on the impacts of food waste deterrence policies in the three relevant countries, including changes in food donation, organic waste recycling, and food waste disposal rates, all of which can operate to reduce greenhouse gas emissions and methane. However, this report does not include an independent quantitative analysis of the impact of specific food waste deterrence policies, nor does it purport to identify which policies have the most potential impact on mitigating greenhouse gas emissions



and methane generation. While general trends in methane emissions are provided for each country, these trends reflect methane emissions across sectors and do not attribute the extent to which reductions or increases are directly tied to changes in food waste deterrence policies, impacting the organic waste sent for disposal.

This study also does not analyze the independent impact of food waste deterrence policies by controlling for other relevant policies. The Harvard Law School Food Law and Policy Clinic and The Global FoodBanking Network partner on *The Global Food Donation Policy Atlas* project to map the laws and policies impacting food donation in 25 countries and counting.¹⁸ While a wide array of policies impact how food waste is managed, this report only analyzes “food waste deterrence policies” as defined above: the policies that specifically aim to reduce food waste by making it more financially burdensome to dispose of food via requirements, penalties, taxes, or bans. This report does not attempt to cover the full range of date labeling, food safety, liability, or other laws and policies that are core to governmental efforts to reduce food loss and waste as well as increase food donation. Additional information about those key policy issues is available on [The Global Food Donation Policy Atlas](#) website.¹⁹

FOOD WASTE DETERRENCE POLICIES ACROSS SOUTH KOREA, FRANCE, AND PERU

This section provides an overview of the background, context, policy design, and general findings for the food waste deterrence policies used in South Korea, France, and Peru. For each of these countries, this section discusses the following categories of information:

- **Country Context and Policy Objectives:** describes the environmental, social, and/or political context in which the country’s food waste deterrence law(s) were developed and their primary policy objectives.
- **Policy Design:** describes the type of food waste deterrence law(s) enacted, scope of covered entities, enforcement mechanisms, and any related tax incentives.
- **Government Infrastructure Support:** details any related government funding for food recovery, recycling infrastructure, or capacity building.
- **Stakeholder Involvement in the Planning and Implementation Process:** examines the extent to which the government included impacted stakeholders in shaping the food waste deterrence policy before or during implementation.
- **Implementation and Enforcement Challenges:** examines concerns that have arisen in implementation, enforcement, and the governmental response.
- **Targets, Indicators, and Monitoring:** provides available published information quantifying the impact of the specific policy over time.

This table provides an overview of the policies discussed in more detail in the case studies below:

Overview of Food Waste Deterrence Policies in Researched Countries*

Country	Type of FW Deterrence Law or Policy	First Enacted	Current Scope of Covered Entities	Enforcement Mechanisms
South Korea	Pay-As-You-Throw Policy	1995	All waste generators (including individuals)	Fines
	Food Waste Disposal Ban	2005	All waste generators (including individuals)	Penalties (including imprisonment) and/or fines depending on the seriousness of the violation
France	Mandatory Source Separation and Recycling ²⁰	2012	All waste generators (including individuals)	Fines and potential imprisonment for violations by commercial generators
	Prohibition on destruction of edible food	2016	Food distributors, food wholesalers, and agri-food industry operators and collective caterers	Fines up to 10% of annual revenue
	Food Donation Contract Requirement ²¹	2016	<ul style="list-style-type: none"> - Food retailers (larger than 400 sq. meters) - Collective caterers (preparing more than 3,000 meals/day) - Agri-food industry operators and food wholesalers (with annual turnover above 50 million euros) 	Fines (€1500, which may be increased to €3000 for repeat offenses)
Peru	Food Donation Requirement	2016	Supermarkets and food warehouses	n/a

* This chart does not include the full range of laws and policies that these countries have enacted to reduce food loss and waste, increase food donation, or divert food waste from landfills.



SOUTH KOREA'S FOOD WASTE DETERRENCE POLICIES

Country Context and Policy Objectives

South Korea experienced rapid urbanization after the post-Korean War economic boom, leading to a dire shortage of landfill space by the 1990s.²² To address this waste disposal crisis, in the early 1990s, the South Korean government began pursuing a sustainable waste management plan to reduce demand for landfills.²³ As part of this plan, South Korea transitioned to a “pay-as-you-throw” system, requiring waste generators to pay disposal costs based on the amount of waste produced.²⁴ Previously, waste collection fees were charged based on a fixed rate (through property tax assessments or set monthly fees) regardless of volume.²⁵

Policy Design

South Korea's approach has primarily focused on the prevention, recycling, and recovery of food waste through the implementation of two solid waste management policies: a pay-as-you-throw system (PAYT) that charges generators based on the amount of waste they dispose of and a ban on the disposal of food waste in landfills.

South Korea's PAYT system is also known by various other names and acronyms, including volume-based garbage collection fee, volume-based waste fee, or pay-as-you-go. The nationwide PAYT system was introduced in 1995 after piloting the system in 33 cities, counties, and districts.²⁶ Its goal was to better manage household waste.²⁷ The underlying principles of the system include:

- 1) requiring the polluter to pay for pollution costs;
- 2) requiring the user to pay the total costs of the resource utilized;
- 3) preventing waste by controlling demand; and
- 4) providing economic incentives for waste reduction by tailoring fees and taxes based on the quantity and type of waste discharged.²⁸

Under this system, individual households and small businesses separated recyclable waste and disposed of other waste (including food waste) in specially purchased bags.²⁹ The cost of waste collection, transportation, and discharge was built into the bag pricing, which was set at the local level.³⁰ Municipalities did not assess fees for the collection of recyclables.³¹ Industrial waste disposal costs for large waste generators remained the generator's responsibility, and they were not required to use the specialized disposal bags.³²

In 2005, South Korea implemented a food waste ban prohibiting food waste disposal in landfills.³³ Instead, food waste had to be separated from general waste and municipalities could charge a fee specifically for food waste recycling.³⁴ Initial implementation and the fees for food waste recycling varied by municipality, with some levying flat rates and others using volume-based waste fees.³⁵ Additionally, volume-based food waste fees were not implemented in multi-unit residences (apartment buildings and condominiums) where waste was collectively disposed of.³⁶

To move away from the flat rate on food waste recycling that persisted in some municipalities and multi-unit residences, in 2013 South Korea implemented the volume-based food waste fee nationwide, in part using sophisticated food waste tracking technology.³⁷ The aim of this policy was to make all residents responsible for the amount of food waste they generate, rather than charging fees that are not reflective of the actual amount of food waste an individual household sends for recycling.³⁸ Recycling fees are now implemented through one of three billing systems: a standardized disposal bag, a chip or sticker system, and a smart card system (Radio Frequency Identification, or “RFID”), as explained below.³⁹

Volume-Based Food Waste Fee Billing Systems

In South Korea, volume-based food waste fees are assessed using one of the following systems:

- **Standardized bag system:** *The disposer purchases a specific bag to dispose of food waste, with costs varying based on the bag size.⁴⁰*
- **Chip or sticker system:** *The disposer purchases a chip or sticker that is affixed to the food waste disposal container. The container then functions as a measurement device for tracking the volume of waste disposed.⁴¹*
- **RFID system:** *The disposer is identified through an electronic tag, and fees are assessed based on the volume of food waste disposed, as measured by weight.⁴²*

South Korea’s food waste deterrence policies do not require food donation. However, its laws do “encourage” the donation of food and other life necessities (e.g., personal hygiene items) to support individuals experiencing material poverty.⁴³

Scope of Covered Entities

South Korea’s food waste ban prohibits all waste generators, including individuals, from sending food waste to landfills.⁴⁴ Any food waste that is generated must be managed and sent for recycling in compliance with the requirements of the *Wastes Control Act* (폐기물관리법).⁴⁵ The *Wastes Control Act* distinguishes between commercial generators, large food waste generators, and households/small businesses.⁴⁶

Businesses that discharge commercial waste (referred to in the Act as “industrial waste”)⁴⁷ are responsible for managing and recycling their commercial waste, including food waste, and paying associated costs.⁴⁸ Any business that generates more than 300kg of waste daily falls into this category.⁴⁹

In South Korea, businesses like RECO have entered the waste management market to provide comprehensive food waste management services, including collection, transportation, and data management.⁵⁰ As part of its services, RECO tracks and reports data regarding the amounts of food waste generated, where it was transported, and how it was recycled.⁵¹ Businesses, which can now receive data on their food waste generation in real-time and specific to individual sites, are

better equipped to diagnose systems or management issues that result in increased food waste generation. The data also facilitates reporting on environmental impact, including emissions and positive environmental impacts (for example, from recycling).⁵² RECO's business model was shared as an example of innovative waste management at COP27.⁵³ In 2022, RECO signed an agreement with the Carbon Neutral Research Institute to develop a “carbon reduction calculation model for waste resources.”⁵⁴

Households, small businesses, and food waste generators (that fall below the 300kg per day waste production threshold) may use the municipal waste system but must comply with the rules and fees for household waste disposal, which local governments manage pursuant to the authority granted to them under the *Wastes Control Act*.⁵⁵ At the household level, food waste disposal fees are relatively small—averaging around US\$.06 per kilogram—and function primarily as a tool to raise awareness of food waste generation rather than act as an economic burden.⁵⁶

Large food waste generators (such as facilities serving more than 100 people per day and restaurants larger than 200 square meters) must comply with an additional requirement to report on their food waste reduction and recycling plans to the relevant local authority.⁵⁷

Enforcement Mechanisms

South Korea's *Wastes Control Act* provides a range of penalties and fines for violating the act, depending upon the seriousness of the violation.⁵⁸ Improper disposal of industrial waste is punishable by up to seven years of imprisonment with labor and/or by a fine of up to 70 million



won (roughly US \$52,500).⁵⁹ Anyone who improperly collects, transports, or recycles food waste along with other industrial waste is subject to up to three years of imprisonment with labor and/or a fine of up to 30 million won (roughly US \$22,500).⁶⁰ Individuals who dispose of their food waste along with household waste are subject to an administrative fine of up to 10 million won (roughly US \$7,500).⁶¹ The country also uses video surveillance and incentives for reporting violations to maximize compliance.⁶² There is widespread acceptance of—and cooperation with—South Korea’s food waste policies, which may be partly driven by a strong cultural desire to comply and partly by the penalties for infractions of the waste laws.⁶³

Government Infrastructure Support

In the initial stages of implementation, the South Korean government provided financial and technical support to subsidize food waste disposal and develop recycling infrastructure. The Ministry of the Environment offered low-interest loans to small recycling businesses to provide capital for developing recycling technology and facilities.⁶⁴ To facilitate the entry of new recycling businesses into the market, new owners were also offered the opportunity to consult with business start-up experts.⁶⁵ In the ten years between 1999 and 2009, the number of recycling companies nearly tripled, growing from 1,647 to 4,375 businesses.⁶⁶ By 2009, the recycling sector employed more than 50,000 people.⁶⁷ Such investments in infrastructure helped facilitate a sharp rise in South Korea’s recycling rates. According to one stakeholder, as South Korea’s food waste management system matured, commercial waste management became more economically self-sustaining. The grants, tax benefits, and low-income loans initially provided by the South Korean government to help develop composting and other recycling infrastructure were phased out over time. With recycling infrastructure in place and considering the increasing sophistication of the system for managing food waste, stakeholders noted that businesses now need more support with technology and data management.

As part of its waste-to-energy strategy, South Korea is shifting to the use of food waste for biogas production.⁶⁸ Stakeholders anticipate that more food waste will be directed to biogas plants, which will likely be owned or operated in partnership with local governments.

Stakeholder Involvement in the Planning and Implementation Process

Before implementation, the South Korean government undertook a series of measures to assess the efficacy of a PAYT system, including a feasibility study and solicitation of public input.⁶⁹ In a series of public hearings and meetings with impacted stakeholders, the government sought feedback on its implementation plan for the proposed legislation and anticipated impacts.⁷⁰ In addition, pilot projects were conducted in cities, counties, and districts across the country to test the proposed system.⁷¹ The pilot phase allowed the government to try out and adapt the program before nationwide implementation, revise and amend related laws, build collection and processing capacity, engage in public relations campaigns, and issue enforcement guidelines before rolling out a nationwide program.⁷²

The South Korean government has also supported public education campaigns in tandem with its waste-management policies. In the lead-up to implementing the food waste ban, the South Korean government rolled out a public education campaign to increase knowledge about food waste's societal and environmental impacts, encourage food waste reduction, and provide concrete actions that citizens could take to reduce their food waste.⁷³

Stakeholders offered additional examples of public engagement that they have observed or helped implement, including curricula for school-age children around the impact of food waste, waste reduction, and guidance on complying with source separation requirements. In addition to South Korea's use of education to increase knowledge and capacity around waste reduction and recycling, stakeholders echoed findings from the literature review suggesting that South Korea's sophisticated PAYT system raises awareness regarding food waste generation, promoting waste reduction.⁷⁴

Implementation and Enforcement Challenges

As South Korea's PAYT system was implemented, several challenges arose requiring continuous development and improvements to the system. For example, the standardized collection bag (initially composed of polyethylene) contaminated food waste during the recycling process, adversely impacting the quality of recycled products such as compost and animal feed.⁷⁵ Residents now use biodegradable bags to dispose of their food waste.⁷⁶

After the system requiring the separation of food waste from paper recyclables was implemented, some residents expressed concern about the emergence of strong odors and increases in insects linked to disposal sites.⁷⁷ Previously, food waste was commonly disposed of in paper wrapping, which helped to absorb liquids and contain odor at landfills.⁷⁸ However, the new system required that paper be separated from food waste for recycling.⁷⁹



Municipal governments, including the Seoul Metropolitan Government adjusted their food waste management approaches to address these concerns.⁸⁰ A vital aspect of these adjustments involved the Seoul Metropolitan Government's construction of five food waste treatment facilities alongside public investment in additional private treatment facilities so that food waste could be collected, disposed of, and processed separately from landfill waste.⁸¹ The 2005 ban on landfilling food waste further addressed these concerns by prohibiting food waste disposal in landfills.⁸² The waste ban also addressed concerns regarding inconsistent implementation of the PAYT system at the local level.⁸³

While nearly 100% of South Korea's food waste is now sent for recycling, there is not a robust end market in the country for food recycled into animal feed or compost.⁸⁴ Stakeholders noted that South Korea is continuing to shift away from recycling food waste into compost and animal feed and moving towards more biogas production. This trend was also reflected in the literature review.⁸⁵

South Korea's food waste policy landscape does not include any requirements, dedicated resources, or structures to promote food donation within the context of food waste reduction. Some commentators have noted—and stakeholders shared—that food donation, recovery, and redistribution are not being used as integral measures to reduce food waste.⁸⁶ Stakeholders highlighted how increased coordination between governmental ministries could further policies better aligned with the food waste hierarchy, including more emphasis on food recovery and redistribution. Such an approach would have aligned with the South Korean government's five-year program for minimizing and recycling food waste issued in 1998, which contemplated that the food bank system would play a role in actualizing South Korea's goal of reducing food waste.⁸⁷ Though the government did establish the organizational system for South Korea's formal food bank network in 2006 and encourages food donations (including through tax incentives), at present South Korea's policies do not appear to consider food recovery a priority lever for food waste reduction.⁸⁸

Targets, Indicators, and Monitoring

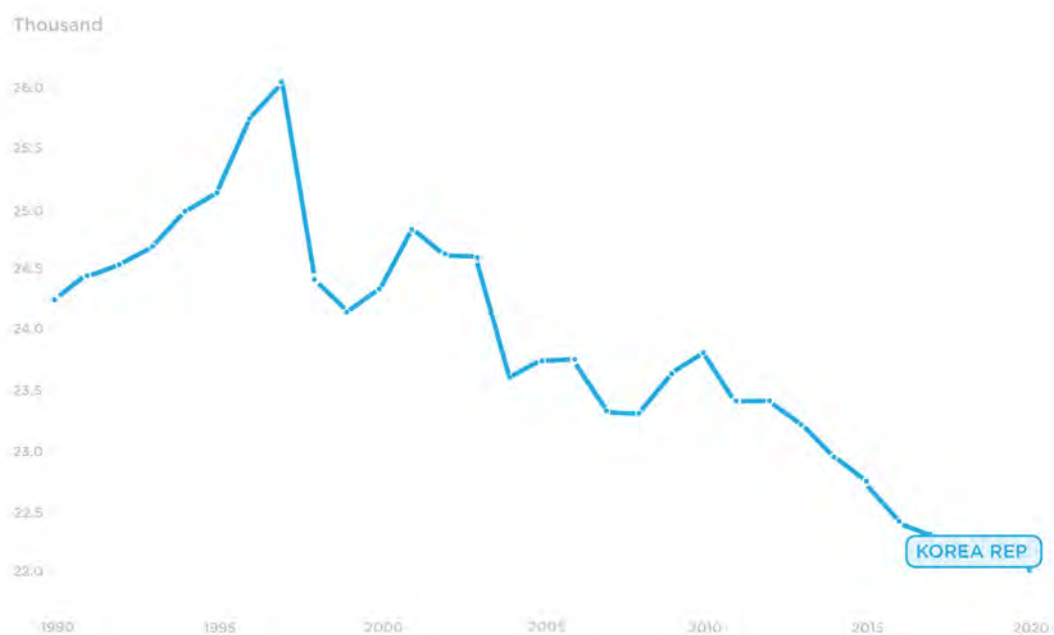
As far back as 1998, South Korea established a target of reducing food waste disposal by 10% and achieving a 60% recycling rate for any disposed food waste by 2002.⁸⁹ As discussed above, South Korea actively tracks food waste generation and recycling rates, in part with mandatory reporting, technology, and data platforms.

The amount of food waste generated in South Korea peaked in 2008 and then declined by 9.6% between 2008 and 2014.⁹⁰ By 2014, 96% of food waste was being sent to recycling,⁹¹ a more than 60% increase in the recycling rate over 13 years.⁹²

The development of the RFID food waste disposal system, which assesses costs for disposal based on weight, is one of the important innovations in South Korea's efforts to reduce food waste.⁹³ Studies evaluating South Korea's systems have found that the RFID household-based system is more effective at reducing food waste disposal than community-based food waste collection systems, where waste fees are divided equally among community members.⁹⁴ According to a 2017 policy report by Seoul Solutions (a public-private partnership focused on urban planning and sustainable

policy development) the RFID system, which assesses fees based on weight, is also more effective than the standard bag and chip methods.⁹⁵ The RFID weight method reportedly reduced food waste disposal up to an estimated 31%, while the standard bag and chip methods, which measure waste based on volume, reduced food waste by 13% and 14%, respectively.⁹⁶ A report by the Organization for Economic Co-operation and Development (OECD) noted that the RFID system has also improved the quality of waste sent to recycling.⁹⁷

Data from the World Bank shows a decrease in South Korea's methane emissions between 1995 (when South Korea first implemented its PAYT system) and 2020 (the World Bank's most current data), decreasing from 25,127 to 21,990 kt of CO₂ equivalent.⁹⁸ In 2020, approximately 30% of South Korea's methane emissions were attributed to the waste sector, while agriculture and energy accounted for approximately 43% and 22%, respectively.⁹⁹



Source: The World Bank, Data, Methane Emissions (KT of CO₂ Equivalent) with underlying data from Climate Watch, Historical GHG Emissions (1990-2020) 2023.¹⁰⁰

Cost evaluations of the RFID system, which required significant initial investments, suggest that reduced waste treatment costs result in overall cost savings.¹⁰¹ In addition to creating a net economic benefit, one researcher has estimated that US\$13 of program costs correlate with a one-ton reduction in CO₂.¹⁰²

FRANCE'S FOOD WASTE DETERRENCE LAWS

Country Context and Policy Objectives

France is a member of the European Union (EU) and, as such, has transferred some of its power to the EU's decision-making institutions.¹⁰³ EU regulations directly impact France as they are binding and take effect irrespective of French law.¹⁰⁴ In addition, France can be required to change its laws to comply with EU regulations.¹⁰⁵ By contrast, EU directives (which set out goals that EU countries must meet) have to be integrated into French law to take effect.¹⁰⁶ In regards to directives, France has the flexibility to decide how its laws will be modified to meet the directive's specified purpose.¹⁰⁷ Thus, EU policies often set the stage for the development of French law, and France's food waste laws are shaped by policies and targets set at the EU level.

The EU's 2008 Waste Framework Directive (Directive 2008/98/EC) mandates that EU countries, including France, include food waste in their waste prevention programs as well as monitor and evaluate the implementation of their food waste prevention measures using a common methodology.¹⁰⁸ More generally, the Directive mandates that member countries abide by a waste management hierarchy that prioritizes prevention, followed by reuse, recycling, and other forms of recovery (e.g., energy recovery).¹⁰⁹ Disposal is the least preferred method of waste management.¹¹⁰ The 2008 Directive encourages composting, digestion, or other environmentally sound methods of treating or repurposing organic waste, which is defined to include food waste.¹¹¹ However, the Directive did not provide further guidance on how countries should manage food waste.

Thus, in 2012, France began implementing laws to reduce the amount of waste sent to landfills and increase recycling rates, including requirements that certain waste generators separate and send organic waste for recycling.¹¹² Consistent with the waste management hierarchy's directives,¹¹³ France has also since prohibited the destruction of surplus food fit for human consumption and required that certain food businesses offer to contract with food recovery organizations to donate unsold surplus food rather than dispose of it.¹¹⁴

Policy Design

France implemented two types of food waste policies that are discussed here: (1) a mandatory source separation and recycling law; and (2) a prohibition on the destruction of edible food, which is accompanied by a food donation requirement.¹¹⁵ Though France does not include its organic waste recycling law among its policies aimed at reducing food waste, both policy designs are described here as examples of policies that aim to prohibit or make it more financially burdensome to waste food.¹¹⁶

Mandatory Source Separation and Recycling

In 2012, France began restricting the amount of organic waste that could be sent to landfills and required large waste generators to sort and send their waste to recycling.¹¹⁷ France now mandates that all residents must source separate their organic waste, including food waste, so that it can be composted or recovered for energy production.¹¹⁸ This policy is often referred to by the media as the "*Compost Obligatoire*."¹¹⁹



Scope of Covered Entities

After initially imposing organic waste sorting and recycling requirements only on large producers of organic waste (those generating more than 120 tons per year¹²⁰), France has gradually decreased the threshold over time to cover those generating lower amounts of organic waste.¹²¹ Beginning December 31, 2023, the obligation to sort organic waste became mandatory for all businesses and individuals regardless of the volume of waste produced, and by law the government was required to provide outlets for organic waste recovery, such as composting bins.¹²² Thus, France's requirement to divert organic waste from landfills now applies to all waste generators.

Enforcement Mechanisms

When commercial waste generators violate the *Compost Obligatoire* and fail to source separate and recycle their organic waste, they are subject to a €150,000 fine and four years in prison.¹²³ Even though all waste generators, including individuals, are required to sort and recycle their organic waste, including food scraps, some local authorities are not yet fully enforcing the *Compost Obligatoire's* requirements while recycling infrastructure is still being put in place.¹²⁴

Food Donation Requirement

France enacted its food donation mandate in 2016, a law commonly referred to as the "Garot Law."¹²⁵ The EU hierarchy guides the *Garot* law, ranking food waste management measures from most to

least preferred, and instructs food distributors to reduce food waste by prioritizing actions in the following order:

- 1) prevention;
- 2) donation or transformation of unsold edible food to feed people;
- 3) recovery of food scraps for animal feed; and
- 4) use of food scraps for compost or energy recovery (especially methanation).¹²⁶

Under the law, food distributors must propose agreements to eligible charitable organizations to facilitate the donation, recovery, and redistribution of unsold food.¹²⁷ Although the law requires that food distributors propose a food recovery contract, it does not mandate the frequency or the amount at which food must be donated.¹²⁸ Further, the law prohibits distributors from destroying or deliberately making unsold food unfit for human consumption or any other form of food recovery, and sets forth penalties for violations.¹²⁹

Scope of Covered Entities

The 2016 *Garot* law mandated that food retailers above a certain size threshold (400 square meters) offer to partner with food recovery organizations to recover and redistribute unsold surplus food.¹³⁰ Three years later, France extended both the food recovery contract obligation and the ban on destroying unsold edible food to mass collective caterers (institutional cafeterias such as those in businesses, hospitals, and schools) and operators in the agri-food industry.¹³¹ The extension applies to those collective caterers that prepare over 3,000 meals daily and agri-food industry operators whose annual turnover exceeds €50 million.¹³² In 2020, the law relating to the fight against waste and the attempt to create a circular economy (*La loi relative à la lutte contre le gaspillage et à l'économie circulaire*) further extended the obligations of the *Garot* law to food wholesalers, with more than €50 million of annual revenue.¹³³

France's policymakers have continued exploring opportunities to build on the existing food waste reduction and food donation policy framework. In January 2023, more than 20 deputies introduced a bill to further combat food waste.¹³⁴ The bill (*Proposition de loi n°701 visant à lutter contre le gaspillage alimentaire*), which did not pass, proposed extending the *Garot* law's prohibition on the destruction of edible food and food recovery contract requirements to smaller food retailers, wholesalers, agri-food operators, and caterers.¹³⁵

Enforcement Mechanisms

To ensure compliance with its prohibition on the destruction of edible food and the requirement to propose a food recovery agreement, France's laws provide for potential sanctions. The *Garot* law made failure to comply with the food recovery requirement a third-class offense and included potential fines.¹³⁶ Fines for destroying unsold food products fit for consumption may reach up to 10% of the distributor's annual revenue and shall be "proportionate to the seriousness of the facts observed, in particular to the number and volume of the products in violation."¹³⁷ Failing to propose a food donation agreement is a 5th class offense, punishable by €1500, which can be increased to €3000 for repeat offenses.¹³⁸ As one stakeholder reported, the French Directorate-General for

Competition, Consumer Affairs and Fraud Control conducted a national study in 2021 and found that nearly 80% of the 345 entities regulated by the food donation laws were complying.

Government Infrastructure Support



France's government has promoted recycling through its Waste Fund and Circular Economy Fund.¹³⁹ By way of the Waste Fund, the Agency for the Environment and Energy Management (ADEME) gives money to local governments, companies, and associations that create projects leading to waste reduction.¹⁴⁰ Through the Circular Economy Fund, ADEME supports local authorities and companies with sorting, recycling, recovery, and energy investments.¹⁴¹ In its discussion of this latter fund, ADEME specifically mentions organic waste as an area of importance.¹⁴² As part of the *Compost Obligatoire*, ADEME also now operates the Green Fund which is particularly focused on organic waste.¹⁴³ The €2 billion Green Fund first opened in January 2023 and supports local governments and private companies that engage in projects to reduce household organic waste.¹⁴⁴

Financial support for food waste initiatives has largely come from two programs. The French National Food Program (*Le Programme national pour l'alimentation*) issues a call for projects aimed at ensuring access to safe, healthy, and sustainable food.¹⁴⁵ A fundamental strategic priority for the program is the “fight against food waste.”¹⁴⁶ Since the program's inception in 2014, nearly €25 million in grant funding has been awarded to food projects, including some focused specifically on food waste.¹⁴⁷ In 2021, the program was funded with €1.8 million to support 29 projects at the regional and national level.¹⁴⁸ Territorial Food Projects, which are funded by the National Food Program, work broadly on food system planning and often incorporate food waste prevention and food redistribution measures.

In 2023, the French government allocated €60 million to its new program, Eat Better for All (*Programme Mieux Manger Pour Tous*).¹⁴⁹ This program aims to, among other things, strengthen local systems addressing food insecurity by further developing alliances between different actors involved in food recovery and redistribution, including the Territorial Food Projects mentioned above.¹⁵⁰ This new funding stream responds in part to concerns over the lack of support for food recovery initiatives, as described below.

Stakeholder Involvement in the Planning and Implementation Process

Stakeholders, like the French Food Bank (*Fédération Française des Banques Alimentaires*), were involved in the drafting process for the *Garot* law, providing their insight and expertise. The *Garot* law was also shaped by the voluntary national pact to reduce food waste that preceded it.¹⁵¹ Operating as a public-private initiative, the national pact engages representatives from across the food chain to voluntarily commit to taking action to advance a collective goal of reducing food waste.¹⁵² The national

pact, piloted in 2013 and renewed in 2017, set up a roadmap for further progress toward France’s goal of halving food waste by 2025.¹⁵³ Following this roadmap, the pact’s signatories collaborated around managing unsold products and food donations, providing training for food industry professionals, increasing public awareness, and advocating for public-private coordination to develop anti-food waste policies.¹⁵⁴ Thus, even before the *Garot* law took effect, many food distributors were already partnering with recovery organizations to donate food, offering a model for how a food donation law could operate.¹⁵⁵

Some stakeholders noted the French government’s efforts to engage stakeholders and coordinate food waste policies and programs at the national, local, and territorial levels. For instance, the French government has supported the organization and funding of regional networks to assist with food waste policy implementation through the National Food and Eat Better for All programs discussed above.¹⁵⁶ The REGAL initiative (*Réseaux de lutte contre le Gaspillage Alimentaire*, which translates to Networks for Fighting Food Waste) convenes actors from various backgrounds –¹⁵⁷ including professionals within the food supply chain, associations, institutional representatives, project leaders, and citizens – to respond to food waste at the regional level, assist with implementation of national food waste policies, and develop innovative food waste reduction projects.¹⁵⁸ Regional REGALs also aim to facilitate coordination between governmental entities and across levels of government.

Implementation and Enforcement Challenges

One of the perceived shortfalls of the *Garot* law noted by stakeholders and in the literature is that the law merely requires covered food businesses to propose a food recovery contract but does not mandate the frequency or the amount at which food must be donated.¹⁵⁹ Despite this perceived shortfall, by 2019 approximately half of the surveyed supermarkets that fell under its regulations were reportedly donating daily according to a survey by Comerso, a French company providing food waste management support services.¹⁶⁰

As donations increased, food recovery organizations experienced challenges adapting without funding for additional infrastructure and capacity. In a 2019 study commissioned by France’s Ministry of Agriculture and Food, evaluators reported that 55% of the food recovery organizations surveyed reported logistical implementation challenges.¹⁶¹ Organizations reported a lack of resources like refrigerated trucks and volunteers necessary to optimize the frequency and efficiency of food donations.¹⁶² The study noted that these challenges were heightened for smaller food recovery organizations in rural areas.¹⁶³ France did not initially make funding available to help food recovery programs and businesses adapt.

Food recovery organizations perceived a reduction in food donation quality after the enactment of the *Garot* law. Stakeholders described “donation dumping,” where food recovery organizations received food that could not be distributed because it was too damaged or close to the expiration date. A 2019 study by the Minister of Agriculture and Food documented the impact on the quality of food donations, with the majority of foods donated by retail stores having expiration dates within 48 hours of donation and many products failing to meet beneficiaries’ nutritional needs.¹⁶⁴ Food donation quality concerns sometimes result in food recovery organizations being unable to redistribute food, thus shifting the burden of disposal onto charitable organizations.¹⁶⁵ A 2023 study by ADEME found

that 16% of the food donated by food retailers (approximately 38,000 tons annually) needed to be disposed.¹⁶⁶ Along these lines, food recovery organizations described being treated as “landfill collectors” with the added burden of sorting and disposing of food waste.

France adjusted its policies by adopting measures related to donation quality, including a requirement for donation quality management plans.¹⁶⁷ Covered food entities must have a designated staff person responsible for coordinating and implementing a food donation quality management plan that ensures food is donated with sufficient time to distribute before the use-by date, is properly sorted, and can be distributed by the recipient food recovery organization.¹⁶⁸ The plan must include training for all staff responsible for food donations and a strategy for increasing awareness among all staff regarding efforts to reduce food waste, including through food donations.¹⁶⁹

Although the *Garot* law initially increased food donations, interviewed stakeholders noted that donations have since decreased as businesses have become increasingly adept at stock management and marketing discounted perishable foods to consumers. The Covid-19 pandemic also negatively impacted food donation rates. One organization interviewed for this case study described recovering about 2 tons of donations *daily* from supermarkets before the pandemic. The same organization now recovers around 2 tons *weekly*, even as its recipients’ needs have significantly increased.

Inflation increased France’s food prices by 6% between February 2022 and February 2023¹⁷⁰ and multiplied the number of households needing food assistance. Stakeholders observed that some food recovery organizations have increased the proportion of purchased food to meet the level of need, which had not previously been necessary. Heightened competition among food recovery organizations has emerged due to diminishing supplies of food donations and some donors opting to collaborate exclusively with a single food recovery entity. As of 2023, the French government allocated €60 million in funding to support food recovery organizations, including subsidizing the purchase of food.¹⁷¹

Targets, Indicators, and Monitoring

France’s anti-waste law for a circular economy (*Loi la lutte contre le gaspillage et à l’économie circulaire*) sets out a goal to cut food waste by half by 2025, using 2015 food waste levels as a baseline.¹⁷² The Agency for the Environment and Energy Management (ADEME) is responsible for monitoring and reducing food loss and waste. As part of these responsibilities, ADEME led a study to define and quantify food loss and waste in the food sector across all supply chain stages, from production to consumption.¹⁷³ ADEME’s 2016 report established baselines to assess France’s progress.¹⁷⁴ At that time, France was losing or wasting around 10 million tons of food valued at €16 billion.¹⁷⁵

Subsequently, in 2019, the European Union issued directives regarding a standard methodology for uniform food waste measurement.¹⁷⁶ Stakeholders report that the methodology used by France when setting its initial baseline differs from the measurement methods and requirements that the European Union now imposes. For example, under the European Union directive, harvest losses and food scraps converted into animal feed are not considered when measuring food waste, nor are bones or other food scraps that are not meant to be ingested.¹⁷⁷ Because this differs from France’s

food waste measurement approach in 2016, France must attempt to align its baseline measurements with the European Union’s chosen measurement methodology to assess its progress on food waste over time. Using the new European Union methodology, it is estimated that France generated an estimated 8.7 million tons of food waste in 2020.¹⁷⁸

In the year after France implemented the *Garot* law, food donation quantities reportedly increased, according to one researcher who interviewed more than 130 French and European experts and stakeholders over seven years beginning in 2013 (before the law’s enactment) and ending in 2021.¹⁷⁹ Also, Comerso reported in 2019 that 96% of the supermarkets it surveyed had food donation contracts in place three years after the *Garot* law’s enactment.¹⁸⁰ Although the *Garot* law did not mandate the frequency of donation, around half of all supermarkets regulated by the law donated food daily.¹⁸¹ As a result, donations reportedly became an increasingly larger share of the national food bank network’s food supply.¹⁸² Notably, a 2019 study commissioned by France’s Ministry of Agriculture and Food found that food donations had become more diversified, with an increased share of fruits and vegetables.¹⁸³

At the same time, 62% of supermarkets reported to Comerso that their donation volumes were either stable or decreased between 2018-2019, suggesting the efficacy of other food waste prevention actions.¹⁸⁴ The law promoted the growth of businesses offering food waste prevention and management solutions such as training, donation optimization support, and the development of organic waste recovery channels.¹⁸⁵ Businesses also adopted better inventory management practices, partnered with intermediaries and apps like Too Good to Go, Comerso, and Phénix to sell surplus food, and began marking down prices as foods neared expiration dates to drive sales, a practice referred to as “sticking.”¹⁸⁶



As of 2018, approximately six years after France began restricting the amount of food waste that could be sent to landfills, it was estimated that more than half of surveyed food retailers had organic waste sorting in place.¹⁸⁷ Of those food retailers with organic waste sorting in place, they were diverting around 60% of their food waste to animal feed, 20% to anaerobic digestion, 10% to compost, and 10% to other forms of food waste recycling.¹⁸⁸

World Bank data through 2020 shows that France's methane emissions have steadily declined since 2008 (68,999kt of CO₂).¹⁸⁹ Although it may be attributed to additional factors beyond food waste reduction and increased diversion, data on France's methane emissions (after the implementation of the organic waste source separation and recycling requirement in 2012 and the 2016 *Garot* law) show a reduction from 64,723kt of CO₂ equivalent in 2012 to 58,451 in 2020.¹⁹⁰



Source: The World Bank, Data, Methane Emissions (KT of CO₂ Equivalent) with underlying data from Climate Watch, Historical GHG Emissions (1990-2020) 2023.¹⁹¹

PERU'S FOOD WASTE DETERRENCE LAWS

Country Context and Policy Objectives

Peru likely has one of the highest food loss and waste levels in Latin America. According to researchers from Peru's *Universidad Nacional de Moquegua* and the *Universidade Federal Fluminense* in Brazil, data collected between 2007 and 2017 showed that an estimated 12.8 million tons, or 47.46% of Peru's national food supply, was lost or wasted annually across the supply chain.¹⁹² While much of Peru's food loss and waste occurs during the production and distribution phase, additional food waste occurs at the retail level, with Lima's Great Wholesale Market generating an estimated 60 to 70 tons of organic waste daily.¹⁹³

At the same time, the prevalence of moderate to severe food insecurity in Peru was estimated at nearly 30% between 2014 and 2016.¹⁹⁴ Peru enacted its food donation law in 2016, to initially incentivize and eventually require that certain entities donate surplus edible food to help meet the needs of the country's most economically vulnerable residents.¹⁹⁵ Since 2017, Peru has faced significant challenges including political instability, social unrest, and extreme climatic events, which has exacerbated the prevalence of food insecurity.¹⁹⁶ A 2021 food security assessment found that more than half of Peru's population is food insecure and nearly 12% of Peruvian children are affected by malnutrition.¹⁹⁷

Policy Design

Peru's law to promote food donation and facilitate transportation of donations during natural disasters (*Ley que Promueve la Donación de Alimentos y Facilita el Transporte de Donaciones en Situaciones de Desastres Naturales*) (Food Donation Law) was adopted in 2016.¹⁹⁸ The law governs food donations in two scenarios: when food has lost commercial value but is still edible and during a state of emergency.¹⁹⁹

In regards to food that has lost commercial value but is still edible, the law prohibits its destruction and requires that supermarkets and food warehouses donate it to a public or private non-profit organization that distributes free food to individuals facing food insecurity.²⁰⁰ These organizations must be qualified and registered with the Tax Authority (*Superintendencia Nacional de Aduanas y de Administración Tributaria* or SUNAT) to receive donations.²⁰¹ Any person or legal entity can donate.²⁰² Donors must follow certain procedures, including donating foods timely so they do not pass their expiration date or decompose, and donation-receiving entities are required to maintain records of donated foods and beneficiaries.²⁰³

The Food Donation Law provides tax incentives for donations to organizations registered with the tax authority.²⁰⁴ The law updates Peru's income tax to provide a deduction of up to 10% of the donor's third category net income (i.e., corporate income), but not exceeding 3% of net annual sales.²⁰⁵ Peru adopted implementing regulations that codified how tax benefits for food donations operate under the law in 2017.²⁰⁶

The donation requirement, prohibiting the destruction of surplus edible food and requiring that

supermarkets and food warehouses donate these foods, was supposed to take effect in 2019.²⁰⁷ However, Peru's government still had not finalized enabling regulations for this part of the law as of March 2024.²⁰⁸

Though less relevant to the discussion of food waste deterrence policies, the second part of the law applies during a government-declared state of emergency and is included here for completeness. During a state of emergency, donations of specific items identified in the government's emergency decree are exempted from Peru's value-added tax (*Ley del Impuesto al Valor Agregado* or VAT) to incentivize their donation.²⁰⁹

Following the enactment of its Food Donation Law, Peru adopted a more generalized law on food loss and waste in 2019, focusing on reducing food loss and waste throughout the entire food chain (*Ley que Promueve la Reducción y Prevención de Pérdidas y Desperdicios de Alimentos*).²¹⁰ The implementing regulation, adopted in 2020, outlines strategies to reduce food loss and waste that include the specific mention of food donation and direct the development of guidelines on the requirements and incentives for food donation.²¹¹ In 2022, Peru passed a law (*Ley que promueve acciones para la recuperación de alimentos* or *Law that promotes actions for food recovery*) to promote food recovery through educational campaigns, coordination of food recovery projects in markets, and tracking information on food recovery and its impacts.²¹²

Peru does not have an organic waste ban, nor does it mandate the source separation and recycling of organic waste, including food waste.

Scope of Covered Entities

In Peru's Food Donation law, the requirement to donate food that has lost its commercial value but is still suitable for human consumption extends only to supermarkets and food warehouses.²¹³ The law does not cover other key actors in the food supply chain, such as restaurants.

Enforcement Mechanisms

Because Peru's government still has not finalized enabling regulations for the food donation mandate as of March 2024, there are no formal procedures for compliance or legal consequences for breaching the law's donation requirement.²¹⁴

Government Infrastructure Support

The research did not reveal any grants or funding to support the implementation of Peru's Food Donation Law. However, as noted above, Peru's 2022 law promoting food recovery lays the foundation for efforts to coordinate and track food donations.

Stakeholder Involvement in the Planning and Implementation Process

Stakeholders involved in food recovery reported that they were not consulted nor engaged during the process leading up to the adoption of Peru's Food Donation Law. They have subsequently communicated the need for increased awareness regarding the law's provisions as well as the need for governmental guidance and technical assistance.

Peru's government has led public education campaigns to build awareness around reducing and preventing food loss and waste. For example, in March 2020, Peru launched a Zero Food Waste (*Cero Desperdicios de Alimentos*) campaign, using social media and other tools to disseminate information about food waste. The country has also provided training on reducing and preventing food loss and waste in the agriculture, livestock, and fisheries sectors.²¹⁵ However, stakeholders in Peru report that additional government support is needed to promote public awareness as well as provide guidance and training on food donations.

Despite the need for increased public awareness, guidance, and training to promote food recovery and redistribution, programs like those operated and supported by the Peruvian Food Bank (*Banco de Alimentos Perú*),²¹⁶ the World Food Programme,²¹⁷ and others generate experiences that help shape the development of viable, scalable, and sustainable solutions. These experiences can inform the development of laws and policies, increasing the likelihood of successful implementation.

Implementation and Enforcement Challenges

In recent years, Peru has faced political instability, the ongoing impacts of COVID-19, and extreme weather events, leading to a crisis.²¹⁸ Amid these challenges, progress addressing food loss and waste has slowed. Although Peru has adopted a framework of laws to promote food donation, reduce and prevent food loss and waste, and promote food recovery, it has yet to fully implement these laws. For example, the Food Donation Law requires further regulations and guidance to implement the donation mandate, though the law's tax incentives are in place including those for donations made during emergency situations.²¹⁹ In this context, stakeholders report an ongoing lack of awareness around the Food Donation Law. They generally agree that the donation mandate is not acting as a compulsory measure at present.

Likewise, Peru's government has been delayed in issuing regulations for the 2022 law promoting food recovery, including recovery of fresh foods from wholesale markets.²²⁰ The law was enacted in 2022, but reports from September 2023 explain that the Ministry of Agrarian Development and Irrigation (MIDAGRI) was still developing the needed regulations.²²¹ Between 2021 and 2024, Peru has had nine different Ministers of Agriculture and Irrigation, which made it difficult to have a sustained consultation process and to finalize the regulations.

Implementing regulations are required to detail how the government will execute educational campaigns, coordinate food recovery projects, and standardize the tracking of food recovery efforts and impacts. While other countries have benefited from iterating on a policy after implementation, Peru has added new policies that do not build on the existing legal framework because aspects of the laws have not yet been implemented or evaluated.

Targets, Indicators, and Monitoring

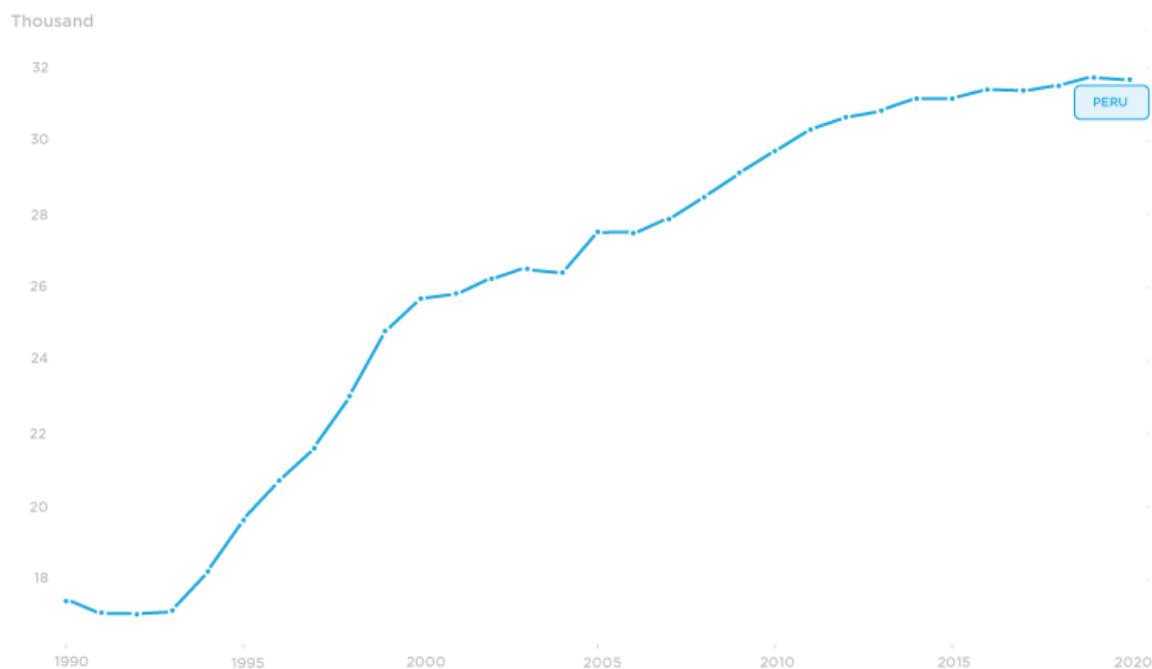
Peru does not have official food loss and waste data.²²² Thus, little data is available on the efficacy of Peru's food waste deterrence policies, including its Food Donation Law. Work is just beginning to establish a methodology for measuring and tracking food loss and waste. The United Nations Food

and Agriculture Organization (FAO) is providing Peru with technical assistance to build its capacity to collect and report national food loss data.²²³

Interestingly, what little data that is available shows that in the year after Peru enacted its Food Donation Law, food donations to the Peruvian Food Bank increased from 861 tons in 2016 to 2,705 tons in 2017.²²⁴ Although food donations decreased in 2018, they have steadily risen since then.²²⁵ The initial tripling of food donations may be attributed to increased attention to food donations following the law's passage. This suggests that even without enforcement mechanisms in place, enacting a law on its own can change behavior by raising awareness of the issue and changing practices for businesses that are inherently motivated to follow the law.

Despite the data showing increased food donations, daily waste has grown exponentially and is predicted to increase from around 20,000 to 36,000 tons per day by 2025.²²⁶ Organic waste makes up approximately 53% of urban solid waste buried in Peruvian landfills²²⁷ and is the source of over 36% of Peru's methane emissions.²²⁸ It is estimated that Peru recycles less than 5% of its total waste.²²⁹ Some of this results from minimal household waste separation, a limited number of composting facilities, and weak waste collection and transportation infrastructure.²³⁰

Although not attributed to specific sectors, World Bank data shows that Peru's methane emissions increased slightly between 2016 (31,413 kt of CO₂ equivalent) and 2020 (31,680 kt of CO₂ equivalent).²³¹



Source: The World Bank, Data, Methane Emissions (KT of CO₂ Equivalent) with underlying data from Climate Watch, Historical GHG Emissions (1990-2020) 2023.²³²

KEY LEARNINGS FROM THE SOUTH KOREA, FRANCE, AND PERU FOOD WASTE DETERRENCE CASE STUDIES

The experiences of South Korea, France, and Peru offer valuable lessons for shaping food waste deterrence policy approaches in different countries. This section seeks to leverage the experience of these three countries, drawing upon both the literature review and insights gathered during the stakeholder interviews. The following key points highlight factors that stakeholders and policymakers should keep in mind when designing and enacting food waste deterrence policies for their country's specific policy landscape and goals.

KEY LEARNINGS

1. Policy Design

To ensure that food suitable for human consumption and food waste suitable for recycling is not sent to landfills to decompose and emit methane, governments must take strategic action. Enacting policies that ban food waste disposal, mandate food donations, or impose steep taxes on disposal can be effective at reducing the amount of food waste sent to landfills. The governments in South Korea, France, and Peru have all taken bold action to put in place policies that prohibit or make it more financially burdensome to waste food. Many of these countries' policies have gone through iterations over time, often gradually expanding to cover more actors along the food supply chain. The most impactful set of policies aligns with the food waste hierarchy, prioritizing food waste prevention and discouraging disposal. Such an approach requires interconnected strategies across government, engaging the broad range of ministries or departments whose missions touch on food waste related issues, such as ministries of the environment, agriculture, health, and social services. While early implementers of food waste deterrence policies have benefitted from taking a tiered and phased-in approach that gradually covers more entities over time, the countries that follow could design policies that include all actors at the outset using the roadmaps provided by South Korea and France.

1.1 Tailor food waste policies in accordance with the priorities set out in the food waste hierarchy

Adherence to the food waste hierarchy to prioritize prevention and food recovery when shaping policy is a best practice that can be replicated elsewhere. The food waste hierarchy prioritizes food waste prevention, immediately followed by redistribution to human and animal food consumption. When food waste cannot be prevented, food scraps should be sent for recycling, where they can be converted into animal feed, compost, or biogas. In all cases, disposal of food waste should be discouraged. As discussed above, France's *Garot* Law specifically mentions and is guided by this hierarchy. In contrast, stakeholders in South Korea and Peru noted the potential to strengthen their country's policies to direct surplus food to populations experiencing food insecurity by adhering to a food waste management hierarchy.

1.2 Deploy Interconnected Strategies Across Government

Across all three countries, stakeholders mentioned the importance of adopting a holistic strategy when crafting and implementing food waste deterrence laws. A whole-of-government approach can help ensure that food waste policies consider the various environmental, economic, and social implications of food waste regulations. Siloed efforts may fail to maximize the potential for organic waste policies to increase food donation rates or to effectively respond to food donation quality concerns that may shift responsibility for organic waste disposal onto food recovery organizations. For example, the lack of prioritization of food recovery was a critique of South Korea's food waste policies. Based on our analysis, a combination of organic waste and food donation policies—as was implemented in France—holds the greatest potential for reducing methane emissions.

1.3 Take a tiered and phased-in approach

Countries considering implementing food waste deterrence laws can benefit from a tiered and phased-in approach, as South Korea and France have done. Tiered and phased-in approaches provide food waste generators and jurisdictions with the time and capacity to adapt and comply. In South Korea, organic waste management efforts began in 1995, with the implementation of a PAYT system requiring waste generators to pay disposal costs based on the amount of waste produced. Not all municipalities were included at the outset, as some were not equipped to shift from assessing flat rates for disposal to volume-based disposal fees. Additionally, residents in multi-unit buildings were not assessed fees based on the amount of waste they disposed, instead paying fees based on the disposal rates of their community. Over time, South Korea developed various systems for implementing its volume-based disposal system (specialized bags, chip or sticker systems, and the RFID system), which allowed for national expansion of the program to cover more municipalities and multi-unit residential buildings. South Korea complimented its PAYT system with a complete ban on food waste disposal in landfills. To facilitate this ban, South Korea first expanded its capacity to collect, dispose, and treat food waste separate from other municipal waste, investing in constructing food waste treatment facilities. South Korea's volume-based disposal system now assesses fees tailored to the cost of food waste collection, transportation, and recycling.

France began restricting the amount of organic waste that could be sent to landfills by focusing on large organic waste producers (generating more than 120 tons/year). Over time, France has gradually expanded the scope of covered entities to include those generating small amounts of organic waste. As of 2024 all individuals and entities in France, regardless of the amount of waste produced, must source separate and recycle organic waste (including food waste). While commercial waste generators are subject to fines and penalties for violations, some local governments are not yet enforcing the law for individuals and smaller waste generators while they set up local collection and recycling infrastructure.

France similarly phased in its food donation requirements, initially covering only those food retailers larger than 400 square meters but later expanding to large caterers, operators in the agri-food industry, and food wholesalers. This tiered and phased-in approach provided food recovery organizations (many of whom experienced challenges adapting to increased donation levels) time to further adjust before navigating increased food recovery partnerships with other

actors in the food supply chain. As the scope of covered entities expanded, it may have also helped temper the impacts of decreased food donations from food retailers, as improved food waste prevention practices decreased their surplus food supplies.

Countries wanting to maximize the impact of food waste deterrence laws could enact food waste bans and food donation requirements for all actors along the food supply chain using a tiered or phased-in approach at the outset. One strength of this approach is that it would allow entities covered in later implementation phases to adapt in anticipation of the law's expansion, stimulating improved food waste prevention, recovery, and recycling practices before the law's expansion.

2. Support the Implementation of Food Waste Deterrence Laws with Government Funding for Infrastructure and Capacity Building

To maximize the impact of food waste deterrence policies, countries often need to invest resources in planning and funding infrastructure development along with capacity building to handle increases in food recovery and food waste recycling rates. This can be one of the most significant challenges when implementing food waste deterrence policies, such as organic waste bans and food donation requirements.

In France and South Korea, where food waste deterrence policies have been fully implemented, stakeholders spoke about the importance of supportive infrastructure. As France's food donation mandate boosted food donation rates, a lack of governmental financial support strained food recovery organizations' abilities to manage the surge. As of 2023, France is providing additional funding to support better coordination of food recovery efforts.²³³ To support the implementation of its organic waste source separation and recycling laws, France is funding a variety of projects, including those that reduce the amount of organic waste, facilitate collection, and increase compost and biogas production capacity. South Korea's early-stage implementation of its organic waste policies was similarly accompanied by financial and technical aid for recycling, leading to sector expansion.

As organic waste disposal and food recovery systems mature, funding needs may shift towards technology, data management, and diversification or coordination of food recovery systems and recycling facilities. In South Korea, stakeholders spoke about the need for continued technology investments, especially around data management, and the government's shift to investing in biogas facilities. The 2022 food recovery law in Peru specifically mentions standardizing information about food recovery and its impacts. The case studies highlight the need to assess infrastructure and capacity-building necessities and to provide sustained governmental support to maximize the success of food waste deterrence policies, especially as needs shift over time.

3. Involve affected stakeholders in the planning and implementation process

Involving those who will be affected in planning and execution helps pave the way for the successful implementation of food waste deterrence policies. Before testing its PAYT system, South Korea solicited public input on its proposed plan through public hearings and meetings. It then transitioned to a pilot phase, facilitating a feedback loop to further refine and improve the proposed system before national implementation. During this pilot phase, South Korea also conducted a public education campaign to garner support for the new system. When encountering implementation

challenges, South Korea considered the concerns of impacted communities to develop solutions to address issues such as increased odor and pests at landfill sites. South Korea continues to use public education campaigns to ensure that its citizens understand the negative impacts of food waste, are equipped to reduce their food waste, and know how to properly source separate waste to prevent contamination.

France's use of a voluntary national pact offers a model for involving affected food businesses and food recovery organizations in the process of developing and implementing systems that increase surplus food recovery. Before the 2016 adoption of France's food donation law, many supermarkets and food distributors were already partnering with food recovery organizations as part of their commitments to the voluntary national pact. This pact set the stage for the subsequent adoption of food donation mandates. France has continued to involve stakeholders, including through its REGAL initiatives at the regional level which engage representatives from the food supply chain, associations, institutional representatives, project leaders, and citizens in efforts to fight food waste. Some REGAL networks are working to improve coordination between the wide array of food recovery organizations and food supply chain businesses now covered by the food donation requirements.

The involvement of affected stakeholders helps identify implementation challenges and provides innovative solutions to ensure the efficacy of food waste deterrence policies.

4. Build in Enforcement Mechanisms or Incentives to Increase Compliance

Enforcement mechanisms help drive behavioral change, even when they are not particularly burdensome or do not result in enforcement action. For example, in South Korea, where food waste recycling fees for individuals are relatively low, those fees appear to have reduced the amount of food waste generated at the household level primarily by providing immediate feedback on waste generation and increasing awareness. In France, the text of the *Garot* law provides for potential fines for failing to comply with donation requirements, but stakeholders report that France is not yet robustly enforcing the law. Enforcement has proven challenging as the laws cut across different codes (e.g., environment, food safety, etc.), some of which may fall outside an inspector's expertise or jurisdiction. In addition, France's food donation laws do not require businesses to donate a minimum amount of food nor specify the frequency at which businesses must donate surplus food,²³⁴ making it more difficult to identify instances of noncompliance. Despite the lack of enforcement action, better food stock inventory management practices, increased sales of discounted soon-to-expire products, increased food donation, and decreased food waste were documented following the enactment of France's food donation mandate. Thus, even the threat of enforcement may be effective in encouraging compliance.

In Peru, where enforcement mechanisms for the food donation mandate are lacking, donations tripled in the year after the law was enacted. Even without a mandate or enforcement, food waste deterrence laws can move action. This rise in food donation rates was likely spurred in part by the tax incentives for food donation that were included in the law and, according to stakeholders, have been a significant incentive to increasing food donations. Thus, incentive mechanisms can also be used to encourage compliance.

5. Set Baselines and Targets to Monitor and Track Outcomes

Food waste deterrence policies should include mechanisms for tracking their efficacy and impact. Both South Korea and France established targets to reduce the amount of food waste sent for disposal. South Korea's initial goal of reducing food waste disposal by 10% and recycling at least 60% of its food waste by 2002 dates back to 1998. South Korea has tracked food waste generation and recycling rates, facilitating studies on the impact of its PAYT system and RFID technology as well as spurring other investments in food waste recycling infrastructure. Using the European Union's new methodology for tracking food waste, France is now using 2020 baseline data to assess its progress towards its goal of reducing food waste by half by 2025. France's legal framework also imposes mandatory measurement requirements and reduction goals on several sectors. ADEME, France's Agency for the Environment and Energy Management, monitors progress. This data is vital in assessing the effectiveness of its policies and programs, including measuring impacts on greenhouse gas emissions attributable to food waste.

However, many countries lack robust data on food loss and waste, and to the extent that countries are tracking data, approaches to measurement have varied significantly.²³⁵ As countries develop food waste deterrence policies, they should use a widely accepted methodology for measurement and tracking to assess policies' efficacy over time. The European Union and the United Nations Environment Programme have developed standardized methods for measuring and reporting food waste data,²³⁶ while the United Nations Food and Agriculture Organization has developed a framework with guidance for reporting food loss.²³⁷ Using a framework and a standardized methodology for food loss and waste measurement such as those created by the European Union, the United Nations Environment Programme, and the FAO, can assist countries in setting baselines, measuring policy efficacy and progress over time, and comparing the impact of policies across countries. As seen in Peru's case, resources such as technical assistance from the FAO are available to assist lesser-resourced countries with capacity building to collect data and measure food loss and waste.



FUTURE RESEARCH

The above case studies yielded important initial learnings regarding the impact and efficacy of different food waste deterrence policy designs in diverse geographies. However, the analysis was limited in terms of the number of countries included and the qualitative nature of the research. Broader research could provide policymakers with a more complete picture of the impact of food waste deterrence policies and the variations in efficacy across different policy designs.

For example, the Global Food Donation Policy Atlas project maps food donation laws and policies in 25 countries.²³⁸ Twelve of those countries, including Peru, have implemented food waste deterrence policies at the national or subnational level.²³⁹ While not included in the Atlas project, the Czech Republic also enacted a law inspired by France's 2016 food donation law.²⁴⁰ As of January 2018, food retailers and grocers in the Czech Republic that are larger than 400 square meters must offer surplus edible food to registered charitable organizations.²⁴¹ However, unlike France, the Czech Republic coupled early implementation with government grants to support the charitable organizations that would be recovering and distributing surplus food.²⁴² Thus, the Czech Republic's system could provide an interesting point of comparison to France's experience. Amplifying the qualitative research and case studies to cover a wider range of countries, policy designs, and even subnational policies would expand on the learnings from South Korea, France, and Peru's experiences.

A quantitative study could build on the more subjective learnings from the case studies to analyze the demonstrated impacts of food waste deterrence policies in South Korea, France, and other countries. Some existing literature and data, much of which was captured above, provide a foundation as to the impact of policies. However, a quantitative study could use standard metrics to compare the effects of various policy designs across countries in a more scientific way. Such an approach could also delve more deeply into the question of whether a waste management-centric approach or a food donation-centric approach is most impactful and in what ways. While the included case studies offered the flexibility to gather perspectives from various stakeholders and countries, providing an initial understanding of policy impacts and planning considerations, a future quantitative analysis would offer objective statistical data to aid in policymaking.

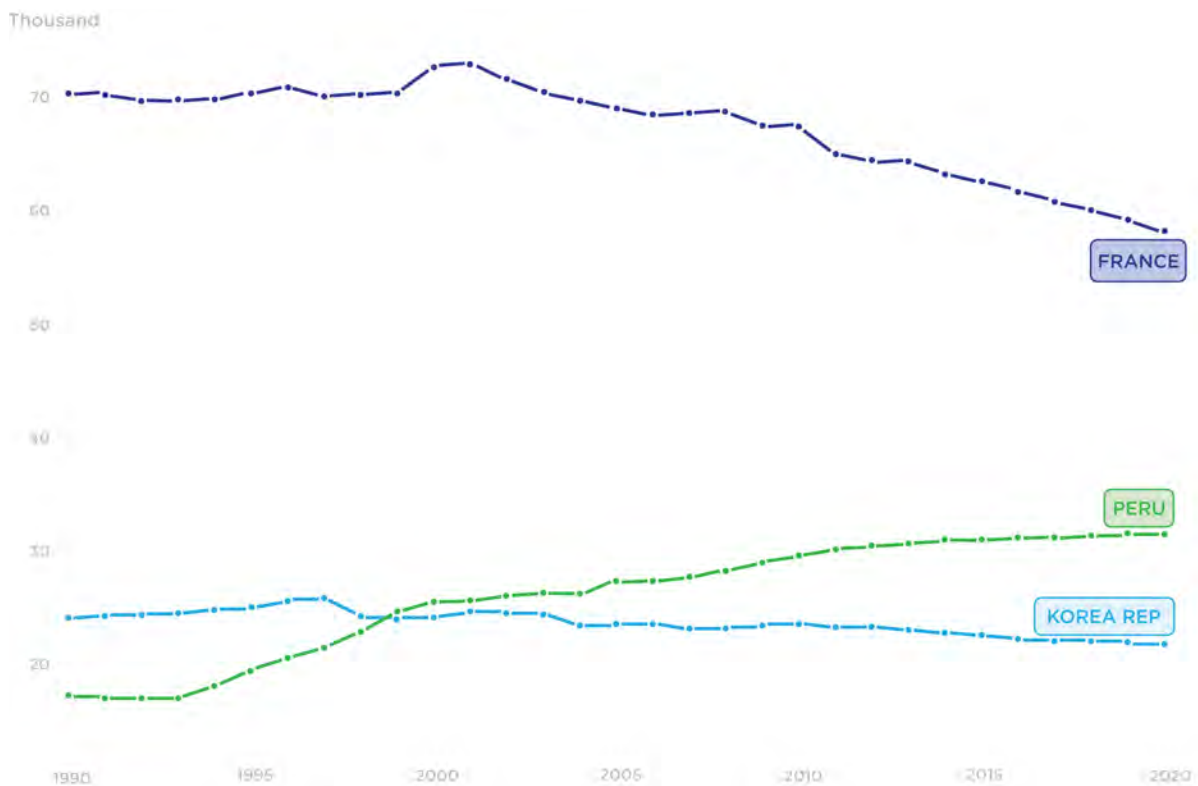
CONCLUSION

South Korea and France have garnered international attention and praise for their commitment to addressing the environmental, social, and economic consequences of food waste through food waste deterrence policies. South Korea is known for its stringent and exceptionally successful food waste laws, including its PAYT system and ban on food disposal in landfills. France is well-known for becoming the first country to ban supermarkets from destroying surplus food and mandating that they work with food recovery organizations to redistribute edible food to communities. Despite the different policy designs and national contexts, the food waste deterrence policies enacted in both countries have succeeded in meeting their goal of reducing waste and methane emissions. Although the precise impacts of specific food waste deterrence policies cannot be isolated from the policy environment in which they rest, both countries are making progress, with South Korea

reportedly diverting 96% of its food waste from landfills and France observing significant changes in the amount, frequency, and diversity of food donation. Methane emissions in both countries are trending down, even if it is difficult to discern precisely how much of this decrease is attributable to food waste policies.

Peru offers a less well-known example of a country that is attempting to use food waste deterrence policies to address the high levels of food insecurity and significant waste challenges within its country. It is also the first country to enact a food donation requirement outside Europe. In the year after Peru enacted its Food Donation Law, donations increased even though the food donation mandate was not accompanied by implementing regulations. Peru has complemented its Food Donation Law with related food loss and food recovery laws. However, progress in implementing Peru’s Food Donation Law has slowed due to political instability, the impact of the COVID-19 pandemic, and natural disasters. As seen below, unlike France and South Korea, Peru’s methane emissions have continued to increase over time.

More research and analysis on these and other countries with such policies can help identify the aspects of these policy designs that are most impactful and worthy of emulation for future interested policymakers.



Source: The World Bank, Data, Methane Emissions (KT of CO2 Equivalent) with underlying data from Climate Watch, Historical GHG Emissions (1990-2020) 2023.²⁴³

ENDNOTES

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