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Eat Every Carrot and Pea on Your Plate: Climate Change and Fining Food Waste

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INTRODUCTION

Climate change’s impact is evident—from rising temperatures¹ and melting ice caps² to the increasing number of devastating storms,

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¹ Myles Allen et al., *Warming Caused by Cumulative Carbon Emissions Towards the Trillionth Tonne*, 458 NATURE 1163 (2009), <https://www.nature.com/articles/nature08019.pdf> [<https://perma.cc/BCP2-QFXQ>].

² Leif S. Anderson et al., *The Expected Lifespans of Icelandic Glaciers and Ice Caps*, 21 GEOPHYSICAL RSCH. ABSTRACTS 1 (2019).

droughts, and other natural disasters.³ One key contributor to climate change is the growing amount of greenhouse gases in the atmosphere.⁴ Even individuals who do not fully realize the importance of reducing the problems greenhouse gases pose will soon see climate change's influence on their finances as housing,⁵ water,⁶ and food supplies become increasingly scarce, causing the prices of these goods to rise.⁷ As climate change continues to affect the environment, farming costs associated with producing crops will increase, and farmers will pass those costs to consumers.⁸

Although experts have suggested that individuals adopt a variety of methods to reduce greenhouse gases, like decreasing air travel⁹ or becoming a vegetarian or vegan,¹⁰ these suggestions frequently seem unreachable or unrealistic because of the drastic lifestyle changes required; however, there is an easier, simpler solution. Each household can reduce the greenhouse gases it produces by reducing the amount of food it places in the trash, since food waste is a significant contributor to greenhouse gases.¹¹

This Article argues that these issues—food waste in the United States, greenhouse gases, and climate change—could be mitigated by implementing the Republic of Korea's food waste reduction model. First, this Article provides a general overview of food waste, describes

³ *Briefing Note for the Public Health and Food Safety Committee on Climate Change and Natural Disasters; Scientific Evidence of a Possible Relation Between Recent Natural Disasters and Climate Change*, at 2, IP/A/ENVI/FWC/2005-35 (2006).

⁴ *Climate Change Indicators: Greenhouse Gases*, EPA, <https://www.epa.gov/climate-indicators/greenhouse-gases> (last visited April 14, 2020).

⁵ Teresa Wiltz, *Climate Change Is Making the Affordable Housing Crunch Worse*, PEW CHARITABLE TRS, <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2019/08/30/climate-change-is-making-the-affordable-housing-crunch-worse> (2019).

⁶ Nate Millington & Suraya Scheba, *Day Zero and the Infrastructures of Climate Change: Water Governance, Inequality, and Infrastructural Politics in Cape Town's Water Crisis*, INT'L J. URB. & REG'L RSCH. (2020) ("Restrictions imposed during the crisis resulted in a sharp rise in water costs . . .").

⁷ J.R. PORTER ET AL., *Projected Impacts on Food Prices and Food Security*, in CLIMATE CHANGE 2014: IMPACTS, ADAPTION, AND VULNERABILITY. PART A: GLOBAL AND SECTORAL ASPECTS. CONTRIBUTION OF WORKING GROUP II TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 513 (2014).

⁸ *Id.*

⁹ James Higham, et al., *Climate Change, Tourist Air Travel and Radical Emissions Reduction*, 111 J. CLEANER PROD. 336 (2016).

¹⁰ Roger Harrabin, *Plant-Based Diet Can Fight Climate Change—UN*, BBC (Aug. 8, 2019), <https://www.bbc.com/news/science-environment-49238749> [<https://perma.cc/GA7F-4QFC>].

¹¹ *Food Security & Nutrition Around the World*, FAO, <http://www.fao.org/food-loss-and-food-waste/en/> [<https://perma.cc/YYX4-78FP>].

its environmental impact, and defines basic terms. Next, it synthesizes data concerning food waste, food insecurity, and climate change. Furthermore, this Article addresses key components of the Republic of Korea's food waste policies; compares various local, state, and federal food waste policies; and describes the ensuing litigation within the United States. Finally, this Article concludes that the federal government should assist state and local governments in implementing the Republic of Korea's food waste model—including the food waste electronic weighing system—through the Farm Bill and its regulatory implementation to gain more accurate consumer statistics, decrease unnecessary consumer waste, and decrease food waste's environmental and social impact.

I

ENVIRONMENTAL IMPACT OF FOOD WASTE

Consumer food waste is exactly what it sounds like, but its effect on our environment and economy is not as obvious.¹² Food waste is discarded food that could have been otherwise used by the end consumer.¹³ Food can be wasted for a variety of reasons, such as improper storage or unsold surplus.¹⁴ Food waste not only wastes the food itself but it also wastes the resources used to produce the food. For example, cooking a hamburger and running a shower for ninety minutes use the same amount of water.¹⁵ If an average showerhead uses two and a half gallons of water per minute,¹⁶ a discarded burger's water waste is 225 gallons of water.¹⁷ Additionally, crops grown but either not harvested or discarded at the distributor or consumer level account for over 25% of the total fresh water consumption in the United

¹² Peter Alexander, et al., *Losses, Inefficiencies and Waste in the Global Food System*, 153 AGRIC. SYS. 190, 192 (2017).

¹³ *Id.*

¹⁴ *Id.*

¹⁵ Emily C. Dooley, *Food Waste Is West Coast's New Front Line on Climate Change*, BLOOMBERG L.: ENV'T & ENERGY (Sep. 12, 2018), [https://www.bloomberglaw.com/\[https://perma.cc/23AP-JR32\]](https://www.bloomberglaw.com/[https://perma.cc/23AP-JR32]).

¹⁶ *WaterSense Labeled Showerheads*, EPA, <https://www.epa.gov/watersense/shower-heads> [<https://perma.cc/C3F8-8N9K>].

¹⁷ Dooley, *supra* note 15.

States.¹⁸ Fresh water is a valuable resource, and the amount of accessible fresh water is decreasing every year.¹⁹

In addition to wasting valuable resources, food waste also contributes to greenhouse gas emissions.²⁰ Food waste is now the largest single component in landfills and constitutes 22% of discarded municipal solid waste.²¹ Decomposing food creates greenhouse gases—contributing to an estimated 8% of all greenhouse gases released into the atmosphere annually.²² Ultimately, decreasing and properly disposing of food waste reduces the amount of resources wasted and greenhouse gases produced.

By depleting resources and contributing to greenhouse gas emissions—significant elements of climate change²³—food waste also threatens our planet’s food supply.²⁴ Climate change’s impact on Earth’s temperature and weather patterns continues to grow, causing fires and floods,²⁵ decreasing or destroying crop yields,²⁶ and increasing the number of diseases and pests,²⁷ which in turn degrades

¹⁸ Kevin D. Hall et al., *The Progressive Increase of Food Waste in America and Its Environmental Impact*, PLOS ONE (2009), <https://doi.org/10.1371/journal.pone.0007940>.

¹⁹ KEVIN WATKINS, UNDP, HUMAN DEVELOPMENT REPORT 2006, BEYOND SCARCITY: POWER, POVERTY, AND THE GLOBAL WATER CRISIS (2006), <http://hdr.undp.org/sites/default/files/reports/267/hdr06-complete.pdf> [<https://perma.cc/W56X-NL8L>].

²⁰ FAO, *supra* note 11.

²¹ *Sustainable Management of Food: Wasted Food Programs and Resources Across the United States*, EPA, <https://www.epa.gov/sustainable-management-food/wasted-food-programs-and-resources-across-united-states> [<https://perma.cc/VD2A-SZ48>].

²² FAO, *supra* note 11.

²³ *Energy and the Environment Explained: Greenhouse Gases and the Climate*, U.S. ENERGY INFO. ADMIN. (Oct. 4, 2009), <https://www.eia.gov/energyexplained/energy-and-the-environment/greenhouse-gases-and-the-climate.php> [<https://perma.cc/X7ZC-PSF4>].

²⁴ Chang-Gil Kim & Jeong-Bin Im, *Korean Policy Responses for Ensuring Food Security in the Time of Climate Change*, FFTC AGRIC. POL’Y PLATFORM (Oct. 18, 2016), http://ap.fttc.agnet.org/ap_db.php?id=694 [<https://perma.cc/5T73-KJUR>].

²⁵ See, e.g., *Australia Fires: A Visual Guide to the Bushfire Crisis*, BBC NEWS (Jan. 31, 2020), <https://www.bbc.com/news/world-australia-50951043> [<https://perma.cc/EQP5-LPAX>]; *Climate Change Impacts in Latin America*, WWF, <https://earthobservatory.nasa.gov/images/19670/heavy-rain-floods-south-america> [<https://perma.cc/S6QW-5ETF>]; *California Fires and Blackouts in Photos: What We Know*, WALL ST. J. (Nov. 1, 2019), <https://www.wsj.com/articles/california-fires-and-blackouts-in-photos-what-we-know-11572286626> [<https://perma.cc/2U9Q-45Q8>].

²⁶ Yinhong Kang, Shahbaz Khan & Xiaoyi Ma, *Climate Change Impacts on Crop Yield, Crop Water Productivity and Food Security—A Review*, 19 PROGRESS IN NAT. SCI. 1665 (Dec. 10, 2009), <https://www.sciencedirect.com/science/article/pii/S1002007109002810> [<https://perma.cc/56R9-T9TR>].

²⁷ Madeleine Stone, *A Plague of Locusts Has Descended on East Africa. Climate Change May Be to Blame.*, NAT’L GEO. (Feb. 14, 2020), <https://www.nationalgeographic>

the quality of crops harvested.²⁸ Consequently, decreasing or, at a minimum, stabilizing current greenhouse gas emissions is critical in managing climate change and climate change's impact on the food supply chain.

In addition to the effect on the food supply chain, the correlation between food waste and climate change also has economic implications. Specifically, food and environmental policy analysts are concerned about how climate change will affect food prices.²⁹ Food production costs will rise as farmers combat the impact of climate change on their crops.³⁰ This increased cost will, consequently, be passed on to consumers. For example, experts predict that by 2050 corn production will decrease by 18% due to climate change.³¹ This decreased production will cause corn prices to rise an estimated 42% to 131% by 2050, even when adjusting for inflation.³² However, the estimated price increases are not inevitable if climate change is quickly mitigated.

II

THE UNITED STATES' HISTORIC AND UNHEALTHY RELATIONSHIP WITH FOOD WASTE

Many Americans are not aware of how much food waste they create, with up to one-third of people reporting they do not waste any food.³³ However, some studies show up to 43% of food waste occurs at the

.com/science/2020/02/locust-plague-climate-science-east-africa/ [https://perma.cc/9CPB-R8AW].

²⁸ U.S. DEP'T OF AGRIC. TECH. BULLETIN 1935, CLIMATE CHANGE AND AGRICULTURE IN THE UNITED STATES: AFFECTS AND ADAPTATION (2013), [https://www.usda.gov/sites/default/files/documents/CC%20and%20Agriculture%20Report%20\(02-04-2013\)b.pdf](https://www.usda.gov/sites/default/files/documents/CC%20and%20Agriculture%20Report%20(02-04-2013)b.pdf) [https://perma.cc/G7AF-2UBG].

²⁹ *Id.* at 2; see Kim & Im, *supra* note 24.

³⁰ Joachim von Braun et al., *High Food Prices: The What, Who, and How of Proposed Policy Actions*, INT'L FOOD POL'Y RSCH. INST. 4 (May 2008), <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/10384> [https://perma.cc/7VHZ-PYGV].

³¹ Helen Kang, *Food Insecurity Impacts on the U.S. Poor as the World Warms*, 28 NAT. RES. & ENV'T 3, 4 (2013).

³² *Id.*

³³ See generally Duncan Walker, *The Children Going Hungry in America*, BBC NEWS (Mar. 6, 2013), <https://www.bbc.com/news/magazine-21636723> [https://perma.cc/B7GZ-29MM]; Malia Wollan, *How to Make Money Collecting Bottles and Cans*, N.Y. TIMES (Apr. 8, 2016), <https://www.nytimes.com/2016/04/10/magazine/how-to-make-money-collecting-bottles-and-cans.html>.

domestic level,³⁴ while others show that consumers generate 60% of food waste.³⁵ This overwhelming quantity of wasted food stands in stark contrast with the high number of individuals facing food insecurity in the United States. For example, at least 10% of children live in food insecure households in every state in the United States.³⁶ In some states, over 25% of children suffer from food insecurity.³⁷ In short, despite the United States' prosperous economy, these statistics show that a large proportion of its population struggles to meet one of the most basic human needs.

Congress has previously endeavored to address both food waste and food insecurity.³⁸ For example, Congress enacted the Bill Emerson Good Samaritan Act in 2012 to protect grocery stores and farmers who donate food to shelters and soup kitchens from legal liability for food poisoning or other illnesses that may occur from consuming the donated food.³⁹ The Act states that:

A person or gleaner shall not be subject to civil or criminal liability arising from the nature, age, packaging, or condition of apparently wholesome food or a fit grocery product that the person or gleaner donates in good faith to a nonprofit organization for ultimate distribution to needy individuals.⁴⁰

Unfortunately, the Good Samaritan Act has been ineffective at reducing food waste for two primary reasons. First, the lack of widespread education concerning the Act means many restaurants and grocery stores do not know they may donate uneaten food without legal

³⁴ DANA GUNDERS, NAT'L RES. DEF. COUNCIL, WASTED: HOW AMERICA IS LOSING UP TO 40 PERCENT OF ITS FOOD FROM FARM TO FORK TO LANDFILL 4 (Aug. 16, 2012); *see also* REFED, A ROADMAP TO REDUCE U.S. FOOD WASTE BY 20 PERCENT 16 (2016), https://www.refed.com/downloads/ReFED_Report_2016.pdf [<https://perma.cc/9CGD-N4F3>].

³⁵ Mary Griffin, Jeffery Sobal & Thomas A. Lyson, *An Analysis of a Community Food Waste Stream*, 26 AGRIC. & HUM. VALUES 67 (2009), <https://link.springer.com/article/10.1007/s10460-008-9178-1> [<https://perma.cc/LJE7-7TTG>].

³⁶ Lauren Bauer & Diane Whitmore Schanzenbach, *Children's Exposure to Food Insecurity Is Still Worse than It Was Before the Great Recession*, BROOKINGS (June 29, 2018), <https://www.brookings.edu/blog/up-front/2018/06/29/childrens-exposure-to-food-insecurity-is-still-worse-than-it-was-before-the-great-recession/> [<https://perma.cc/Y87T-RQ39>].

³⁷ *Id.*

³⁸ Alexandra I. Evans & Robin M. Nagele, *A Lot to Digest: Advancing Food Waste Policy in the United States*, 58 NAT. RES. J. 177, 182–85 (2018), https://www.jstor.org/stable/26394778?seq=1#metadata_info_tab_contents [<https://perma.cc/Y9MF-UUQ9>].

³⁹ Bill Emerson Good Samaritan Food Donation Act, 42 U.S.C. § 1791 (2012).

⁴⁰ *Id.*

repercussions.⁴¹ Second, the Act does not promote decreasing food waste as a primary goal, but merely removes legal liability from those who do decide to donate.⁴² Although the Bill Emerson Good Samaritan Act's drafters intended to address food insecurity and, as an added benefit, reduce food waste, the ongoing food waste and lack of donation by grocery stores and restaurants shows that the Act is an inadequate solution.

Members of Congress have introduced several other pieces of legislation to resolve the issues surrounding food waste, but these have not yet been adopted.⁴³ Generally, proposed food waste legislation is introduced as a potential addition to the Farm Bill.⁴⁴ This omnibus piece of legislation must be renewed every five years, otherwise many crucial aspects of American agriculture are not funded.⁴⁵ Typically, previous legislation that has been introduced in past iterations of the Farm Bill is included in the renewed bill, along with new bills and acts related to food, farming, and agricultural research.⁴⁶ However, the final version of the 2018 Farm Bill did not contain crucial provisions addressing food waste that were suggested in earlier versions of the bill.⁴⁷ The 2018 Farm Bill initially contained several provisions concerning food waste, such as increased funding for biogas research, food waste reduction pilot projects, and a new study that would provide better statistics concerning current food waste volume and trends.

⁴¹ Mackensy Lunsford, *Despite Law, Restaurants Still Don't Donate*, USA TODAY (Nov. 23, 2015), <https://www.usatoday.com/story/news/nation-now/2015/11/23/despite-law-restaurants-still-dont-donate-food/76286144/> [<https://perma.cc/26PC-4E8V>]; see also John Light, *U.S. Restaurants Are Terrible at Getting Wasted Food to the Hungry. Can We Change That?*, GRIST: FOOD (Sept. 2, 2015), <https://grist.org/food/u-s-restaurants-are-terrible-at-getting-wasted-food-to-the-hungry-can-we-change-that/> [<https://perma.cc/3NPM-NDHT>].

⁴² Bill Emerson Good Samaritan Food Donation Act, 42 U.S.C. § 1791 (1996).

⁴³ See, e.g., *Bill History*, Agriculture Improvement Act of 2018, Pub. L. No. 115-334 (2018), <https://www.congress.gov/bill/115th-congress/house-bill/2/text> [<https://perma.cc/Y2CJ-YLYY>].

⁴⁴ See EMILY BROAD LEIB ET AL., HARV. FOOD L. & POL'Y CLINIC, OPPORTUNITIES TO REDUCE FOOD WASTE IN THE 2018 FARM BILL (May 2017), <https://furtherwithfood.org/resources/opportunities-reduce-food-waste-2018-farm-bill/> [<https://perma.cc/Y44K-FY6W>].

⁴⁵ See *Bill History*, Agriculture Improvement Act of 2018, Pub. L. No. 115-334 (2018), (approving, among other things, the continuation of agricultural program through fiscal year 2023).

⁴⁶ See Margaret Sova McCabe, *Cooperation or Compromise? Understanding the Farm Bill as Omnibus Legislation*, 14 J. FOOD L. & POL'Y 1, 6 (2018).

⁴⁷ See *id.*

However, those provisions were ultimately removed from the final 2018 Farm Bill.⁴⁸

The Food Recovery Act of 2017 is an example of failed food waste legislation.⁴⁹ The Act would have authorized grants or loans for activities that raise awareness of food waste and food recovery efforts.⁵⁰ It also outlined agricultural research goals to reduce the quantity of wasted food and to install facilities, including composting or anaerobic digesters, which use food or crop waste to produce energy.⁵¹ Unfortunately, the Food Recovery Act of 2017 did not survive the Senate Subcommittee on Health and was ultimately cut from the final version of the omnibus bill.⁵²

Another bill introduced in 2017 as a potential addition to the 2018 Farm Bill was the Food and Farm Act.⁵³ This Act, if passed, would have established the Office of Food Waste and the Food Loss and Waste Reduction Task Force.⁵⁴ The mission of the Office of Food Waste would have been to coordinate food waste measures in the United States and increase educational efforts within the federal government about the impact of food waste.⁵⁵ Meanwhile, the Food Loss and Waste Reduction Task Force would increase public education efforts, as well as monitor food waste reduction goals and benchmarks.⁵⁶ The task force would have incorporated members from industries and interest groups directly involved in food production and management, including agriculture, the food processing and manufacturing industry, the food service and restaurant industry, and nonprofits focused on food waste prevention.⁵⁷ Although the Act was introduced in 2017 with hopes it would become part of the 2018 Farm

⁴⁸ Agriculture Improvement Act of 2018, Pub. L. No. 115-334 (2018) (When the bill was referred to the Subcommittee on Energy and Commerce, the relevant provisions were still part of the bill).

⁴⁹ Food Recovery Act of 2017, H.R. 3444, 115th Cong. (2017–2018), <https://www.congress.gov/bill/115th-congress/house-bill/3444/all-actions?overview=closed#tabs> [<https://perma.cc/KTT6-7XCS>].

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *See id.*

⁵³ Food and Farm Act, H.R. 4425, 115th Cong. (2017–2018).

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.*

Bill, it did not pass in either the House or the Senate and, thus, did not make it into the bill.⁵⁸

Many state and local governments have passed food waste legislation and regulations instead of waiting for federal initiatives to pass.⁵⁹ For example, Vermont, one of the most aggressive opponents of food waste, has banned all new food waste in landfills after 2020;⁶⁰ however, Vermont's methodology may not work in every state due to the extensive infrastructure needed to implement food waste disposal facilities. Although most initiatives are not as intense, other states have already had varying levels of success with their food waste recycling initiatives.⁶¹ More viable solutions that will work with a variety of economic and political structures are needed.

III

REPUBLIC OF KOREA: FROM WORST GLOBAL FOOD WASTE PRODUCER TO ENVIRONMENTAL GLOBAL LEADER

A. History

The Republic of Korea, also known as South Korea, once wasted more food than any other Asian country.⁶² Korean culture traditionally encouraged elaborate and extravagant meals, valuing them as a sign of wealth and prestige.⁶³ Although the Republic of Korea enacted the Environment Conservation Act in 1977⁶⁴ and established the Korean

⁵⁸ See Food and Farm Act, H.R. 4425, 115th Cong. (2017–2018) (Did not pass Senate or House, 2017), <https://www.congress.gov/bill/115th-congress/house-bill/4425/all-info?r=4&s=3#actionsOverview-content> [<https://perma.cc/KTT6-7XCS>].

⁵⁹ EMILY BROAD LEIB ET AL., HARV. FOOD L. & POL'Y CLINIC, KEEPING FOOD OUT OF THE LANDFILL: POLICY IDEAS FOR STATES AND LOCALITIES 63, (Oct. 2016), http://www.chlpi.org/wp-content/uploads/2013/12/Food-Waste-Toolkit_Oct-2016_smaller.pdf [<https://perma.cc/VPW6-7SE9>].

⁶⁰ 2013 Vt. Acts & Resolves 148.

⁶¹ Nicholas M. Vaz, *Are You Gonna Eat That: A New Wave of Mandatory Recycling Has Massachusetts and Other New England States Paving the Way Towards Feasible Food Waste Diversion and a New Player in Alternative Energy*, 26 VILL. ENV'T L.J. 193, 200–06 (2015) [<https://perma.cc/JE8C-8VRK>].

⁶² Liv Lemos, *How Governments Around the World Are Encouraging Food Waste Initiatives*, WINNOW (Mar. 7, 2018), <http://blog.winnowsolutions.com/how-governments-around-the-world-are-encouraging-food-waste-initiatives> [<https://perma.cc/5DFS-6KW7>].

⁶³ Hae-Kyun, Hye Jeong Yang, Dayeon Shin & Kyung Rhan Chung, *Aesthetics of Korean Foods: The Symbol of Korean Culture*, 3 J. ETHNIC FOODS 178, 179 (Aug. 6, 2016), <https://www.sciencedirect.com/science/article/pii/S2352618116300853> [<https://perma.cc/2YV7-ZA7V>].

⁶⁴ Law No. 3078 of Dec. 31, 1977 (S. Korea); Hong Sik Cho, *An Overview of Korean Environmental Law*, 29 ENV'T. L. 501, 505 (1999) <https://go.gale.com/ps/i.do?p=>

Environment Administration and Korea Resources Recovery and Reutilization Corporation in 1980,⁶⁵ the Republic of Korea struggled to enforce these new environmental regulations and cope with the mounting food waste problem and its environmental impact.⁶⁶ While these specific regulations did not specifically address food waste, the Korean government began to shift its focus from overarching environmental regulations governing pollution and other environmental issues to specifically address food waste in 2001.⁶⁷

In 2001, the Korean government implemented the Comprehensive Measures for Food Waste Reduction campaign.⁶⁸ As part of this new campaign, the Republic of Korea created TV and radio campaigns encouraging food waste reduction, created action plans for its citizens, and utilized various other advertising methods to educate the public on food waste's societal and environmental impact.⁶⁹ As a result of the 2005 regulation banning dumping of food waste into landfill sites, 95% of South Korea's annual food waste is currently recycled.⁷⁰ This is a massive success and provides encouragement to other societies looking to decrease their carbon footprint through legislating food waste.

B. Current Systems for Reducing Food Waste

In the Republic of Korea, two main methods for reducing food waste exist—the radio frequency identification system and averaging household waste system.⁷¹ First, radio frequency identification

AONE&u=euge94201&id=GALE%7CA57388950&v=2.1&it=r [https://perma.cc/FG85-AAW3]. The Environment Conservation Act 1977 was reformed in 1990. See Rakhyun E. Kim, *Principles of Sustainable Development in Korean Environmental Law: Towards the Earth Charter Principles*, N.Z. POST GRADUATE L. E-J. (Jan. 2007).

⁶⁵ History, KOREA ENV'T CORP., <https://www.keco.or.kr/en/manage/history/contentsid/1911/index.do> [https://perma.cc/6W3A-4JFQ].

⁶⁶ Richard J. Ferris Jr., *Aspiration and Reality in Taiwan, Hong Kong, South Korea, and Singapore: An Introduction to the Environmental Regulatory Systems of Asia's Four New Dragons*, 4 DUKE J. COMP. & INT'L L. 125, 160–63 (1993), <https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1335&context=djcil> [https://perma.cc/E8X9-VKDJ].

⁶⁷ COMM'N ON SUSTAINABLE DEV., 18TH-19TH SESSION OF THE COMMISSION ON SUSTAINABLE DEVELOPMENT, NATIONAL REPORT: REPUBLIC OF KOREA (2009), at 50–52, https://sustainabledevelopment.un.org/content/dsd/dsd_aofw_ni/ni_pdfs/NationalReports/korea/full_report.pdf [https://perma.cc/3VC3-Y9F8].

⁶⁸ *Id.* at 50.

⁶⁹ *Id.*

⁷⁰ *Id.* at 51.

⁷¹ Elaine YJ Lee, *South Korea: The Future of Trash*, ATMOS (Aug. 27, 2020), <https://atmos.earth/south-korea-recycling-technology/>.

(RFID) is the newest method Korea uses to manage food waste.⁷² Instituted in 2013, each resident received a unique RFID card that they scan whenever they deposit their food waste at a designated bin.⁷³ The machine then weighs the food waste and charges the resident accordingly based on weight of the food deposited.⁷⁴ By 2017, authorities claimed the RFID system reduced food waste by 25%.⁷⁵ Korea's RFID system is currently the gold standard for managing food waste since it allows the government to track and create individualized fees for each household instead of relying on an average for the area or apartment building.⁷⁶ The RFID system allows households to decrease their charges by lowering their food waste output, whereas the previous system averaged the food waste created between households.⁷⁷ The RFID volume-based waste fee system also allows each family to monitor waste, reduce their waste output, and benefit financially without relying on the wider community.

IV ANALYSIS

Food waste and climate change are just two problems the United States currently faces. However, these problems can be addressed using various economic tools commonly used to tackle environmental law issues.⁷⁸ Moreover, additional tools and research are needed to quantify the amount of food currently wasted in the United States. With current

⁷² Ben Jackson, *Don't Waste That Banchan: Where South Korea's Food Waste Goes*, KOREAN EXPOSÉ (May 23, 2018), <https://www.koreaexpose.com/banchan-south-korea-food-waste/> [https://perma.cc/3B54-KR4R].

⁷³ *Id.*

⁷⁴ Andrea D. Steffen, *South Korea Has Almost Zero Food Waste, Here's How*, INTELLIGENT LIVING (2019), <https://www.intelligentliving.co/south-korea-zero-food-waste/>.

⁷⁵ Press Release, RFID Food Garbage Volume Scale Expanded to General Residential Area, Songpa-gu Office (July 28, 2017), http://www.songpa.go.kr/user.kdf?a=songpa.open.admin.news.bodoApp&c=1002&seq=4632&cate_id=AG0406000000 [hereinafter Press Release, Songpa-gu Office]; see also Kwangho Jung & Sabinne Lee, *A Systematic Review of RFID Applications and Diffusion: Key Areas and Public Policy Issues*, 1 J. INNOVATION TECH., MKT., & COMPLEXITY 1, 10 (Sept. 2015) (explaining the positive environmental effects of RFID technology when used as part of an eco-friendly waste management system).

⁷⁶ Press Release, Songpa-gu Office, *supra* note 75.

⁷⁷ Lisa Hou, *You Waste, You Pay: South Korea's Food Waste Solution*, COMMONWEALTH (Apr. 3, 2013), <https://english.cw.com.tw/article/article.action?id=573> [https://perma.cc/AR8R-765S].

⁷⁸ See e.g., Caroline Cecot & W. Kip Viscusi, *Judicial Review of Agency Benefit-Cost Analysis*, 22 GEO. MASON L. REV. 575, 588 n.93 (2015); Lynn E. Blais, *Beyond Cost/Benefit: The Maturation of Economic Analysis of the Law and Its Consequences for Environmental Policymaking*, 2000 U. ILL. L. REV. 237, 240–43 (2000).

attitudes toward food waste, the lack of food waste education, and conflicting jurisprudence between state constitutions and the U.S. Constitution, the United States must work hard before it can effectively address this issue.

However, the United States could implement other systems that have proven to be effective instead of experimenting with new systems that could produce mixed results. As already evidenced, the Republic of Korea has curbed both food waste and greenhouse gases through its policies and legislation, which focused on climate change and the environmental impact of its citizens.⁷⁹ Furthermore, the Republic of Korea has shown it is possible to educate the public on the issues surrounding food waste and incorporated technology—like the RFID system—to further decrease food waste and greenhouse gases.⁸⁰ To effectively address the issues facing it today, the United States should adopt the methods and technologies used in the Republic of Korea to curb food waste and decrease its carbon footprint.

A. Tackling Food Waste and Climate Change Through Economic Analysis

Law and economics are undoubtedly intertwined, and food waste policies are no exception. Creating efficient and sustainable public policies often requires a thorough economic analysis. Thus, before tackling a critical and massive challenge within public policy, such as food waste, it is important to discuss and understand some fundamental economic principles. For the purposes of this discussion, three relevant economic principles are addressed: the tragedy of the commons, the time value of money, and the cost-benefit analysis.

First, the tragedy of the commons is an especially relevant economic principle for food waste policies because the theory fittingly applies to environmental issues, including climate change. A tragedy of the commons occurs when an individual's short-term personal interests or benefits cause them to ignore a more significant, long-reaching problem negatively affecting the broader community.⁸¹ Generally, the individual has an incentive to use a shared resource before others

⁷⁹ COMM'N ON SUSTAINABLE DEV., *supra* note 67, at 50–52.

⁸⁰ *Id.*

⁸¹ One Minute Economics, *The Tragedy of the Commons Explained in One Minute*, YOUTUBE (July 23, 2016), <https://www.youtube.com/watch?v=jSuETYEgY68> [<https://perma.cc/W5UQ-2UUG>].

can deplete the resource and make it unavailable to consume.⁸² As applied to climate change, for example, an individual can internalize a positive externality—like satisfying a cheeseburger craving—without immediately internalizing the associated negative externality—the amount of greenhouse gases emitted to produce the cheeseburger. Without immediately internalizing the negative externality, the cheeseburger-loving individual does not have the incentive to change their behaviors.

On a macroeconomic scale, governments, like individuals, are incentivized to use a resource or realize positive externalities before other governments use up that resource.⁸³ This includes resources like oil, fresh water, wildlife, wilderness, and even clean air.⁸⁴ On a more microeconomic scale, this pervasive mentality means individuals continue to increase greenhouse gases through their actions, food waste, or other means, instead of modifying their actions to stop contributing greenhouse gases to the environment. Any public policies tackling climate change must address issues surrounding limited resources and this tragedy of the commons problem.

Second, the time value of money is a well-known economic principle, but it is generally misused when applied to food waste policies. This principle simply explains that a dollar today is worth more than a dollar tomorrow due to its potential earning capacity.⁸⁵ The time value of money concept encourages financial investors to save money in accounts with compounding interest or in mutual funds that regularly pay dividends to their investors.⁸⁶ However, unlike investing money in an account, which earns interest, here, paying for items never used, like wasted food, has no earning potential. Hence, implementing a system that causes individuals and families to incur additional up-front costs for proper food disposal at first appears to create a financial time-value loss because the families initially lose funds they could otherwise invest. However, paying the fines is a nonfinancial investment; this system will significantly decrease the creation of food waste as families reduce the amount of food purchased but not

⁸² Jouni Paavola, *Climate Change: The Ultimate Tragedy of the Commons?*, PROP. IN LAND & OTHER RES. 417, 419 (Daniel H. Cole & Elinor Ostrom eds., 2012).

⁸³ *Id.* at 419–20.

⁸⁴ James E. Krier, *The Tragedy of the Commons, Part Two*, 15 HARV. J.L. & PUB. POL'Y 325, 327, 330–31 (1992).

⁸⁵ See Norman D. Gardner, *The Time Value of Money: A Clarifying and Simplifying Approach*, 1 J. COLL. TEACHING & LEARNING 25, 25 (Jan. 28, 2011).

⁸⁶ See *id.*

consumed, and properly disposing of food will reduce greenhouse gases.⁸⁷ Consequently, the public should view these fines as an investment and not a violation of the economic time-value principles found in efficient public policies.

The last—and arguably most important—economic principle for this discussion is the cost-benefit analysis. When economists perform a cost-benefit analysis on the problem of greenhouse gas emissions, they “weigh the consequences of the projected increase in carbon emissions versus the costs of current policy actions to stabilize or even reduce [carbon] emissions.”⁸⁸ Necessarily, the social benefits of a policy or law must exceed the social costs.⁸⁹ On a macroscale, economists must incorporate the effects of climate change already being felt: severe hurricanes, devastating fires, and other natural disasters.⁹⁰ Moreover, as global temperatures rise, tropical diseases and pests can increase their affected territory—another necessary cost that must be incorporated into the climate change cost-benefit analysis.⁹¹ A challenge for those creating food waste policies is factoring these costs into legislation that ensures an effective and sustainable policy.

Crucial to the cost-benefit analysis is the knowledge and utilization of incentives, which the Republic of Korea has used as part of its food waste policies. Incentives are important to understand because they can shift the costs or the benefits in either a positive or negative direction. The Korean RFID system relies on a negative incentive—a penalty or fine—to encourage its citizens to reduce food waste. By incentivizing citizens to decrease food waste through a fee system, the program not only helps families monitor their food waste but also helps prevent the purchase of additional groceries that are not needed and will not be eaten. For example, the average amount a Korean household spends on food waste collection is around USD \$2 a month in the Republic of Korea.⁹²

⁸⁷ *Fact Sheet – Biogas: Converting Waste to Energy*, EESI (Oct. 3, 2017), <https://www.eesi.org/papers/view/fact-sheet-biogasconverting-waste-to-energy>.

⁸⁸ JONATHAN M. HARRIS, BRIAN ROACH & ANNE-MARIE CODUR, *THE ECONOMICS OF GLOBAL CLIMATE CHANGE* 19 (2017), https://www.sciencetheearth.com/uploads/2/4/6/5/24658156/2015_harris_the_economics_of_global_climate_change.pdf [<https://perma.cc/FMZ8-92MZ>].

⁸⁹ *Id.* at 19.

⁹⁰ *Id.* at 20–21.

⁹¹ *Id.* at 21.

⁹² See Seungha Lee & Hae Sun Paik, *Korean Household Waste Management and Recycling Behavior*, 46 *BLDG & ENV'T* 1159, 1161 (2010) (showing the average person in Korea only wastes 1.04 kg of food daily, which is much lower than citizens in many other

Meanwhile, a cost-benefit analysis reveals a strong incentive for the United States to implement some of Korea's food waste policies. Families in the United States regularly spend over USD \$1,500 annually, or approximately USD \$125 monthly, on food that ultimately ends up in landfills.⁹³ If the United States implemented a system similar to the Korean food waste payment system, as a result, American families would ultimately save a substantial amount of money by paying less than USD \$10 a month on food waste, compared to the current amount of USD \$125 they spend on food waste.⁹⁴ When broken down, these numbers show that the available savings for individual households create a strong incentive for families to reduce their food waste through implementing the RFID system.

One American city already realized the advantages of applying an incentive program to influence the cost-benefit analysis approach of its citizenry concerning food waste issues. Although no longer able to inspect its residents' garbage for food waste cross contamination due to *Bonesteel v. City of Seattle*, Seattle has found another way to incentivize its citizenry to remove food waste from other garbage.⁹⁵ The city currently charges its residents different fees based on whether they recycle (\$0 for one cart), use a food and yard bin (\$6.60 for a thirteen-gallon container), or use a general garbage bin (\$25 for a twelve-gallon container).⁹⁶ This tiered fee system is an economic incentive for residents to recycle and remove their food waste instead

countries, and a decrease from the 2.3 kg of daily food waste recorded in 1991); Seonghoon Hong, *The Effects of Unit Pricing System Upon Household Solid Waste Management: The Korean Experience*, 57 J. ENV'T MGMT. 1, 4 (1999) (stating the average household continued to spend 2000–3000 won on waste removal even after the introduction of higher fees, which indicates these households decreased their average waste production); Megan Thompson & Mori Rothman, *These Policies Helped South Korea's Capital Decrease Food Waste*, PBS (Mar. 19, 2017, 3:40 PM), <https://www.pbs.org/newshour/show/policies-helped-south-koreas-capital-decrease-food-waste> [<https://perma.cc/8EQF-247W>].

⁹³ GUNDERS, *supra* note 34. See *Love Food, Stop Waste Fact Sheet 2*, SEATTLE PUB. UTILS. (Feb. 2018), <https://www.seattle.gov/Documents/Departments/SPU/Services/Recycling/StopFoodWasteFactSheet.pdf> [<https://perma.cc/6QJD-3LBV>]; see also JEAN C. BUZBY, HODAN F. WELLS & JEFFREY HYMAN, USDA, *THE ESTIMATED AMOUNT, VALUE, AND CALORIES OF POSTHARVEST FOOD LOSSES AT THE RETAIL AND CONSUMER LEVELS IN THE UNITED STATES* 16 (Feb. 2014), https://www.ers.usda.gov/webdocs/publications/43833/43680_eib121.pdf [<https://perma.cc/QZ9X-YYW4>].

⁹⁴ See *Cart Size Calculator*, SEATTLE PUB. UTILS., <http://www.seattle.gov/Util/MyServices/FoodYard/HouseResidents/CartSizeCalculator/index.htm> [<https://perma.cc/4CZW-2VNF>] (showing that a family utilizing Seattle's tiered waste system could pay \$6.60 to use a thirteen-gallon bin dedicated to food waste in 2020).

⁹⁵ *Id.*

⁹⁶ *Id.*

of throwing all waste in the same container. A similar incentive-based approach to food waste could be effective throughout the United States.

B. Practical and Legal Issues

1. Unknown Food Waste Levels

Information and education are powerful tools. However, lack of knowledge is a significant issue for governments concerned with food waste since the current methods of measuring food waste are inconsistent, and governments do not know how much waste is created every year.⁹⁷ Although various organizations and governments have estimated the amount of food waste generated, the exact amount remains unknown.⁹⁸ Several factors, including underreported waste at the agricultural level⁹⁹ and inefficient methods of measuring the different types of waste at the landfill, contribute to an uneducated public that does not know what constitutes food waste or how they contribute to the problem. Consequently, we can only estimate how much food waste is produced in the United States annually.¹⁰⁰ It is difficult to design an effective policy without first knowing the extent of the problem.

2. Cross Contamination

A major concern currently plaguing waste management in the United States is cross contamination. A common form of cross contamination occurs when people place regular garbage in recycling containers.¹⁰¹ This increases the time and costs associated with

⁹⁷ Marc F. Bellemare et al., *On the Measurement of Food Waste*, 99 AM. J. AGRIC. ECON. 1148 (2017); see also Roni A. Neff, Marie L. Spiker & Patricia L. Truant, *Wasted Food: U.S. Consumers' Reported Awareness, Attitudes, and Behaviors*, 10(6): e0127881 PLOS ONE (2015) ("Respondents were also asked to estimate the total percentage of food they themselves discard. While these estimates should not be taken literally, they are useful for gaining insight into how Americans perceive their waste levels and for comparing with evidence-based averages and perceptions about national waste.").

⁹⁸ GUNDERS, *supra* note 34.

⁹⁹ Compare Gregory A. Baker et al., *On-Farm Food Loss in Northern and Central California: Results of Field Survey Measurements*, 149 RESOURCES, CONSERVATION & RECYCLING 541 (2019) (citing a field survey that found that 33.7% of food loss occurred at an agricultural or farm level) with FAO, GLOBAL FOOD LOSSES AND FOOD WASTE (2011) (finding that food loss at the agricultural level varied from less than 5% to 20% depending on the type of food product and global region).

¹⁰⁰ *Id.* See also GUNDERS, *supra* note 34.

¹⁰¹ Jefferson Hopewell, Robert Dvorak & Edward Kosior, *Plastics Recycling: Challenges and Opportunities*, 364 PHIL. TRANSACTIONS ROYAL SOC'Y LONDON B BIOLOGICAL SCI. 2115, 2118 (2009); see also *Why Can't I Recycle Stuff with Food on It?*,

recycling, because employees at the recycling plants are forced to sift through the various containers to make sure regular waste is not processed with plastics, glass, or paper.¹⁰² Beyond waste disposal in private homes, some restaurants and coffee shops have incorporated separate bins to show customers where to place garbage and where to place recyclable materials; however, customers frequently ignore these indicators and fill both bins with garbage.¹⁰³ Subsequently, restaurant employees may either sort through the garbage themselves, send it all to the recycling plant, or let the waste collectors take all of it.¹⁰⁴ Frequently, employees will choose the last option. Although some argue inadequate and non-standardized labels increase recycling cross contamination and that introducing better labels would resolve the issue,¹⁰⁵ others argue that increasing public awareness or education would resolve this cross contamination issue.¹⁰⁶ Regardless, cross contamination is still a major problem faced by those interested in increasing the amount of waste recycled every year.

While cross contamination remains an issue for recycled waste, the issue may not translate to food waste. Unlike regular recycling, where an individual may not know what materials can or cannot be recycled, disposing of food and food waste is intuitive. A straightforward explanation is that if a wild animal—for example, a seagull or raccoon—would eat the trash, then it would likely be considered food waste.¹⁰⁷ Although this simplified explanation does not include items like eggshells or used coffee grounds, it is helpful in showing how food waste differs from other recycling categories.

RECYCLEBANK (Sept. 10, 2014), <https://livegreen.recyclebank.com/column/because-you-asked/why-can-t-i-recycle-stuff-with-food-on-it> [<https://perma.cc/47EV-JHL9>].

¹⁰² Chantal Carriere & Rachael Beavers Horne, *The Case for a Legislated Market in Minimum Recycled Content for Plastics*, 50 ENV'T L. REP. 10042, 10046 (2020).

¹⁰³ See, e.g., Adam Minter, *Why Starbucks Won't Recycle Your Paper Coffee Cup*, CHICAGO TRIB. (Apr. 8, 2014), <https://www.chicagotribune.com/opinion/ct-xpm-2014-04-08-ct-starbucks-recycling-oped-0408-jm-20140408-2-story.html> [<https://perma.cc/WM42-9PTL>].

¹⁰⁴ *Id.*

¹⁰⁵ See Ann E. Carlson, *Recycling Norms*, 89 CAL. L. REV. 1231, 1276 n.184 (2001) (explaining recycling cross contamination); James T. O'Reilly, 41 FED. BAR NEWS & J. 106, 111 (1994) (indicating the importance of recycling labels on consumer products).

¹⁰⁶ Megan Workman, *Curbing Confusion and Contamination*, RECYCLING TODAY (May 8, 2018), <https://www.recyclingtoday.com/article/curbing-recycling-confusion-and-contamination-connecticut/> [<https://perma.cc/U33P-E58W>].

¹⁰⁷ See Richard Conniff, *Unnatural Balance: How Food Waste Impacts World's Wildlife*, YALE ENV'T 360 (Jan. 6, 2016), https://e360.yale.edu/features/unnatural_balance_how_food_waste_impacts_worlds_wildlife.

3. Food Waste and the Fourth Amendment

Legislative efforts to reduce food waste in America will inevitably raise constitutional concerns regarding privacy. Federal, state, and local governments cannot implement food waste laws until American citizens allow government officials to sort through their trash to ensure compliance with new regulations. Government officials sorting through the trash of a family or individual could raise potential privacy concerns under existing law.¹⁰⁸ Individuals concerned about the privacy of their garbage have previously invoked the Fourth Amendment and claimed that trash is constitutionally protected from government intrusion.¹⁰⁹

Fortunately for lawmakers interested in implementing stricter food waste laws, the Supreme Court removed some constitutional obstacles in *California v. Greenwood*, holding that individuals do not have an objectively reasonable expectation of privacy concerning their trash.¹¹⁰ In *Greenwood*, state police officers received a tip that Greenwood was involved in drug trafficking.¹¹¹ During the investigation, an officer asked Greenwood's garbage collector for his trash.¹¹² After finding drug paraphernalia in Greenwood's garbage, the police secured a search warrant and arrested Greenwood on drug charges after searching his residence.¹¹³ After assessing whether society would be willing to recognize a right to privacy concerning garbage, the Supreme Court concluded that:

[T]he respondents exposed their garbage to the public sufficiently to defeat their claim to Fourth Amendment protection. It is common knowledge that plastic garbage bags left on or at the side of a public street are readily accessible to animals, children, scavengers, snoops, and other members of the public. Moreover, respondents placed their refuse at the curb for the express purpose of conveying it to a third party, *the trash collector, who might himself have sorted through respondents' trash . . .*¹¹⁴

However, not all states agreed with the Supreme Court's decision in *Greenwood*. In *State v. Boland*, the Washington Supreme Court

¹⁰⁸ Hope Lynne Karp, *Trash: A Matter of Privacy*, 20 PACE L. REV. 541, 547 (2000).

¹⁰⁹ See, e.g., *State v. Boland*, 800 P.2d 1112, 1116–17 (Wash. 1990); *Bonesteel v. City of Seattle*, No. 15-2-17107-1, 2016 WL 4070522 (Wash. Super. Apr. 27, 2016); see also Jung & Lee, *supra* note 75, at 10.

¹¹⁰ *California v. Greenwood*, 486 U.S. 35, 41 (1988).

¹¹¹ *Id.* at 37.

¹¹² *Id.*

¹¹³ *Id.* at 38.

¹¹⁴ *Id.* at 40 (emphasis added).

challenged the holding of *Greenwood*.¹¹⁵ First, the court held that Washington's state constitution created an increased privacy interest that was in direct contrast to the holding in *Greenwood* stating that the United States Constitution afforded no such privacy protections.¹¹⁶ Additionally, the court held that the *Greenwood* analysis was partially based on the location of the garbage, which it previously held as "indeterminative when inquiring into whether the State has unreasonably intruded into an individual's private affairs."¹¹⁷ Finally, the *Boland* court concluded that state precedent did not remove an expectation of privacy when information was conveyed to a third party, such as a telephone company.¹¹⁸ The court found that privacy interests concerning garbage were similarly not removed by expecting the trash to be removed by the garbage collectors.¹¹⁹ "While a person must reasonably expect a licensed trash collector will remove the contents of his trash can, this expectation does not also infer an expectation of governmental intrusion."¹²⁰

Recently, in *Bonesteel v. City of Seattle*, a Washington superior court ruled against a local food waste regulation because of state constitutional privacy concerns.¹²¹ In *Bonesteel*, Seattle's newly implemented food waste law fined citizens \$1 if they did not comply with regulations requiring that food waste be placed in specialized containers separate from regular trash.¹²² Garbage collectors were trained to leave educational information and fining notices whenever they found food waste contaminating 10% or more of the regular garbage container.¹²³ The plaintiff argued that the garbage collectors could not have found food waste in her trashcan without opening the black, opaque trash bags inside and, therefore, unreasonably searched her garbage.¹²⁴ The court stated that searching trash bags belonging to Seattle citizens was a disturbance of one's private affairs under *Boland*.¹²⁵ Consequently, the court held that analyzing the contents of

¹¹⁵ State v. Boland, 800 P.2d 1112, 1116–17 (Wash. 1990).

¹¹⁶ *Id.* at 1117.

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ *Id.*

¹²⁰ *Id.*

¹²¹ Bonesteel, 2016 WL 4070522, at *6 (Wash. Super. 2016).

¹²² *Id.* at *2.

¹²³ *Id.* at *2–3.

¹²⁴ *Id.* at *4.

¹²⁵ *Id.* at *4–5.

the plaintiff's garbage to ensure compliance with disposal regulations violated the individual's privacy rights.¹²⁶

However, several other state courts have rejected the holdings of *Boland*. Unlike in *Boland*, where the court found Washington's citizens have individual privacy rights in garbage, several other states have found instead that their citizens have no privacy interests in their trash.¹²⁷ In these states, food waste laws requiring that citizens separate food waste from other garbage or be fined could be upheld. However, in states where food waste laws already exist, similar cases involving food waste and privacy interests have not yet been filed.

4. Federal, State, or Local Implementation

While the federal government has the authority and resources to comprehensively regulate food waste in America, federal oversight may be impractical or impossible. Garbage is an article of interstate commerce regulated by the federal government under the Commerce Clause, per *Philadelphia v. New Jersey*.¹²⁸ Because garbage—and, consequently, discarded food within the garbage—can be regulated through the Commerce Clause, Congress has the authority to implement the Korean food waste system.¹²⁹ Congress's interest in food waste is growing, as shown by the increasing amount of related legislation passed in the last twenty years.¹³⁰ However, local and state government generally handle waste.¹³¹ Although Congress may propose legislation utilizing its spending power to strongly influence state and local governments to implement food waste policies, such a process does not seem to be a feasible solution due to preexisting municipal waste structures.

One notable obstacle standing in the way of federal food waste regulation is the difference between federal and state interpretations of

¹²⁶ *Id.*

¹²⁷ See *State v. Jackson*, 937 P.2d 545, 550 n.4 (Utah Ct. App. 1997) (“Apparently, only three states have expressly interpreted their state constitutions more broadly than their federal counterpart in the area of garbage searches. See *State v. Tanaka*, 67 Haw. 658, 701 P.2d 1274, 1275–77 (1985); *State v. Hemptele*, 120 N.J. 182, 576 A.2d 793, 814–15 (1990); *State v. Boland*, 115 Wash.2d 571, 800 P.2d 1112, 1116–18 (1990) (en banc).”).

¹²⁸ *Philadelphia v. New Jersey*, 437 U.S. 617, 622–23 (1978).

¹²⁹ See U.S. CONST. art. I, § 8, cl. 3.

¹³⁰ Mary K. Bedard, *Hunger Games in the Capital: An Examination of the Need for America's Elected Officials to Emerge from the Legislative Landfill and Combat Our Country's Food Waste and Hunger Epidemics*, 42 U. DAYTON L. REV. 283, 293 (2017).

¹³¹ See, e.g., *Waste*, MICH. DEP'T OF ENV'T, GREAT LAKES, & ENERGY, <https://www.michigan.gov/egle/0,9429,7-135-3312---,00.html> [<https://perma.cc/LUG3-KNHF>].

privacy. In *California v. Greenwood*, the Supreme Court held that the Constitution does not guarantee a privacy right to garbage because citizens do not have a reasonable expectation of privacy concerning their garbage.¹³² However, three state supreme courts—New Jersey, Hawai‘i, and Washington—have held that their state constitutions contain stronger privacy protections than the federal Constitution.¹³³ Although several other states have rejected this minority opinion, most of the cases brought before state supreme courts analyze police searches of a citizen’s garbage for drug paraphernalia rather than food waste regulations and cross contamination of garbage.¹³⁴ Regardless, this split between states concerning individual privacy rights in garbage means that the federal government will find it difficult, if not impossible, to implement a national food waste regulation system.

State and local food waste regulations also face unique challenges. Businesses may decline to bring food-related products or services into the state for fear they may violate a law while disposing of said products. This effect can be seen in California, which passed a law in November 2018 banning cages for animals and products created from or by animals kept in cages or extremely restricted areas.¹³⁵ Many food industries and lobbyist organizations, including the National Pork Producers Council and the Association of California Egg Farmers, opposed the bill because changing animals’ housing systems would increase costs and could cause shortages in the products while farmers built the new structures needed to comply with the laws.¹³⁶

¹³² *California v. Greenwood*, 486 U.S. 35, 41 (1988).

¹³³ See *State v. Tanaka*, 701 P.2d 1274, 1276–77 (Haw. 1985) (finding that a person does have a protected privacy interest in their garbage under the Hawai‘i state constitution); *State v. Hemepele*, 576 A.2d 793 (N.J. 1990) (stating that the New Jersey Constitution provides broader privacy protections than the Fourth Amendment of the United States Constitution); *State v. Boland*, 800 P.2d 1112, 16–17 (Wash. 1990).

¹³⁴ See *State v. Boland*, 800 P.2d 1112, 16–17 (Wash. 1990) (holding the Washington Constitution protects broader privacy interests than the U.S. Constitution). *But see* *State v. Rydberg*, 519 N.W.2d 306, 308 (N.D. 1994) (holding the Court would not follow the minority of states that imply a citizen maintains privacy rights in their garbage and, consequently, finding there is no reasonable expectation of privacy concerning garbage placed in a public area for removal by city officials); *Litchfield v. State*, 824 N.E.2d 356, 363 (Ind. 2005) (disagreeing with the court’s reasoning in *Boland* that searches of trash are per se unreasonable).

¹³⁵ See CAL. HEALTH & SAFETY CODE § 25990 (West 2018); see also Hilary Hanson, *California Votes to Ban Cages for Hens, Give Farm Animals More Room*, HUFFPOST (Nov. 8, 2018), https://www.huffpost.com/entry/california-prop-12-farm-animals-cage-free_n_5be31a73e4b0dbe871a5f5b3 [<https://perma.cc/YW9C-4BW7>].

¹³⁶ Patrick McGreevy, *Live in California and Buy Eggs? If Voters Approve This in 2018, They’ll Need to Be from Cage-Free Hens*, L.A. TIMES (Aug. 29, 2017), <https://www>

Furthermore, the new law applies to farmers who do not live or work in California but sell their products in the state.¹³⁷ As a result of these increased measures, organizations, business owners, and farmers must decide whether they want to continue doing business in California.

By forcing businesses to decide whether to stay in a jurisdiction that regulates food waste, state and local regulations may also affect local economies. Implementing new food waste laws may affect the number of businesses willing to conduct business within a state that has incorporated restrictions or limitations on food waste. In turn, this may decrease business variety within a state and could negatively affect the state's economy unless entrepreneurs or other businesses are willing to fill the market gap. This same analysis also holds for localities. Companies likely won't offer their goods or services in an area where they will pay fines not required elsewhere.

V

IMPLEMENTING KOREAN FOOD WASTE POLICIES

If individual states and local governments applied the Republic of Korea's RFID system, the United States could resolve many of its food waste issues. The RFID system addresses problems ranging from a lack of information and education to the tragedy of commons issue. Moreover, Congress should consider incentivizing state and local governments to adopt the Korean RFID system.

First, a crucial component of the Korean food waste reduction policies is that public education preceded the introduction of the fining system.¹³⁸ Without the government educating the public, people will continue to cross contaminate regular recycling and garbage with food waste.¹³⁹ Similarly, the United States has also implemented educational outreach programs to help ensure that its citizens recycle more.¹⁴⁰ For example, most, if not all, people have heard of the phrase, "Reduce. Reuse. Recycle."¹⁴¹ This phrase resulted from a 1976 campaign in the United States after Congress passed the Resource Conservation

.latimes.com/politics/la-pol-ca-cage-free-eggs-ballot-initiative-20170829-story.html [https://perma.cc/C8TG-6DDH].

¹³⁷ Hanson, *supra* note 135.

¹³⁸ COMM'N ON SUSTAINABLE DEV., *supra* note 67, at 50–51.

¹³⁹ Carlson, *supra* note 105.

¹⁴⁰ COMM'N ON SUSTAINABLE DEV., *supra* note 67, at 50–52.

¹⁴¹ *Recycle*, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/recycle> [https://perma.cc/6AGW-T9UB].

and Recovery Act.¹⁴² As a result of the campaign, recycling efforts increased, and citizens began to recognize the importance of recycling.¹⁴³ Additionally, many states now fine drivers who throw garbage alongside roads and highways.¹⁴⁴ Similar campaigns through radio and television advertisements, elementary and secondary public school education, and other forms of mass education could spread awareness, help minimize consumer-created food waste, and decrease the negative effects of climate change.

Second, the Korean RFID system weighs food waste and charges a fee based on that weight. This could resolve the unknown food waste contribution occurring at the consumer level. In the Republic of Korea, the government has the ability to accurately report the amount of food waste created annually through its food waste reduction systems.¹⁴⁵ However, the United States can only estimate how much food is wasted in the United States every year.¹⁴⁶ Implementing the RFID system would allow the United States to gather more accurate data on the amount of food wasted based on the amount of food waste weighed every year. From there, the United States could modify future policies to best target the challenge.

Furthermore, charging households according to the weight of their food waste would eliminate the tragedy of the commons economic problem, since households would be encouraged to individually address their food waste instead of relying on other homes to overcompensate for them. By utilizing a system charging households per waste weight, and consequently decreasing each household's environmental impact, every family could enjoy the environmental benefits associated with decreased food waste.

Congress could also incentivize local and state governments to initiate these programs by offering grant money. The future of food waste legislation, policies, and research are unknown, but some government organizations, including the USDA, have already

¹⁴² Conservation and Recovery Act of 1976, 42 U.S.C. § 6901 *et seq.* (1976).

¹⁴³ John A. McCarty & L.J. Shrum, *The Recycling of Solid Wastes: Personal Values, Value Orientations, and Attitudes About Recycling as Antecedents of Recycling Behavior*, 30 J. BUS. RES. 53, 55–56 (May 1994).

¹⁴⁴ *See, e.g.*, COLO. REV. STAT. ANN § 18-4-511 (West 2018).

¹⁴⁵ Douglas Broom, *South Korea Once Recycled 2% of Its Food Waste. Now It Recycles 95%*, WORLD ECON. F. (2019), <https://www.weforum.org/agenda/2019/04/south-korea-recycling-food-waste/> [<https://perma.cc/DY8Z-PBY5>] (stating that the RFID food waste program measures the weight of food waste, which allows officials to track the waste weight decrease over the past six years).

¹⁴⁶ GUNDERS, *supra* note 34.

recognized the importance of food waste reduction initiatives and have created grants for companies, local municipalities, and states to experiment with different food waste reduction methods.¹⁴⁷ This also allows food waste initiatives to conform to local needs and customs.

CONCLUSION

Food waste is an issue affecting the economy, health, and future of American citizens. The effects of discarded food on the climate are enormous, but not insurmountable. Because the 2018 Farm Bill does not contain provisions allowing organizations to research food waste reduction policies and encourage food donations,¹⁴⁸ states and localities need to implement laws and policies discouraging food waste at the consumer level. Additionally, the Supreme Court explicitly held that there is no federally protected privacy right surrounding garbage.¹⁴⁹ Since only a handful of states have interpreted their state constitutions to have stronger privacy protections,¹⁵⁰ the majority of the United States can implement and enforce regulations surrounding garbage. This includes regulations permitting trained waste collectors to evaluate food waste inappropriately discarded. This will prevent food waste from contaminating recycling or other garbage. Finally, people are likely to separate food waste from other garbage if the fine for not separating food waste is greater than paying for the waste by volume or weight.

Consumer food waste is only one aspect of the broader global problem—farmers, distributors, and consumers all waste food at different points in the food supply chain, and implementing the RFID waste pricing system will only influence consumer waste. It will not stop climate change. However, by increasing efforts that positively affect climate change, the United States can slow down greenhouse gases created by food waste and mitigate the impact of climate change.

¹⁴⁷ *Funding for Food Waste Reduction Projects*, U.S. DEP'T OF AGRIC. (Sept. 2016), https://www.usda.gov/sites/default/files/documents/RD_Food_Loss_and_Waste_Guide.pdf.

¹⁴⁸ Agriculture Improvement Act of 2018, Pub. L. No. 115-334 (2018), <https://www.congress.gov/115/plaws/publ334/PLAW-115publ334.pdf> [<https://perma.cc/G2F8-KCEW>].

¹⁴⁹ See *California v. Greenwood*, 486 U.S. 35, 40 (1988).

¹⁵⁰ See, e.g., *State v. Boland*, 800 P.2d 1112, 1117 (Wash. 1990).