The University of Maine
DigitalCommons@UMaine

Honors College

Spring 5-2022

Envisioning a Bold Food Waste Policy for Maine: A Mixed-Methods Study into the Context of Landfill Diversion of Food Waste

Dominique Danielle DiSpirito

Follow this and additional works at: https://digitalcommons.library.umaine.edu/honors

Part of the Food Science Commons

This Honors Thesis is brought to you for free and open access by DigitalCommons@UMaine. It has been accepted for inclusion in Honors College by an authorized administrator of DigitalCommons@UMaine. For more information, please contact um.library.technical.services@maine.edu.

ENVISIONING A BOLD FOOD WASTE POLICY FOR MAINE:

A MIXED-METHODS STUDY INTO THE CONTEXT OF LANDFILL DIVERSION OF FOOD WASTE

by

Dominique Danielle DiSpirito

A Thesis Submitted in Partial Fulfillment
of the Requirements for a Degree with Honors
(Political Science)

The Honors College

University of Maine

May 2022

Advisory Committee:

Robert Glover, Associate Professor of Political Science and Preceptor in the Honors College, Advisor
Melissa Ladenheim, Associate Dean of the Honors College
Cynthia Isenhour, Associate Professor of Anthropology and Climate Change
Travis Blackmer, Lecturer and Undergraduate Coordinator for the School of Economics
Tom Saviello, Former Maine State Senator

Copyright 2022 Dominique Danielle DiSpirito

All Rights Reserved

ABSTRACT

Landfilled organics waste both natural and financial resources by discarding usable materials that could bolster food security programs and composting efforts. According to the Drawdown Project, one-third of the food we produce in the United States goes to the landfill without ever reaching someone's plate, contributing to leachate at disposal sites and accounting for more greenhouse gasses than the entire airline industry. As communities across the state struggle to support the 1 in 6 Mainers experiencing food insecurity with dwindling financial resources and limited personnel, food waste diversion provides a local solution that bolsters resilience at low cost. The absence of bold food waste diversion policy in Maine is not due to a lack of successful examples nearby, as Vermont's recent universal organics recycling policy has seen tremendous success both in diverting more than 53,000 tons of food waste per year and in yielding a 40% increase in food donations. However, Maine faces distinct logistical challenges that complicate efforts to scale up current local food waste diversion efforts such as regional population sparsity and staffing resource constraints. This thesis project examines how Vermont's Universal Recycling Policy could inspire a path forward to a food waste diversion policy that would work for Maine. The analysis draws upon professional interviews, surveys sent to municipalities, and organizational reports to examine the barriers and assets at play in Maine's journey toward a bold food waste diversion policy, culminating in suggestions that will work for Mainers.

ACKNOWLEDGEMENTS

There is simply so much to be thankful for as I look back on the four years that have culminated in this amazing project. The love and energy of my Black Bear community is unmatched and has been instrumental in shaping the person I am today.

I am incredibly grateful for all those who contributed their insights and expertise to this project in the interviews, surveys, and in passing conversations. The tremendous wealth of knowledge that you all shared with me is what makes this project so significant.

I also want to thank my thesis committee for their enthusiasm, feedback, and support through the highs and lows of this project. I'm incredibly thankful for Tom Saviello's eagerness to get this research to the legislature from the very beginning, the opportunity Travis Blackmer gave me to supplement this project with some hands-on waste auditing experience, and Cyndi Isenhour's guidance through new and intimidating analysis methods.

This project would not be what it is, I would not be who I am today, without the guidance and support of Melissa Ladenheim and Rob Glover. There simply are no words that will thank them enough for the energy and commitment they have given to my personal and academic endeavors throughout this thesis and beyond. I can finally say I'm so proud of myself and this project thanks to their support.

Lastly, I would not have been able to realize the vision I had for this thesis project's impact on real-world policy without the generous support of a CUGR academic year fellowship, the Rendle A. Jones '65 and Patricia K. Jones '65 Honors Thesis Fellowship, the Honors Legacy Fund and the Dick Hill Undergraduate Research Fund.

TABLE OF CONTENTS

Introduction……..1
Literature Review……4
Overview……..4
Defining food waste……4
Measuring food waste……..6
Tackling food waste……6
Implementing food waste solutions……9
Evaluating food waste policy……11
Summary……13
Theoretical Framework……..14
Overview……14
Criticisms of RCT……..15
Adapting RCT to policy……17
Adapting RCT to food waste……18
Methods……..20
Research aims……20
Interview methodology……..21
Survey methodology……..25
Analytical framework……27
Findings……28
Respondent Characteristics……28
Inspiration for Bold Food Waste Policy……30
Barriers to Food Waste Diversion in Maine……..32
Food Waste Diversion Successes in Maine……...36
Summary……39
Discussion……..40
Framework for Evaluating Policy Options……40
Organics Ban Scenario……...41
Status Quo Scenario……...44
Incremental Transition Scenario……47
Envisioning a Path Forward……...49
Conclusion……51
Policy Recommendations……...51
Further Research Needs……53
Summary……55
References……..56

TABLE OF CONTENTS (Continued)

Appendices……63
Appendix A: Interview Questions……64
Appendix B: PAYT Survey Questions……..66
Appendix C: Summary of Findings from PAYT Survey……...70
Appendix D: Institutional Review Board Approval for Interviews……...75
Appendix E: Institutional Review Board Approval for PAYT Survey……76
Author's Biography……...77

LIST OF TABLES

Table 1. Coding Process……22
Table 2. Description of Codes……...23
Table 3. Participant Scope of Knowledge by ID number……..…28
Table 4. Organics Ban Scenario Summary……42
Table 5. Status Quo Scenario Summary……....45
Table 6. Incremental Transition Scenario Summary……48

INTRODUCTION

Food waste is a global phenomenon. Across the planet, humans waste a significant portion of their food supply each year. One-third of the food we produce in the United States goes to the landfill without ever reaching someone's plate (Project Drawdown 2021). These landfilled organics are a significant threat to the health of our environment, contributing to leachate at disposal sites and accounting for over 8% of greenhouse gas emissions, which is more than the entire airline industry (Project Drawdown 2021). The issue of food waste is one of both community resilience and environmental justice, as we waste precious financial and natural resources that could otherwise support food security efforts, soil health, or the energy sector. The injustice of food waste has global implications, as rich countries like the United States waste more food than the entire food production of Sub-Saharan Africa and other less-affluent regions (United Nations Environmental Programme n.d.). Advocates like Maine's own Congresswoman Chellie Pingree have championed the resilience-building effect of strong food waste reduction policy, arguing that if we divert just 15% of our food waste we can cut food insecurity in half (Pingree 2015). Food waste reduction programs also carry financial incentives such as municipal operating costs decreasing as communities divert organic material from their solid waste tonnages. States across the nation are taking action on the issue, as federal engagement has been limited due to the distinctly local nature of solutions. Responding to the emerging information about food waste, states have adopted innovative policies that remove organics from the waste stream by supporting local composting, building food rescue programs that connect food donations

to food security organizations through a network of volunteers, or implementing universal organics recycling policies.

Maine has much to gain from diverting more food away from landfills to where it is needed. As communities across the state struggle to support the 1 in 6 Mainers experiencing food insecurity (Cumberland County Food Security Council 2020) with dwindling financial resources and limited personnel, food waste diversion provides a local solution that bolsters resilience at low cost. Companies and individual municipalities around Maine have even earned distinctions for the progress they've made to divert food waste, such as Allagash Brewing, Hannaford and the town of Skowhegan. Maine is also recognized as a leader in environmental policy in other realms such as banning plastic bags and passing the nation's first Extended Producer Responsibility for Plastic Packaging (EPR) legislation (Natural Resources Council of Maine 2021), yet has little to no policies in place to support food waste diversion statewide. The absence of bold food waste diversion policy in Maine is not due to a lack of successful examples nearby, as Vermont's recent universal organics recycling policy has seen tremendous success both in diverting more than 53,000 tons of food waste per year and in yielding a 40% increase in food donations (Mugica 2017).[1] Vermont's Universal Recycling Policy has generated a buzz both in Maine and across the nation, inspiring advocates to propose bills and drawing public attention to the issue of food waste.

This project aims to examine the context of food waste diversion in the state with an emphasis on envisioning what a bold policy that works for Maine would look like.

[1] The long-term goal of reducing food waste will inevitably reduce the total amount of food that would otherwise be wasted that is available to donate to food security organizations. However, in the short-term food donations are a beneficial way to redirect the waste away from the landfill and into the community.

This question has a broad scope, so this thesis project takes a mixed-methods approach that includes interviews of professionals involved in waste management for both Maine and Vermont, online surveys targeting municipalities about Pay-As-You-Throw and organics programs, and recent reports and bills. The analysis focuses on identifying the major barriers and assets that contextualize the current food waste diversion activities across the state. We then examine three policy scenarios based on an evaluative framework derived from a Rational Choice Theory (RCT) model that incorporates the barriers and assets unique to Maine. The insights gained from this project aim to inform policy action in the near future to move us toward more diversion of food waste away from the landfill and back into the community.

LITERATURE REVIEW

Overview

This thesis research intends to provide practical information for actors across the state to use in their efforts to push forward to greater diversion of food waste from the landfill by describing the current status of food waste diversion in Maine and evaluating the best next step for food waste policy. To that end, I reviewed the literature for insight into defining the food waste issue, its solutions, and the role of policy in reducing food waste. The interdisciplinary nature of the literature is both an asset and a challenge, as definitions and methodologies range significantly. However, there is tremendous consensus across disciplines that 1) food waste is an incredibly complex issue that requires complex solutions and 2) effective solutions to food waste must engage actors across sectors and systems. This project will expand upon the research that has already been done to examine the design and implementation of policy solutions to reduce food waste.

Defining food waste

The necessary first step toward any solution is a clear and accurate definition of the problem. This is not an easy goal, as the issue of food waste is often called a "wicked" problem, a term referring to issues that are incredibly complex both to describe and to solve (Weber and Khademian 2008; Reinecke & Ansari 2016; Saber and Silka 2020). Wicked problems require complex solutions that span systems, looping in multiple actors throughout society. The complexity of food waste, however, has contributed to a diverse range of definitions and terms used throughout the literature. Some experts, including the EPA, utilize different definitions of food waste depending on the type of

organic material and the stage at which the material became waste, such as “food waste” and “food loss” (EPA 2021; Spang et al 2019). These separate terms are helpful in identifying different aspects of the food waste problem that may require unique solutions. For example, “food loss” typically refers to the loss of organic materials intended for consumption in agriculture and requires a drastically different reduction strategy than “food waste” which refers to plate scraps and expired food at the consumer level. Specific terms are defined differently throughout the literature, however, and there is little consensus on whether utilizing specific, separate terms is necessary (Horton et al 2019; Bajželj 2020). In some contexts, it is beneficial to use the more colloquial term “food waste” as an umbrella term for organic material intended for food at any stage in the food supply chain (Chen and Chen 2018; Bajželj 2020). Due to the wide scope of this project, the term “food waste” will be used this way throughout the paper with specifications as needed.

Regardless of the specific terms utilized, it is clear that reaching a sufficient definition of the food waste issue necessitates situating it within an interconnected network of systems. Food waste is an incredibly complex issue that is intertwined with all aspects of our society, from our food system practices to the structure of our economy. Failing to take a systems-based approach to food waste reduction efforts inevitably leads to misunderstanding the consequences these efforts may have on related systems, such as when “reduced” food waste enters other waste streams as contaminants (Lake et al 2019) or when food waste compost contains toxic substances (Thakali 2020; Isenhour et al 2022). Understanding food waste as a systemic issue then enables us to strategically tackle the various aspects of the issue through collaborative and interdisciplinary

approaches which lead to more robust outcomes (Saber and Silka 2020; Benson et al 2017). Therefore, our definition of food waste must capture the nature of the phenomenon as being deeply entwined with our economics, our food system, our waste management practices, and our very core as a society.

Measuring food waste

Finding a suitable definition that sufficiently reflects the dimensions of food waste comes with the twin challenge of identifying metrics and measurement strategies. Researchers have only begun to measure food waste over the past few decades, as the importance of the issue has become increasingly prevalent. A recent study identified and evaluated several methods for measuring food loss and waste (FLW) utilized across the globe: weighing and garbage collection methods, surveys and diaries, and indirect measurement methods using secondary data. The study found that indirect measurement methods employing modeling were the most frequently utilized despite being the least accurate of the three examined (Xue et al 2017). While more direct methods like waste audits provide more accurate data, they are often more time consuming and expensive which can be a significant barrier to acquiring robust data which can inform effective solutions.

Tackling food waste

Our effort to find a permanent, sustainable management system for food waste requires collective action across society. “Wicked” problems like food waste require collaborative action that pulls consumers, government actors, and corporate actors together to create innovative strategies and to implement solutions at every stage of the problem (Gobel et al 2015; Walia and Sanders 2019; Naravanen et al 2019). For example,

a study on the ways in which food waste is framed as a policy issue found that different frameworks worked to engage distinct stakeholder groups to support food waste reduction, such as using rhetoric of solidarity to appeal to residents (Mesiranta et al 2021). Consumers have unique roles to play in these coalitions, contributing inputs and feedback to ensure that policy and corporate solutions are effective (Warshawsky 2018; Benyam et al 2018). State actors can implement "strong" prevention measures like food waste bans (Mourad 2016) and incentive-based policies that work to encourage waste reduction (van der Werf 2020) that are key to the sustainable management of food waste into the future. Corporate actors contribute to food waste reduction efforts through innovations like improvements in packaging for perishable foods (Vilella 2018; Brennan et al 2021) and developing consumer-facing management software that could encourage increased reduction behaviors like shopping lists (Tavill 2020). Together, these actors can create a management system that will sustainably divert food waste from the landfill, creating a circular food system that will support our needs well into the future.

Building these interdisciplinary, cross-society coalitions will allow us to address system-wide issues that drive food waste and undermine solutions. For example, the issue we face in curbing waste production in general requires the same collaboration among different actors in society to construct and implement effective solutions (Isenhour et al 2016; Shahid and Hittinger 2021). Since the issue of food waste is intertwined within the waste management system, policies that effectively reduce overall waste like Pay-As-You-Throw work to discourage the generation of food waste as well (van der Werf 2020). Merging food waste reduction strategies with broader Municipal Solid Waste (MSW) management strategies strengthens efforts by improving the longevity of limited

resources such as landfills, reducing the overall negative environmental impacts of our waste management system (Maalouf and El-Fadel 2017; Spang et al 2019), and mitigating the accumulation of toxins in food waste (Thakali 2019; Isenhour et al 2022). Moving toward a sustainable management system that eliminates food waste will only be possible through collaborative coalitions across sectors that address the full scope of the issue across systems.

If defining the food waste issue is the first step toward a solution, then developing a strategy is the second. The EPA recognized this when they adapted the Food Recovery Hierarchy (FRH) which provides a prioritization structure for food waste management (EPA 2021) from their previous Waste Management Hierarchy. The FRH puts source reduction efforts at the highest priority, followed by food recovery efforts aimed at feeding people and humans, with terminal activities like composting and anaerobic digestion as just above the lowest priority management action: landfilling. While the FRH provides important guidance for public agencies and private firms alike, there is little information about its efficacy and implementation across the United States (Chen and Chen 2018). Some case studies even suggest that the FRH is impractical and unachievable for actors outside of public agencies and governmental agencies, such as the challenges posed by lack of employee education and capacity that supermarkets face in source reduction efforts (Ceryes et al 2021). Though the practicality of the FRH remains an area for further research, it is clear that it ought to drive every food waste management decision from the individual level to policy decisions.

Implementing food waste solutions

The FRH provides a glimpse of the scope of food waste as a systemic issue, illustrating the different dimensions of the problem that must be addressed to reach an effective and sustainable solution. Before we discuss the different management actions described within the hierarchy, it is important to frame the FRH as a tool for holistic solutions rather than an excuse to address only one aspect of the issue. In a sense, the FRH is deceptive in that it lays out a series of steps: you reduce the source first, and if you can't do that then you feed people, and if you can't do that then you feed animals, and so on. However, there are significant limitations on the capacity of each management action as a single solution to food waste, especially those focused on limiting source reduction through shifts in individual consumer choices (Schanes et al 2018; MacDonald 2019). For example, increased reliance on food rescue and recovery programs that divert edible food that would be wasted to feeding the food insecure can quickly overwhelm the limited infrastructure and resources of the receiving food security organizations (Millar et al 2020). Even though most of our food loss occurs at the consumer and retail levels (Schanes et al 2018), systemic barriers like policies that support the production of surplus food (Lohnes 2021) and inconsistency in date labeling (Toma et al 2020) undermine the capacity to significantly reduce food waste through individual action alone. The utility of the FRH is then best realized as guiding consistent action that ensures food is diverted to the best use at each stage of the food supply chain (Papargyropoulou et al. 2014).

Source reduction, the highest priority in the FRH, refers to actions that seek to limit the amount of food wasted through both shifts in consumer behavior, commercial practice, and food supply. Source reduction is widely recognized to be the ultimate priority in addressing many environmental issues like climate change (carbon emissions).

Ignoring source reduction efforts leads to a "prevention paradox" because management efforts cannot keep up with the pace of waste production (Messner et al 2020), which has been increasing steadily through the years (Hall et al 2009; Hic et al 2015). Studies have found that individual drivers of food waste require solutions that slowly nudge consumers to shift behaviors (Dobernig and Schanes 2018), from reducing plate size in hotels and restaurants (Reynolds et al 2019) to selling "ugly" produce that would otherwise be discarded before making it to the market (Collart and Interis 2018; Hingston et al 2020). Innovative commercial practices, like redesigning packaging for perishable foods (Vilella 2018; Brennan et al 2021), can significantly reduce the amount of food wasted at the pre-consumer level. Source reduction also necessitates ending farming practices that encourage surplus production on American farms (Evans and Nagele 2018). The multifaceted nature of source reduction strategies complicate efforts to target food waste at its source, emphasizing the need for downstream food waste reduction efforts.

The next priorities on the FRH identify activities that redistribute edible food that would be wasted to hungry people and hungry animals. Food recovery programs work to establish relationships between grocery stores, farmers, and even individuals and food security organizations like food banks to divert food away from the landfill and over to people who need it. These food recovery programs are widely recognized as a successful strategy to divert food from the landfill as they contribute to shifts in corporate waste behaviors (Lohnes 2021) and an increase in the satisfaction of those experiencing food insecurity (Wolfson and Greeno 2018; Hecht and Neft 2019). However, our food recovery efforts are significantly weakened by lack of data and reliable metrics (Wolfson

and Greeno 2018; Hecht and Neft 2019) and complicated by infrastructural and logistical needs of low-resource food banks (Millar et al 2020).

The last food waste diversion activities prioritized in the FRH are energy-producing anaerobic digestion and composting. Anaerobic digestion refers to the process in which microorganisms convert organic material into biogas that can be used for energy (Haltas et al 2017). The issue of food waste has contributed to a vibrant industry of innovative companies focusing on anaerobic digestion around the world (Akhiar et al 2020). Anaerobic digestion and composting activities, though the last priority on the FRH, are crucial to the effort to end food waste as they both divert material from the landfill and into the energy grid or back into the food supply system through fertilizer (Horton et al 2019; Shahid and Hittinger 2021). A combination of each priority on the FRH, including end-of-the-line activities like composting and anaerobic digestion, move us closer to an efficient food waste management system.

Evaluating food waste policy

Policy solutions to address food waste are especially important to developing and implementing solutions that work the full hierarchy to reduce food waste at every stage. Policy solutions are uniquely capable of requiring or restricting behaviors, which research has suggested is key to significantly increase participation in waste diversion activities (Mourad 2016). The literature documents and describes existing policies with an emphasis on the measurable outcomes like tonnage diverted and percent increase in household participation (Blackmer and Criner 2014; Evans and Nagele 2018). However, there is relatively little research on evaluative methods for policy design and implementation beyond these numeric metrics (e.g. behavior change, infrastructure

accessibility, etc.). In part, the lack of research on evaluative methods is due to the fact that food waste policy tends to be more prominent on state and local levels (Benson et al 2018; Evans and Nagele 2018; Walia and Sanders 2019). Additionally, the complexity of food waste as an issue means that effective solutions must accommodate particular cultural norms (Mesiranta et al 2021) and infrastructure challenges (Metcalfe et al 2017) that vary across communities (Benson et al 2018; Evans and Nagele 2018).

While few projects have set frameworks for designing and evaluating effective food waste policies, we can infer particular characteristics from the literature. One particular qualitative study interviewed agencies at various levels (federal, state and local) about their food waste reduction strategies and perceptions of other food waste reduction programs found that strong stakeholder engagement is crucial to policy design (Benson et al 2018). Stakeholder engagement must be a part of comprehensive planning, which is undergone to thoroughly understand the implementation strategies for policy (Isenhour et al 2016). We can also infer from the literature that an effective policy must be designed with the unique resource constraints of the area in consideration, such as accessibility to infrastructure. For example, communities that cannot accommodate curbside collection services due to their regional sparsity need policies that center on alternative collection methods such as bins brought to dropoff locations (Metcalfe et al 2017). Additionally, while the Benson et al 2018 study found that agencies prefer quantitative metrics to measure progress, research also suggests that effective policy must aim to change waste behavior. The literature suggests that the capacity to generate behavior change is what distinguishes policy solutions to food waste from market-based solutions (Mourad 2016), but it is difficult to set measurable metrics and goals for

behavior change. In part, this project will aim to establish an evaluative framework for food waste policy options in Maine with the aim to accomplish both quantitative results and change in waste behaviors.

Summary

The road toward a sustainable solution for food waste is uncertain and incredibly bumpy. A common theme throughout the literature is the need for metrics to evaluate food waste solutions (Wolfson and Greeno 2018; Hecht and Neft 2019) and data to characterize consumers' behaviors related to food waste (Warshawsky 2019). Despite the need for more information about the "wicked" problem of food waste, great strides have been made across the country to divert food waste away from the landfill and back into the system whenever possible. However, the question remains: *which solution is the next right step for Maine?* We've discussed the necessity of systems-wide change, but that kind of work requires a long time and significant effort to accomplish. This research aims to provide practical insight into the next policy step that will move Maine toward greater recovery of its valuable natural resources by examining the barriers and assets that contextualize food waste diversion today, and establishing a framework for evaluating three policy options.

THEORETICAL FRAMEWORK

Overview

Rational Choice Theory (RCT) is a framework with roots in the economic principle that consumers make logical decisions that maximize efficiency of their scarce resources. Economist Anthony Downs laid the foundation for RCT by applying the economic concept of rational consumers to political systems (Downs 1957). However, Downs argues that the theory of the rational consumer must be adapted to understand the varied goals and resources available to consumers if we are to use RCT to evaluate decisions in real-world settings. From Downs' perspective, government actors make decisions based on whether a particular policy will guarantee new or renewed political capital in the form of votes. And citizens cast their votes according to an incredibly complex set of desires that include material desires, party affiliations, and potentially more. This theory has been widely adopted and recognized for its utility in understanding the process of policy design and adoption.

Despite RCT's widespread use across disciplines, the theory has been widely criticized and adapted. A wide range of derivative versions of RCT incorporate new constraints and motivational theories that are tailored for particular disciplines. The essence of RCT, then, is its utility as a framework for thinking about the drivers of decision making and how rationales differ among the various actors within society (Herfeld 2020). While RCT ought to be adapted for each unique situation, Herfeld argues that RCT can provide a framework for evaluating decisions based on universal drivers such as the limited resources of time, money, or political capital. Herfeld notes that this

view of RCT is instrumental to navigating and evaluating the many criticisms of the theory.

Criticisms of RCT

Perhaps the most compelling critique of RCT since its inception has been the questionable assumption of consistent rationality. We know that the average decision maker is neither rational nor consistent, or else most of the major problems we face would not exist. The rational person makes decisions to allocate their scarce resources to maximize the satisfaction of their desires. This criticism is unique in that it calls into question the major premise of RCT, rather than the specifics of a particular case. In the case of food waste, a rational person would only purchase the amount of food needed to meet daily needs without wasting scarce financial resources. Food waste, therefore, should not exist in a world where everyone optimizes the utility of their scarce resources (Annunziata et al 2021). RCT has persisted despite this criticism, as theorists argue that irrationality is driven by other factors like lack of education and can be corrected through appropriate measures (Annunziata et al 2021; Stern 1999).

Another major criticism of RCT centers on the role individualism plays in the framework. The economic theory of rational choice conceptualizes decision makers as isolated actors that make their decisions based solely on their own needs and desires for their own welfare. Critics argue that this individualist perspective both renders RCT incomplete (Popa 2015) and creates a framework that ignores the role that collective decision making plays in communities (Petracca 1991). While individual drivers absolutely influence decision making, both Petracca and Popa argue that individualism cannot be the only lens we use to describe the motivational forces that influence

individuals' decisions. For example, people decide to contribute to public goods on the basis of a number of competing factors that include cultural values and their sense of trust and reciprocity within the community and toward governance structures (Popa 2015). Neglecting to incorporate these external influences in our RCT framework inevitably leads to incomplete and inefficient policy solutions. These criticisms highlight the need for an RCT that considers motivations beyond just economic optimization and individual satisfaction.

Furthermore, RCT does not map neatly on to complex issues such as food waste that involve nuanced considerations. Research has long demonstrated that environmental decisions are deeply influenced by a myriad of factors, such as an individuals' beliefs regarding the environment (Mueller and Tickameyer 2020; Turaga et al 2010; Stern 2000), access to information and incentives, and the accessibility of environmental options (Stern 1999; Best and Kneip 2011; Carrus et al 2008). For example, recent studies indicate a relationship between natural disaster experiences and climate change beliefs, with people who experience things like major flood damage demonstrating more support for climate action (Albright and Crow 2019). The entanglement of both individual, social, and moral factors in environmental decision making adds a layer of complication to evaluating such decisions that must be incorporated into the RCT framework.

Adapting RCT to Policy

An expanded, interdisciplinary RCT is tremendously helpful for guiding political analyses, especially in evaluating policy decisions. Our political systems, from legislative bodies to local enforcement agents, engage in tradeoffs as they decide which policies to

adopt and which to reject. Understanding the drivers of these decisions can shape the way we design policies, and whether and how they will be implemented. For example, Newig explains that the level of public attention devoted to a particular environmental issue deeply influences which environmental regulations are adopted and implemented (Newig 2004). This view expands Downs' original perspective that political institutions primarily make decisions based on whether the particular policy will maximize support from constituents (1957). Our understanding of what motivates institutional actors is also necessarily shaped by logistical, capacity constraints such as the type of departments available and the purpose of departments (Meyer and Konisky 2007; McCabe et al 2017). Using RCT to evaluate the role these motivations and constraints play in determining which policies are successful allows us to critically examine policy design.

Using RCT to evaluate the factors influencing policy decisions allows us to develop a framework for determining when interventionist policy action by the state is preferable over market-based solutions. Market-based solutions emerge from the supply and demand pressures at play in the economy and are frequently heralded as the appropriate avenues for environmental solutions such as clean energy and reusable food containers. In traditional macroeconomics, state intervention is reserved for a narrow set of issues that can't be solved by the free market alone, whether that be punishing unjust corporate practice through things like antitrust laws or by guaranteeing equal opportunity for work. The tension between these two avenues for solutions are complex, generating a long-standing debate over appropriate actions. Interventionists on one hand propose that market failures and private hesitance necessitate state intervention through policy (Campbell 2016). On the other hand, proponents of free markets argue that markets

respond to consumers' desires better than political delegates (Cherry 2009) and policy failure can be more devastating than market failures (Evangelopoulos 2007). A framework for resolving this tension must then focus on evaluating the tradeoff between the more authoritative, uniform state interventionist policies and the more fluid and adaptive market solutions for particular issues.

Adapting RCT to food waste

Environmental policy especially requires evaluative frameworks that incorporate behavioral, institutional, and logistical lenses. While environmental analysis frequently relies on a classical microeconomics RCT to evaluate environmental behaviors, the irrationality inherent in the issue of food waste highlights the need for an adapted RCT framework (Annunziata et al 2021). If food waste exists because we are not optimizing our use of scarce resources, then we must understand the drivers and barriers that prevent us from doing so. Taking a systems-level approach allows us to see how political and social organizations influence both individual motivations toward environmental decisions and the availability of pro-environmental options (Hovi et al 2011; Vatn 2005). Vatn argues that community organizations shape preferences for environmental wellbeing, establish and define parameters for a healthy environment, and perceptions of risk and responsibility. A RCT framework for food waste must then evaluate the influence of the legislature, community organizations, and private actors as shaping the context of policy options.

Pro-environmental behavior, whether examined on the individual or institutional levels, demonstrates the interplay between economic constraints and moderating factors. Household recycling is a frequently examined case study, as household participation

fluctuates depending on convenience, environmental concern, and perceived ability to have a positive impact (Carrus et al 2008; Best and Kneip 2011). However, these case studies have also indicated that sound policy and programs can raise individuals' environmental concern and capacity to act through information and incentives (Stern 1999). Food waste is likely to be no different, as access to food recycling programs and information about the social, environmental and economic costs of food waste create informed and engaged participants. Considering and weighing these factors in our RCT framework for food waste will allow us to evaluate different policy options for a solution to food waste that works for Maine.

METHODS

Research aims

This research project aims to provide concrete suggestions for the next policy steps toward a more robust policy for landfill diversion of food waste that works for Maine. Initially, I intended to analyze Vermont's Universal Recycling Policy and whether Maine could adopt a similar food waste ban. However, it became clear that Vermont's universal recycling policy should only be a starting point for a much broader analysis after I attended the Maine Resource Recovery Association (MRRA) annual conference in October 2021. I then shifted the focus of the project's analysis to examining the context of food waste policy in Maine today with an emphasis on the logistical barriers that complicate diversion of food waste away from our landfills. With this new focus, I broadened the analysis to include interviews of professionals involved in materials management in Maine and Vermont, an anonymous survey targeting officials in municipal materials management departments, and public reports regarding food waste management in Maine.

While a Rational Choice Theory (RCT) framework guides the way I evaluate different policy options based on the findings, the design of this project is rooted in inductive inquiry through the Grounded Theory Method (GTM). Originally theorized by Anselm Strauss and Barney Glaser, GTM is a framework for inductive reasoning which builds theory out of empirical research (Glaser and Strauss 1967). Typically, research projects are designed to formulate and test hypotheses defined on the basis of theoretical assumptions. GTM allows researchers to draw questions, evaluative frameworks, and possibly answers as they emerge from the empirical research. In this case, I use GTM to

guide the collection and initial interpretation of data by allowing an understanding of the context of food waste diversion in Maine, as well as metrics to evaluate policy options, to emerge from responses.

Interview methodology

The purpose of the interviews was to understand the context of food waste policy in Maine by capturing the perspectives of professionals involved in materials management across different contexts: legislators, organics processors, non-profit advocates, and officials from the environmental agencies of Maine and Vermont. For interviews of Vermont officials, the questions focused on the process of implementing the universal recycling policy and its characteristics (Appendix A). I designed a different set of questions for stakeholders involved in materials management in Maine that focused on their involvement with food waste and their perspectives on the context and future of food waste policy in Maine (Appendix A). I aimed to conduct 10 interviews with professionals in Maine and 5 interviews with professionals from Vermont.

Interviewees were recruited and interviewed in compliance with University of Maine IRB protocols (Application #2021_11_07 DiSpirito, Appendix D). Participants were recruited through public information on organization websites and snowball sampling. I also recruited participants through networking at the Maine Resource Recovery Association (MRRA) annual conference. Sixteen potential participants were emailed, and follow-up emails were sent up to three times over the course of the study period (December 2021-February 2022). Once participants confirmed their interest via email, I worked to schedule a one-hour time slot for the interview with a modality (zoom,

in-person, or phone) that worked for them. All interviews were audio recorded with the consent of the participant following IRB protocols.

I labeled and downloaded the mp4 files for all audio recordings immediately after the respective interview ended. The files were then uploaded to Trint for transcription, and I edited each interview for accuracy. Once edited, the transcripts were saved as word documents that were then subjected to multiple rounds of iterative, inductive coding for emergent themes (table 1).

Table 1. Coding Process

Round(s)	Process
1	Read through all 12 interview transcripts, underlining important phrases without assigning codes or themes
2	Identified one major theme, coded all interviews for that theme (Ex. color-coding quotes in all of the interviews that had a theme of "costs")
3	Chose a new theme (from the uncoded underlined material) and color-coded all 12 interviews for that theme.
4-7	Repeated round 3 until most of the initially underlined material was coded.
8	Re-read coded materials to examine consistency in coding and reassign material depending if necessary.

A total of 8 unique codes captured emergent themes in the interviews (table 2). The codes reflect major, repeated themes across responses to our question set about food waste diversion policy in Maine. Coded quotes from each of the interviews were then isolated and compiled into separate word documents for each code, retaining the interview label for reference. These codes were used to organize the data into a framework for thinking about the context and future of food waste diversion policy in Maine.

Table 2. Description of Codes

Code	Scope	Example Quote
Costs	Financial costs to organics collection and recycling, subsidy of trash services, implications of financial inequities across municipalities, policies that target costs	#36 “You know, I think everybody thinks it's a really good idea because it comes down to, comes down to logistics and funding our budget.”
Infrastructure	Physical facilities or lack thereof, the need for more infrastructure development, aspects of infrastructure that are barriers to diversion of food waste, logistical capacity (personnel, land availability, etc.)	#34 “It's important to to realize that you have to give the market time to develop to that policy. And and that can drive, you know, private and public investment in the infrastructure is needed to to maintain and to grow those those operations.”
Education	Extent to which education is key to solutions, components of efficient education strategies	#12 “I see that people don't know about this at all. But, you know, so a lot of them want to educate, inform them and give them something to do. I guess that's goes hand and hand with education. But if you give them education and they don't have garbage2garden and they don't have a drop off site and they don't have a garden, a yard even where they could do composting, well then they still can't do anything.”
Local Solutions	Local activities to divert food waste, importance of local solutions/policy, limitations to local solutions	#34 “So each municipality is independently responsible and obligated to manage their municipal solid waste as they see fit. So this creates quite a patchwork of systems and infrastructures across the state, which make it challenging to implement blanket policies in the waste industry.”

Table 2 (continued). Description of Codes

Code	Scope	Example Quote
Behavior Change	The need for behavior change, successful strategies that generate behavior change, barriers to behavior change	#05 "That's what you want, that's that's the sign of like nothing's happened and life just keeps going on. And that's what I hope to do with pay as you throw is get communities interested enough to try it. And then once they try it and they start realizing savings, then it just becomes second nature."
Enforcement	Challenges to enforcement, necessity of enforcement, types of enforcement	#29 "I think there is a need for– there's a policy gap because I just, I feel like I'm repeating myself, but it's great to have a hierarchy. It's wonderful. But that hierarchy is essentially meaningless because there's no way to force outcomes to actually meet the hierarchy."
Mainer's Sensibility	Unique characteristics of Mainers, Mainers' perceptions of food waste, culture of individualism, political culture	#11 "I think there's sort of like a sensibility for Mainers where they're, you know, if you can, like, lay out a really clear reason why it's a good idea. I think they'll be easy, easy, easy adopters of diverting food waste from the landfill."
Contamination	Types of contamination that raise concerns, the role contamination plays as a barrier to diversion efforts	#33 "We certainly see some level of food scraps and organic matter in the recycling that certainly happens. But Maine is is generally pretty, pretty great at not having contaminated recycling. We're at 10 or 11 percent right now, contamination coming into our local recycling facility and we hear from places in Florida, for example, that are at 40-45 percent."

Survey methodology

The survey aimed to capture information about Pay-as-you-throw (PAYT) programs in Maine and the relationship they may have with food recycling in municipalities to parse out the role PAYT policy could play in supporting food waste diversion. Over 100 towns in Maine have PAYT programs, which require residents to pay for their waste disposal by the unit (bags, weight, etc.). These programs have led to upwards of 50% decreases in solid waste production in over 7,100 communities across the United States (Skumatz 2008; Skumatz and Freeman 2006). However, PAYT programs are highly controversial for the costs they impose on households and the administrative costs of maintaining a program (Blackmer and Criner 2014; Skumatz 2008). The survey was designed in partnership with the Maine Department of Environmental Protection (MDEP) to collect information about the characteristics of Maine PAYT programs and barriers towns face when considering whether to adopt PAYT programs or food waste collection and/or composting programs. The survey included a separate opportunity for respondents to provide contact information to receive more information about setting up a PAYT or food recycling program from the MDEP. The survey's target population included all municipal administrative staff overseeing solid waste management in Maine.

The anonymous Qualtrics survey (Appendix B) and recruitment materials were designed in compliance with University of Maine IRB protocols (Application #2021_12_09 DiSpirito, Appendix E). We aimed to collect 50 survey responses and recruited participants through recruitment emails sent to the publicly available emails of town managers and public works directors for municipalities listed in NRCM's "Maine

Communities with PAYT" document (Natural Resources Council of Maine 2022). We also sent recruitment advertisements through listservs maintained by the Senator George J. Mitchell Center for Sustainability Solutions, Maine Resource Recovery Association, and Maine Municipal Association. Beginning at the end of December 2021, I began sending recruitment emails to small groups of municipalities (bcc'd) at a time. By mid January 2022, I had contacted all municipalities with publicly available information from NRCM's document. I sent recruitmentment emails directly to 88 public email addresses and filled 6 contact forms on public websites. Between these direct emails, contact forms and the advertisements posted through the Senator George J. Mitchell Center for Sustainability Solutions, Maine Municipal Association, and the Maine Resource Recovery Association, I anticipate that the recruitment information reached around 150 municipal officers over the course of the study period. Between December 2021 and the end of January 2022, I sent three email reminders out to all municipalities.

At the close of the collection period (February 1st), survey responses were downloaded as an Excel spreadsheet from Qualtrics. I analyzed the quality of all survey responses, and removed responses that were incomplete from the Excel spreadsheet. A survey was considered complete if all the "filter questions" (denoted with an * in Appendix B) were answered. Given the mix of qualitative and quantitative questions, the surveys were analyzed for trends using a mix of methods. Responses to qualitative questions, like "Please describe the resources and/or support your municipality would benefit from while implementing an organics collection or composting program," were compiled in a word document based on the question and analyzed based on the frequency of terms. Responses to quantitative and categorical questions, like "How long have you

had your organics collection or composting program?" or "How has your PAYT program generally been received by residents?", were analyzed using descriptive statistics (e.g. percentages, means). The analysis focused on producing an understanding of municipal perspectives and constraints on adoption and implementation of organics and PAYT programs to contextualize the municipal-level barriers and assets to food waste diversion policy.

Analytical framework

The analysis parameters emerged from the data collection as the research project progressed, drawing upon a GTM framework to guide the important metrics to examine in evaluating potential policy options. This entire thesis project was conducted with the intent to produce actionable policy and research recommendations for advocates, legislators, and agency members across the state. With that goal in mind, I allowed the major themes to emerge from the data that would guide the evaluation of our major policy options. The findings section of this thesis identifies and discusses the evaluative framework that our data identified as significant. We selected two policy options based on their prevalence in the data, and constructed a third option based on the significant dimensions of a successful policy that emerged from the data.

FINDINGS

Respondent Characteristics

By the end of the study period, I conducted 12 interviews with professionals involved in food waste management in Maine and Vermont. The interviewees represented several different perspectives on the issue, from state agencies to private haulers to nonprofit advocacy and research organizations (see table 3). Every interview was conducted over Zoom with the exception of one, which was over the phone. Each interview lasted approximately 30 minutes.

Table 3. Participant Scope of Knowledge by ID number

ID #	Stakeholder group	Scope of Knowledge
34	Private Hauler (primarily trash)	Policy influence on business practices, policy interests of private haulers, costs and constraints of business, tradeoff between business and environmental interests, consumers' interests and decision making trends, influence of Vermont policy on business practice
36	Private Hauler (organics)	Policy influence on business practices, policy interests of organic haulers, costs and constraints of business, tradeoff between business and environmental interests, consumers' interests and decision making trends, influence of Vermont policy on business practice
05	Maine State Agency	Long-term impacts of policy, complexities facing statewide enforcement, influence of waste management system structure on food waste diversion, current state-wide food waste diversion efforts, current support for food waste diversion policy on state, local, and regional levels
23	Nonprofit Advocacy/Research	Successful strategies to encourage food waste diversion in Maine and beyond, components of resilient food waste programs in Maine, barriers and assets to food waste diversion across the state, importance of multi-faceted

		solutions

Table 3 (continued). Participant Scope of Knowledge by ID number

ID #	Stakeholder group	Scope of Knowledge
03	Maine State Agency	Farms' role in food waste diversion, farms' interests in food waste diversion, contamination concerns for compost
27	Nonprofit Advocacy/Research	Environmental interest groups' policy desires, food waste education strategies across the state, impact and successes of bold food waste policies in other states
12	Maine State Legislature	Long-term perspective on waste management policy, municipal interests and constraints, rulemaking process, interplay between executive and legislative interests
11	Maine State Legislature	Current perspective on waste management policy, tradeoff between competing legislative interests, policy support for food waste diversion efforts
48	Vermont State Agency	Educational strategies and needs resulting from the Universal Recycling Policy, long-term needs and questions of municipalities, perspective on behavior change
29	Nonprofit Advocacy/Research	Current perspective on environmental interest groups' policy interests, policy design, challenges to policy adoption, comparison of food waste diversion policy across states
44	Vermont State Agency	Enforcement of Universal Recycling Policy, long-term perspective on acceptance and implementation strategies, policy influence on behavior change and business practice over time
33	Private Hauler (Primarily recycling)	Policy influence on business practices, policy interests of private haulers, costs and constraints of business, tradeoff between business and environmental interests, consumer interests and decision making trends

The PAYT survey collected a total of 33 responses, and 7 responses were eliminated due to incompleteness. The remaining 25 responses reflected an approximate response rate of 16.67%. The survey responses represented municipalities across the state and of various population sizes (see Appendix C). The survey respondents were split between respondents without a PAYT program (12) and respondents with a PAYT program (13) in their respective municipalities. Respondents similarly reflected a split between not having a municipal organics recycling program (11), being in the process of starting one (3), and having such a program (11). At the end of the study period, six respondents opted in to be contacted by the MDEP about starting a PAYT program or an organics recycling program. For detailed survey results, see Appendix C.

The Inspiration: Vermont's Universal Recycling Policy (Act 148)

The Vermont Universal Recycling Law (Act 148) has undoubtedly sparked conversations in Maine and across the country. For the purposes of this study, Vermont's law serves as the baseline for defining what bold food waste diversion policy looks like: a state-wide, concentrated, strategic policy to drastically reduce the landfilling of organics. Act 148 has earned this distinction by achieving a 300% increase in food donations,[2] the development of processing infrastructure that covers the entire state, and the diversion of more than 50,000 tons of organics away from the landfill (Department of Environmental Conservation 2019).

Perhaps the most compelling aspect of Act 148's success is the way it approached and generated behavioral change. Both interviewees from Vermont emphasized the

[2] This statistic was reported by the Vermont Department of Environmental Conservation, without the supporting data included. More information may be needed to fully assess the impact of the policy on food donations in Vermont.

centrality of behavior change to the policy's mission. They cited the focus on emphasizing the creation of "parallel services" to trash as key to achieving that mission. The policy endeavored to change waste behavior by requiring that organics collection and recycling services be offered alongside all trash services, as well as that municipalities require some sort of unit-based pricing for trash disposal to incentivize waste reduction. These components of Act 148 spurred changes in residents' waste behavior by increasing the accessibility, both economic and logistical, of recycling and composting options. This is especially important to consider as we begin to imagine a bold food waste policy that would work for Maine, where accessibility has been cited as a major barrier to food waste diversion across surveys, interviews and literature.

Vermont's success has generated interest in moving toward a bold food waste diversion policy for Maine. All 10 interviewees from Maine spoke favorably of Vermont's Universal Recycling Policy, though they disagreed on whether Maine is ready to adopt a similar organics ban. A stakeholder working group on addressing hunger and food waste in Maine found that organic waste bans were considered the most transformative policies out of all the options presented to the working group (LD 1534 Stakeholder Working Group 2018). Conversations around Act 148 like this working group led up to LD 1540, An Act To Reduce Hunger and Use Food Scraps in Farming and Energy Production, which proposed a phased-in, statewide landfill and incineration ban for surplus food and food scraps. While the Act was reported "Ought Not to Pass" out of the Environment and Natural Resources Joint Standing Legislative Committee in May 2021 due to concerns about lack of infrastructure and enforcement capacity, the conversations it has begun continue today and have generated other policy proposals.

Complicating Factors

While Vermont's Universal Recycling Policy has inspired conversations and policy discussions, it has also illuminated the challenges that complicate food waste diversion activities across the state. The interview questions focused on examining logistical barriers that would complicate implementation of an organics ban like Vermont's Universal Recycling Policy. However, interviews highlighted other challenges arising from the political, cultural, and economic context of landfill diversion. Both qualitative and quantitative data from the PAYT survey also described challenges that undermine the adoption of unit-based pricing (UBP) programs (a.k.a. PAYT programs) across the state.

Both the interview and survey data demonstrate that there are significant infrastructural barriers that complicate efforts to increase food waste diversion efforts across the state. These infrastructural challenges are both systemic and specific, highlighting the interconnectedness of the food waste issue with the broader systems of waste management, consumerism, and food production in Maine. The systemic challenges noted in the interviews center on costs, accessibility, and municipal discretion. Municipalities bear the responsibility of the costs and operational logistics associated with waste management in Maine, while state agencies ensure environmental standards and encourage improvements in waste diversion and reduction. Several interviewees noted that Maine's solid waste management structure causes cost to be a major driver of waste management decisions, as municipalities grapple with resource constraints such as limited personnel and financial resources. These resource constraints complicate waste

reduction efforts for more rural communities, as composting and organics recycling options are generally more expensive and less accessible than trash.

Currently, trash incineration and/or landfilling is the cheapest and most accessible disposal option in Maine. Under the Maine Won't Wait climate plan, the state has allocated millions of dollars to assist communities with housing and energy improvements to combat climate change (Maine Climate Council 2021). However, the plan does not include any strategies or provisions for waste reduction at all (Maine Climate Council 2020), and several interviewees noted that this means municipalities aren't getting financial or strategic support to reduce food waste despite the impact organics have on climate change. Several logistical factors further undermine the accessibility of alternative disposal options, such as the regional sparsity and concentration of organics hauling and processing facilities. The interviewees representing private haulers each noted that the sprawling geography of Maine's residential areas increase costs for the companies associated with mileage and render curbside services impractical. Additionally, the fact that most of Maine's waste is incinerated at Waste-to-Energy (WTE) facilities drives down the costs of trash by drastically reducing the volume of waste that gets landfilled.

The survey data demonstrated that these infrastructural challenges also complicate the implementation and adoption of PAYT programs across the state. PAYT programs are frequently heralded as effective strategies to reduce waste, including organics, by putting residents in control of their disposal costs. Several qualitative responses noted that limited staffing availability is a major challenge for municipalities with PAYT programs. One survey respondent noted that "reducing waste is a major issue, but it is

difficult to implement at the municipal level when we are limited in time, staffing levels, and the host of local priorities." Administrative needs such as ensuring that bags are available to residents require staffing and resources that may not be accessible for every municipality, especially when officials face a myriad of other pressing issues. While there are other types of PAYT programs, such as ones that require payment by weight rather than by bag, the bag-based program is typically thought to be the most convenient for consumers and is the most prominent PAYT program in Maine (Blackmer and Criner 2014). Several qualitative responses also noted that good quality PAYT bags are difficult to obtain at scale, potentially due to a limited number of companies that provide such bags.

These systemic challenges are also recognized by the American Society for Civil Engineers (ASCE), which annually evaluates the performance of states' infrastructure. The Maine Chapter of ASCE gave Maine's solid waste infrastructure a grade of C- in its 2020 evaluation, which has been consistent since 2016 (Maine Section of the American Society of Civil Engineers 2020). This grade is reserved for systems that are in fair to good condition, while raising serious concerns about resilience and performance in the future. Resilient management systems include a range of viable disposal options that work to increase the lifespan of landfills by diverting maximum amounts of materials to other recycling and composting points. The ASCE applauded Maine's use of its landfill capacity, but noted that lack of investment in waste reduction efforts jeopardizes future disposal capacity(Maine Section of the American Society of Civil Engineers 2020). While Maine recently passed a bill to end the disposal of out-of-state waste in our landfills (LD 1639, 130th Legislature), the state has yet to make the large-scale

investments needed to support organized, resilient waste reduction and food waste diversion efforts.

In addition to the systemic challenges complicating food waste diversion, more than one hundred municipalities across the state are prohibited from engaging in organics diversion or PAYT programs. These municipalities formed the Municipal Review Committee (MRC) over thirty years ago to consolidate their waste and establish collective management strategies (Municipal Review Committee, n.d.). The MRC eventually established contracts binding municipalities to send their total Municipal Solid Waste (MSW) to a proposed Fiberight WTE plant in Hampden in 2015. After just a few months of operation, the facility failed due to financial trouble and remains inactive today despite the MRC's attempts to secure a buyer for the property (Calder 2020). Despite the facility's failure, all of the MRC signatories are still prohibited from adopting PAYT or organics programs as the MRC seeks new businesses to purchase the facility. Some of these signatories include some of Maine's most populated areas like Bangor, creating a serious challenge for efforts to increase food waste diversion across the state. Two survey respondents indicated interest in adopting a PAYT or organics recycling program, but noted that they were legally unable to do so due to their MRC contract stipulations.

These challenges undermine our food waste diversion efforts today, and complicate our efforts to design a bold policy to increase diversion. Interviewees differed on whether these barriers ought to be solved before any bold policy is passed or whether policy is necessary to resolve them. Some interviewees, particularly those with extensive legislative experience, argued that Maine's legacy of municipal autonomy is an intrinsic and inescapable challenge to any state-imposed policy such as an organics ban.

Municipalities are mostly left to their own devices on matters like waste management, bearing the brunt of the cost and responsibilities. This municipal autonomy has led to a culture of local authority and discernment where towns make their own decisions based on the resources available and what's successful in neighboring towns. The Maine Municipal Association (MMA)'s core belief statement reflects the powerful role municipal autonomy has in state politics: "that local government is a fundamental component of a democratic system of government" (Maine Municipal Association, n.d.). There was consensus across the interviews around the importance of designing a policy that works for these municipalities by leveling inequities and increasing accessibility of alternative disposal methods. Interviewees also noted that our lack of data about the different types of waste diversion activities, challenges, and resources accessible to municipalities complicate our efforts to design a policy that works for Maine.

Successes and Assets

This project uncovered several food waste diversion activities across the state that establish a foundation for bold policy. As one interviewee noted, Maine is known for its rugged individualism and reducing food waste just makes "good Yankee sense." Several interviewees referred to the New England proverb, "Use it up, wear it out, make do, or do without," that is still a part of Mainer's sensibility regarding wastefulness today. In fact, a 2017 study by the University of Maine found that Maine has one of the most robust reuse economies in the nation (Isenhour et al 2017). In many ways, this sensibility is an asset to advocates seeking to increase food waste diversion efforts. For example, several interviewees noted that there are significant rates of backyard composting in rural communities like Aroostook county that would otherwise lack access to organics

processing. While some interviewees questioned whether Mainers would be amenable to an organics ban, the sense that Mainers generally oppose wastefulness and tend toward environmentally beneficial actions came through all the interviews.

The survey responses and interviews indicate that Maine municipalities are leading food waste diversion efforts across the state. The tremendous success of the One Climate Future Plan adopted by the communities of Portland and South Portland was mentioned as an outstanding example of municipal leadership and collaboration. The One Climate Future Plan includes measurable goals for waste diversion, like the goal to reduce organics in their waste stream by 70% by 2030 (One Climate Future 2020). Pursuant to this plan, Portland has established a publicly funded organics collection program for their residents with the guidance of the Senator George J. Mitchell Center for Sustainability Solutions' Food Waste Solutions Project. The survey responses also suggest that municipalities that have PAYT and organics programs are experiencing success with 46% of respondents with organics programs and 77% of PAYT programs have maintained their programs for more than 5 years (see Appendix C). The interviews suggested that Maine municipalities share their success by building partnerships with each other, which further builds support networks to sustain such programs.

While several interviewees suggested that we need stronger food waste policy, there are several state policies and programs that support food waste diversion activities across the state. In terms of direct support, the MDEP distributes over $100,000 in grant funding to private entities and municipalities for waste diversion activities each year (Maine Department of Environmental Protection 2021). The MDEP further supports municipalities that want to launch organics collection and/or recycling programs through

their partnerships with the Maine Department of Conservation, Forestry, and Agriculture (MDCFA) and the Senator George J. Mitchell Center for Sustainability Solutions. The MDEP and MDCFA operate the Compost Management Plan program that allows farms to establish a plan with the MDCFA to manage up to 60 yards of compost each month without a MDEP permit. The MDEP also directly supports pilot food recycling programs for interested municipalities across the state through their partnership with the Senator George J. Mitchell Center for Sustainability Solutions.

Additionally, the Maine State Legislature has recently considered several bills to strengthen our solid waste management system and foster waste reduction. While the bill died at the end of the 129th legislative session due to emergency adjournment resulting from the COVID-19 pandemic, LD 988 proposed to amend the current fees for MSW disposal within the state. The bill was reported OTP out of the Environment and Natural Resources Joint Standing Legislative Committee, though it had been amended to reduce the fees that would be imposed on MSW. Regardless, LD 988 demonstrates a legislative interest in increasing the cost of waste disposal in the state by levying fees that can be funneled to support the DEP's waste diversion efforts. The legislature is also currently considering LD 1639, which aims to ban the landfilling of out-of-state waste at Maine's disposal sites. This bill is important for food waste diversion efforts because it attempts to keep out-of-state organics from filling our landfills. These two bills provide insight into the legislature's efforts to increase the diversion of food waste away from the landfill through smaller policy steps, which could be the appropriate path forward for Maine.

Summary

Our data highlights the major challenges and successes characterizing food waste diversion in Maine today, with an emphasis on the way professionals are thinking about potential policy solutions. While these findings are broad in scope, two major points stood out to me as particularly significant for policy considerations: Maine's culture of local autonomy and the systemic resource constraints and inequities facing government actors at all levels. Maine's unique, engrained culture of locally-driven policy is a challenge to state-driven, top-down policies like Vermont's Universal Recycling Policy. However, it can also be an asset to policy design if it is leveraged by bringing municipalities on board. For example, one interviewee noted that the state-wide plastic bag ban came about only as the result of multiple municipalities adopting initiatives themselves. On the other hand, significant resource inequities undermine municipalities' ability to adopt and implement organics collection and composting programs even if they are interested. As one qualitative response from our PAYT survey put it: "Reducing waste is a major issue, but it is difficult to implement at the municipal level when we are limited in time, staffing levels, and the host of local priorities." These two points seem to be the most important factors for consideration when we begin envisioning a bold food waste diversion policy that will work for Maine.

DISCUSSION

Framework for Evaluating Policy Options

With an understanding of the resources and constraints that characterize food waste diversion in Maine, we can begin to critically examine potential policy solutions through the RCT framework. We recognize that food waste reflects an inefficient use of our scarce resources (Annunziata et al 2021), and this resource loss is especially detrimental to Maine. As communities across the state struggle to support the 1 in 6 Mainers experiencing food insecurity (Cumberland County Food Security Council. 2020) with dwindling financial resources and limited personnel, the food we lose to the landfill represents financial resources that could have been redirected to support food security organizations. Maine also has much to gain from closing gaps in its food system by redirecting food waste to compost for its large agricultural sector. For these reasons and many more, our framework for evaluating policy options assumes that maximizing the tonnage of food waste diverted away from the landfill ought to be the ultimate goal of our policy efforts.

That being said, our findings illustrate that there is much more to good policy than simply accomplishing a goal. A good, bold food waste diversion policy that will work for Maine must navigate the unique challenges we face, build upon the successes we have already accomplished, and harmonize with cultural values and priorities. While the findings outlined several significant factors to consider in evaluating policy steps forward, the culture of local policy action and significant resource constraints emerged as the most significant factors. We will examine three potential policy scenarios based on

the barriers and successes discussed in our findings: an organics ban scenario, status quo scenario, and an incremental transition scenario.

Organics Ban Scenario

The first scenario involves the adoption of a policy closely mirroring Vermont's Universal Recycling Policy: a phased-in ban on the landfilling of organics that includes provisions for the creation of parallel services to trash. These two pieces are the major, essential aspects of Vermont's Universal Recycling policy. The failed organics ban proposal (LD 1540, 129th Legislature) provides a glimpse into what such a bill could look like for Maine. Such a bill could phase in the organics ban over a 5-year period starting out by regulating entities that generate more than 50 tons of organics a week. The bill would also include requirements for commercial entities engaged in the transport of solid waste to offer organics and recycling collection services to all of their commercial customers, similar to the provisions included in LD 1540. Our findings illustrated a number of pros and cons to adopting an organics ban in Maine (see table 4).

There are several significant benefits to implementing this kind of policy that are distinct from the other two scenarios discussed here. Primarily, a phased-in organics ban has the potential to accelerate the development of private and state infrastructure like it did for Vermont. After the organics ban began to be phased in, organics collection services were made more accessible as existing companies offered new services alongside trash and new companies popped up to seize opportunities created by the policy's guarantee. Despite the concerns about lack of existing infrastructure to support such a ban, there's not clear evidence that the barriers in Maine would prevent the private

Table 4. Organics Ban Scenario Summary

Description	Pros	Cons
Development and implementation of a phased-in landfill ban on organic material starting with major food waste generators (e.g. hospitals, schools).	• "Fast-track" to private and public infrastructure development • High diversion rates for food waste • Potential to improve the solid waste management system overall • Potential to produce behavior change around waste production • Captures more participation than voluntary methods	• Potential for significant political push back from residents and legislators • Requires tremendous planning and financial resources on municipal and state levels • Significant geographical challenges to most convenient large-scale organics collection methods (e.g. curbside)

infrastructure from being developed at pace with the policy's implementation. This state-level policy also has the benefit of reaching higher participation rates by going beyond voluntary diversion of food waste. As several interviewees argued, the majority of people need a push to start new practices like separating organics from their waste stream. Without an enforcement mechanism such as a statewide organics ban, it is difficult to increase the participation past a certain threshold due to both reluctance and resource constraints.

It is difficult to determine the impact pursuing this scenario may have on the resource inequities and constraints facing municipalities and individuals throughout the state. On the one hand, the statewide requirement for unit-based pricing for trash services would make trash costs comparable to organics and recycling collection options which creates incentives to lower trash costs by diverting material to the other options. Additionally, the requirement for waste haulers to offer these alternative services would make the options accessible to all residents. On the other hand, there are no financial and logistical resources available to municipalities now that could support the planning and management needs generated by unit-based pricing programs. Without such resources in place before the implementation of this policy, there is an excessive burden on local government that may be insurmountable. Additionally, the rulemaking, implementation, and enforcement of the policy requires significant and immediate investment from the state to create robust capacity to guide the state through the phases of the policy. If such investments are made, then this scenario is a powerful next step to swiftly develop robust, resilient infrastructure that supports high rates of food waste diversion.

Despite the transformative potential of this scenario, a few striking drawbacks undermine its feasibility. The primary and foremost barrier is that there is little political support for such a state-driven policy at any level. While our nonprofit advocacy leaders are fierce proponents, the MDEP has maintained that this organics ban is not the right next step for Maine due to lack of infrastructure in its testimony on LD 1540 (129th Legislature). And the legislature agreed, killing the bill. From our findings, it is clear that such an organics ban works against the culture of municipal autonomy rather than leveraging it to create political momentum. The transformative power of this option is jeopardized by the fact that it requires a complete shift in Maine's political culture as well as its waste management system.

Status Quo Scenario

The status quo scenario is meant to represent the continuation of current policy practices and priorities without significant investment in new resources and infrastructure. In this scenario, food waste diversion in the state is characterized by local programs supported by the MDEP and private and non-profit organizations. There would be no state-wide waste reduction objectives or mandates, so municipalities and individuals would participate on a voluntary basis. Any state-level policies in this scenario would center on supporting municipalities with existing PAYT or organics programs for the purposes of generating municipality-to-municipality momentum for organics diversion. There are several significant challenges and benefits to proceeding with this scenario (see table 5).

Table 5. Status Quo Scenario Summary

Description	Pros	Cons
Policy emphasis on providing incentives for towns to develop their own food waste diversion activities such as PAYT or organics collection/recycling/composting programs. MDEP provides support to interested municipalities through grant opportunities and consultations.	• Minimal pushback from taxpayers or legislators • Potential to build political momentum toward bolder food waste diversion policy • Leverages Maine's political culture of municipal autonomy	• Resource capacity drives whether municipalities take advantage of resources • Limited state and private infrastructure (hauling availability, staff, support resources) • Slow development of state and private infrastructure • Inefficient at producing behavior change around waste reduction

There are minimal benefits to proceeding with this scenario, if maximizing diversion of food waste in Maine is the goal. The strongest benefit to this option is that it leverages municipal autonomy to create robust local programs and then facilitate the adoption of similar programs in neighboring communities. The partnership between the Senator George J. Mitchell Center for Sustainability Solutions and the MDEP to support the adoption and implementation of organics recycling programs in communities has seen tremendous success in launching successful programs across the state, and has the potential to move activities toward a larger scale. However, current activities cannot support increased food waste diversion on a rapid timeline which undermines its capacity to significantly change behaviors around waste.

There are several aspects of this scenario that significantly undermine efforts to generate robust, resilient food waste diversion efforts in Maine. Our findings suggest that without significant investments and an enforcement mechanism, resource constraints and hesitance significantly limit the participation we can reach from continuing with this scenario. Out of the survey respondents from municipalities without PAYT programs, 66% of respondents indicated that they were not interested in starting a program due to lack of administrative and/or resident interest, limited capacity and resource constraints. The survey also indicates that these barriers limit adoption of organics programs, with 64% of respondents without organics programs indicating that they were unlikely to adopt one. Due to the lack of new investments and implementation of enforcement mechanisms, this option has the least potential to maximize food waste diversion rates in the near future.

Incremental Transition Scenario

A third scenario emerged from the discussions that previously centered on evaluating the adoption of an organics ban versus proceeding with current efforts. This scenario, tentatively titled the "incremental transition scenario," focuses on policy that establishes a statewide agenda to bolster food waste diversion rates through the creation of new resources for municipalities, development of state infrastructure, and eliminating subsidies for trash services. The vision for this scenario emerged from the emphasis on the legacy of locally-driven policy in Maine alongside the sentiment that Mainers are on board with food waste diversion, but are simply prevented from doing so by systemic resource constraints. The major policy steps that we examine as part of this scenario, along with the pros and cons, are outlined in table 6.

There are several significant benefits to pursuing an incremental transition over the other policy options we have considered here. Unlike the status quo scenario, the policy steps included in this scenario make a significant set of sustainable investments in developing statewide capacity and infrastructure that are key to engaging more communities. Creating revenue sources for both the waste diversion grants and expanding the MDEP's capacity through increased franchise fees would allow for more support to go directly to municipalities that need it the most. Setting state objectives for waste reduction and food waste diversion in the Maine Won't Wait climate action plan would also send a clear message that waste diversion is an issue worth prioritizing. While an incremental transition may not have the same transformative potential as an organics ban in the short term, such a strategy leverages Maine's culture of municipal autonomy while taking steps toward systemic change by eliminating the practice of subsidizing trash

Table 6. Incremental Transition Scenario Summary

Description	Pros	Cons
Policy actions that develop state resources and infrastructure, establish measurable waste reduction goals, and increase disposal costs for trash. **For example:** • Incorporating waste reduction objectives in the Maine Climate Action Plan • Increasing franchise fees per ton of trash • Developing MDEP financial and personnel resources available for organics issues • Requiring Unit-based pricing for waste disposal	• Development of state resources provides support for municipalities with significant resource/capacity challenges • Increase in franchise fees supports state infrastructure development • Supports statewide diversion and collaboration across sectors • Encourages private infrastructure development • Leverages municipal autonomy	• Potential for significant taxpayer and legislator pushback to UBP and franchise fee requirements • UBP requirement places additional costs on impoverished residents • Requires resources to establish and measure waste reduction objectives • Limited capacity to yield high diversion rates and increased participation

disposal costs.

This incremental transition scenario is not without its potential drawbacks, though. Policy steps that eliminate trash disposal subsidies through PAYT requirements and franchise fees are likely to face tremendous political and corporate pushback, as well as incurring significant financial burdens on impoverished municipalities and individuals. Even though there have always been costs to trash disposal, most Maine residents have not had control over those costs before due to municipal subsidies and inclusion of disposal costs into property taxes. Additionally, the development of programs to utilize this new revenue stream and establish measurable waste reduction objectives for the climate action plan would require significant human and financial resources. However, the Governor's Office of Policy, Innovation, and the Future (GOPIF) would be an incredible resource to lead the development of such programs and objectives. In terms of impact, this scenario is unlikely to reach high diversion rates or participation rates in the next five years unlike the organics ban scenario. However, it is likely to provide a solid foundation for a more robust food waste diversion policy by 2030.

Envisioning a Path Forward

It is impossible to say that there is a "wrong" and a "right" next step for Maine in terms of food waste diversion policy, even after examining these three hypothetical scenarios. Through the organics ban scenario, there is tremendous potential to rapidly transform our waste system and behaviors. However, our findings and analysis suggest that such a step may be too rapid for Maine. As we have seen through the number of successful food waste diversion activities across the state, our municipalities are an unrivaled resource in efforts to generate political momentum and behavior change such as

in the example of the plastic bag ban. However, it is also clear that we need to have more investments and state action to increase support for food waste diversion activities than we are seeing in the status quo. If a bottom-up, municipality-driven strategy for food waste diversion truly is the right step for Maine, we need to send a message that this issue is worth prioritizing by establishing statewide objectives and resources for municipalities to utilize in their efforts to reach them.

CONCLUSION

Policy Recommendations

As our analysis suggests, the best policy path for Maine to begin tackling the food waste issue is to initiate an incremental transition to a political and social culture that prioritizes waste diversion efforts on the municipal level. Maine municipalities have lead the way for environmental innovation over the years, whether through adopting plastic bag bans or developing creative solutions for sustainability. There are several key policy steps that can be taken in the next year by executive and legislative state actors to support municipalities as they lead the way toward a culture that prioritizes waste diversion:

- **Incorporating waste reduction objectives in the Maine Climate Action Plan.** The nationally and internationally lauded Maine Won't Wait climate action plan ought to be amended to include waste reduction and diversion objectives for the rest of its project length. The Governor's Office for Policy, Innovation, and the Future (GOPIF) is the likely, appropriate agent to accomplish this task in the next year or so. By establishing these waste reduction goals and strategies, Maine can set a statewide mission that will bring attention and resources to the issue of food waste.
- **Increasing franchise fees per ton of trash to support the MDEP waste diversion initiatives and capacity development.** Legislation similar to LD 988, a bill to increase the state fees for trash and ash disposal at state-owned landfills proposed in the 129th Legislative session, ought to be proposed and passed. Such a bill could increase the flat rate franchise fees to $3/ton, as well as establish a timeline for phasing in higher fees. The language of

the bill ought to stipulate that these fees be appropriated directly to the MDEP for supporting capacity development and municipal grant programs for waste diversion.

- **Developing financial and personnel resources to support municipal waste diversion activities and statewide initiatives.**

  Additional bills, executive orders, and agency strategies ought to be directed toward supporting the development of capacity and funding specifically for municipal waste diversion activities and statewide initiatives. If we are to significantly impact waste reduction and diversion by building up municipal initiatives across the state, then our state agencies need greater financial, logistical, and personnel capacity to support our municipalities. Examples include expanding MDEP staff dedicated to municipal waste diversion support, bills to appropriate additional funds toward waste diversion grant programs, and the issuance of mission statements and/or objectives for waste diversion.

- **Requiring unit-based pricing for waste disposal.**

  This policy suggestion would be the most complicated and difficult to adopt, but is nonetheless an important option to begin changing behavior around waste reduction. A bill could be proposed and adopted that required municipalities to adopt a form of unit-based pricing, whether by charging by the bag or by weight, after the other suggestions listed here have been implemented. Unit-based pricing programs can be financially and logistically demanding on municipalities and are typically unpopular with residents, but they have demonstrated significant

capacity to generate behavior change, both in recognizing the costs of producing waste and to incentivize diversion as an alternative.

Further Research Needs

There is still much we do not know about Maine's waste management system, the resource constraints facing municipalities, and appropriate solutions for significant challenges. Maine has a legacy of being thoughtful about the next policy steps it takes, understanding that careful solutions yield resilient outcomes. The following areas that require our continued research emerged from this project:

- **Achievable objectives and strategies for reaching higher waste diversion/reduction rates statewide.**

  Significant thought will need to be devoted to designing reasonable, ambitious goals and strategies if Maine is to incorporate waste reduction objectives into the Maine Won't Wait climate action plan. These strategies and goals will also guide agency (e.g. MDEP, GOPIF, MDCFA) action and develop collaborative support systems statewide.

- **Mapping and understanding governmental resource inequities across municipalities.**

  While it is clear that municipalities face unique resource challenges that complicate their waste management activities, we know very little about which municipalities face what kinds of constraints. Our research suggests that the concept of the "two Maines," that rural communities face more resource constraints than urban communities, is not entirely accurate. Frequently, Maine communities are a juxtaposition of extreme poverty alongside affluence with

resource constraints varying greatly even between neighboring towns (e.g. Orono and Old Town). Understanding the nature of these constraints and the municipalities that face them will contribute to more resilient outcomes for policy initiatives.

- **Mapping and understanding logistical organics collection infrastructure needs statewide.**

  Our survey results suggest that collection site organics programs are the most frequently utilized in Maine (Appendix C), which provides preliminary insight into infrastructure needs. However, there is much we still need to know about 1) what kinds of infrastructure provide the most impact on participation and diversion rates, 2) accessibility of various infrastructure types across municipalities, and 3) public and private financial investment needed to develop infrastructure that supports food waste diversion statewide.

- **Evaluating performance of different unit-based pricing (UBP) programs across municipalities.**

  If Maine is to require unit-based pricing for trash at the municipal level, we need to know more about what kinds of UBP programs work best for municipalities. While our findings join other studies that indicate bag-based UBP programs are the most prominent for Maine, there are several drawbacks related to logistical needs that arise from this kind of UBP program. Additional research could both support state guidance in the implementation of municipal programs and provide ease of mind to municipalities that are hesitant to adopt such programs.

- **Equitable resolutions to the Municipal Review Committee (MRC)/Fiberight contract issue.**

  The MRC contracts prevent a critical mass of municipalities (over 100) from participating in waste diversion efforts, a significant barrier as we endeavor to significantly reduce the landfilling of waste. To date, MRC has not demonstrated that a facility will come online in the near future (Calder 2020; Berleant 2021) which means that the over-100 signees (including Bangor, Bar Harbor, and others) will have their total waste be incinerated and then landfilled. Needless to say, we need more research and engagement with the MRC to examine potential solutions for this issue so that we can divert waste from these municipalities to more sustainable options. Advocates have suggested the abolition of the MRC (Vallette 2021), but other options such as contract amendments are potential options.

Summary

There is still much to learn about the best strategies for reducing and diverting food waste in Maine. However, this project has laid a strong case for what the next step should be if we are serious about increasing the amount of food waste that is diverted back into the community instead of the landfill. If we begin to invest in resources and set objectives now, we might be ready for something like Vermont's Universal Recycling Policy in the next decade. In the meantime, we will be supporting municipalities that want to reduce food waste but are constrained by resource inequities and setting a mission that will bring people across the state together.

REFERENCES

Akhiar, Afifi et al. 2020. “Anaerobic Digestion Industries Progress throughout the World.” IOP Conference Series: Earth and Environmental Science 476(1).

Albright, Elizabeth A., and Deserai Crow. 2019. “Beliefs about Climate Change in the Aftermath of Extreme Flooding.” Climatic Change 155(1): 1–17.

Annunziata, Azzurra, Massimiliano Agovino, Aniello Ferraro and Angela Mariani. 2021. “Food waste as a consequence of an inefficient consumer’s choices: a microeconomic approach.” Applied Economics, 53(54): 6266-6285.

Bajželj, Bojana, Thomas E. Quested, Elin Röös, and Richard P.J. Swannell. 2020. “The Role of Reducing Food Waste for Resilient Food Systems.” Ecosystem Services 45(July): 101140.

Benson, Christine, William Daniell, and Jennifer Otten. 2018. “A Qualitative Study of United States Food Waste Programs and Activities at the State and Local Level.” Journal of Hunger and Environmental Nutrition 13(4): 553–72.

Benyam, Addisalem, Susan Kinnear, and John Rolfe. 2018. “Integrating community perspectives into domestic food waste prevention and diversion policies.” Resources Conservation and Recycling, 134: 174-183.

Berleant, Anne. 2021. “MRC still working towards sale of Hampden waste facility.” The Ellsworth American, 21 December 2021.

Best, Henning, and Thorsten Kneip. 2011. “The Impact of Attitudes and Behavioral Costs on Environmental Behavior: A Natural Experiment on Household Waste Recycling.” Social Science Research 40(3): 917–30.

Blackmer, Travis, and George Criner. 2014. “Impacts of Pay-As-You-Throw and Other Residential Solid Waste Policy Options: Southern Maine 2007–2013.” Maine Policy Review 23(2): 51–58.

Brennan, Linda, Sophie Langley, Karli Verghese, Simon Lockrey, Maddison Ryder, Caroline Francis, Nhat Tram Phan-Le, and Allister Hill. 2021. “The role of packaging in fighting food waste: A systematised review of consumer perceptions of packaging.” Journal of Cleaner Production, (281).

Calder, Amy. 2020. “Maine towns’ trash disposal future in limbo as buyer sought for beleaguered plant.” Kennebec Journal.

Campbell, John Y. 2016. “Restoring Rational Choice : The Challenge of Consumer Financial Regulation.” 106(5): 1–30.

Carrus, Giuseppe, Paola Passafaro, and Mirilia Bonnes. 2008. “Emotions, Habits and Rational Choices in Ecological Behaviours: The Case of Recycling and Use of Public Transportation.” Journal of Environmental Psychology 28(1): 51–62.

Ceryes, Caitlin A., Antonacci Cerra C., Steven A. Harvey, Marie L. Spiker, Anne Bickers, and Roni A. Neff. 2021. “Maybe it’s still good? A qualitative study of factors influencing food waste and application of the EPA Food recovery hierarchy in U. S. supermarkets.” Appetite, 161: 105111.

Chen, C. Rita, and Rachel J.C. Chen. 2018. “Using Two Government Food Waste Recognition Programs to Understand Current Reducing Food Loss and Waste Activities in the U.S.” Sustainability (Switzerland) 10(8): 1–24.

Cherry, Mark J. 2009. “Discourse Failure and the (Ir)Rational Politics of Democratic Decision Making.” The Journal of Value Inquiry 43(1): 119–27.

Cumberland County Food Security Council. 2020. “End Hunger in Maine by 2030 Report to the Maine State Legislature.” Cumberland County Food Security Council.

Department of Environmental Conservation. 2019. “Vermont’s Universal Recycling Policy Status Report.” Vermont Agency of Natural Resources.

Dobernig, Karin, and Karin Schanes. 2019. “Domestic Spaces and beyond: Consumer Food Waste in the Context of Shopping and Storing Routines.” International Journal of Consumer Studies 43(5): 480–89.

Downs, Anthony. 1957. “An Economic Theory of Political Action in a Democracy.” The University of Chicago Press, Journal of Political Economy, 65(2):135-150.

Environmental Protection Agency. 2021. “Sustainable Management of Food Basics.” Environmental Protection Agency (Webpage).

Evangelopoulos, Panagiotis. 2007. “Towards a Synthesis of Theories of State Failure.” International Review of Economics 54(1): 13–34.

Evans, Alexandra I, and Robin M Nagele. 2018. “A LOT TO DIGEST ADVANCING FOOD WASTE POLICY IN THE UNITED STATES.” 58(1): 177–214.

Glaser, Barney J and Anselm L. Strauss. 1967. “The Discovery of Grounded Theory: Strategies for Qualitative Research.” Aldine Publishing.

Göbel, Christine et al. 2015. “Cutting Food Waste through Cooperation along the Food Supply Chain.” Sustainability (Switzerland) 7(2): 1429–45.

Hall, Kevin D., Juen Guo, Michael Dore, and Carson C. Chow. 2009. “The Progressive Increase of Food Waste in America and Its Environmental Impact.” PLoS ONE 4(11): 9–14.

Haltas, Ismail et al. 2017. “Anaerobic Digestion: A Prime Solution for Water, Energy and Food Nexus Challenges.” Energy Procedia 123: 22–29.

Hecht, Amelie A. and Roni Neff. 2019. “Food Rescue Intervention Evaluations: A Systematic Review.” Sustainability, 11(23): 6718.

Herfeld, Catherine. 2020. “The Diversity of Rational Choice Theory: A Review Note.” Topoi, 39: 329–347.

Hiç, Ceren, Prajal Pradhan, Diego Rybski, and Jürgen P. Kropp. 2016. “Food Surplus and Its Climate Burdens.” Environmental Science and Technology 50(8): 4269–77.

Hingston, Sean T. and Theodore J. Noseworthy. 2020. “On the epidemic of food waste: Idealized prototypes and the aversion to misshapen fruits and vegetables.” Food Quality & Preference, 86, 103999.

Horton, Peter, Richard Bruce, Christian Reynolds, and Gavin Milligan. 2019. “Food chain inefficiency (FCI): Accounting conversion efficiencies across entire food supply chains to re-define food loss and waste.” Frontiers in Sustainable Food Systems, 3(79)

Hovi, Jon, Arild Underdal, and Hugh Ward. 2011. “Potential Contributions of Political Science to Environmental Economics.” Environmental and Resource Economics 48(3): 391–411.

Isenhour, Cindy, Travis Blackmer, Travis Wagner, Linda Silka, and John Peckenham. 2016. “Moving up the Waste Hierarchy in Maine: Learning from “Best Practice” State-Level Policy for Waste Reduction and Recovery.” Maine Policy Review, 25(1): 15-29.

Isenhour, Cindy, Andrew Crawley, Brieanne Berry, and Jennifer Bonnet. 2017. "Maine’s Culture of Reuse and Its Potential to Advance Environmental and Economic Policy Objectives." Maine Policy Review, 26(1): 36-46.

Isenhour, Cindy et al. 2022. “Toxicants, Entanglement, and Mitigation in New England’s Emerging Circular Economy for Food Waste.” Journal of Environmental Studies and Sciences.

Lake, Danielle, Amy McFarland and Jody Vogelzang. 2020. “Creating Resilient Interventions to Food Waste: Aligning and Leveraging Systems and Design Thinking.” Food Waste Management: Solving the Wicked Problem, 193-221.

LD 1534 Stakeholder Working Group. “Waste is Not the Maine Way: Final Report.” Senator George J. Mitchell Center for Sustainability Solutions, University of Maine, 10 January 2018.

LD 1639: An Act To Protect the Health and Welfare of Maine Communities and Reduce Harmful Solid Waste. H.R., 130th Maine State Legislature.

LD 988: An Act To Reduce the Landfilling of Municipal Solid Waste. H.R., 129th Legislature.

Lohnes, Joshua D. 2021. “Regulating Surplus: Charity and the Legal Geographies of Food Waste Enclosure.” Agriculture and Human Values 38(2): 351–63.

Maalouf, Amani, and Mutasem El-Fadel. 2017. “Effect of a Food Waste Disposer Policy on Solid Waste and Wastewater Management with Economic Implications of Environmental Externalities.” Waste Management 69: 455–62.

MacDonald, Ashley J. 2019. “Minimizing Terminal Food Waste within the Food Supply Chain.” Dalhousie University, Digital Commons.

Maine Climate Council. 2020. “Maine Won’t Wait: A Four-Year Plan for Climate Action.” Maine Climate Council.

Maine Climate Council. 2021. “Maine Won’t Wait: One-Year Progress Report.” Maine Climate Council.

Maine Department of Environmental Protection, Division of Materials Management. 2021. “RFP# 202111169: 2022 Waste Diversion Grants Program, Round I.” State of Maine.

Maine Municipal Association. N.d.“About Us.” Maine Municipal Association.

Maine Section of the American Society of Civil Engineers. 2020. “2020 Report Card for Maine’s Infrastructure.” American Society of Civil Engineers.

McCabe, Barbara Coyle, Branco Ponomariov, and Fabyan Estrada. 2017. “Professional Cities: Accredited Agencies, Government Structure, and Rational Choice.” 78: 295–304.

Millar, Shannon, Kate Parizeau, and Evan D.G. Fraser. 2020. “The Limitations of Using Wasted Food to ‘Feed Hungry People.’” Journal of Hunger and Environmental Nutrition 15(4): 574–84.

Meisranta, Nina, Elina Närvänen, and Malla Mattila. 2021. “Framings of Food Waste: How Food System Stakeholders Are Responsibilized in Public Policy Debate.” Journal of Public Policy & Marketing, 41(2): 144-161.

Messner, Rudolf, Carol Richards, and Hope Johnson. “The “Prevention Paradox”: food waste prevention and the quandary of systemic surplus production.” Agriculture and Human Values (37): 805-817.

Meyer, Stephen M., and David M. Konisky. 2007. “Adopting Local Environmental Institutions Environmental Need and Economic Constraints.” Political Research Quarterly 60(1): 3–16.

Mourad, Marie. 2016. “Recycling, Recovering and Preventing ‘Food Waste’: Competing Solutions for Food Systems Sustainability in the United States and France.” Journal of Cleaner Production 126: 461–77.

Mueller, J. Tom, and Ann R. Tickamyer. 2020. “Climate Change Beliefs and Support for Development: Testing a Cognitive Hierarchy of Support for Natural Resource-Related Economic Development in Rural Pennsylvania.” Journal of Rural Studies 80(April): 553–66.

Municipal Review Committee. n.d. “History.” Municipal Review Committee Website.

Närvänen, Elina, Nina Mesiranta, Malla Mattila, and Anna Heikkinen. 2019. “Food Waste Management: Solving the Wicked Problem” Springer International Publishing.

Natural Resources Council of Maine. 2021. “Extended Producer Responsibility for Packaging.” Natural Resources Council of Maine (Webpage).

Natural Resources Council of Maine. 2022. “Pay As You Throw Toolkit.” Natural Resources Council of Maine (Webpage).

Newig, Jens. 2004. “Public Attention, Political Action: The Example of Environmental Regulation.” Rationality and Society 16(2): 149–90.

One Climate Future. 2020. “One Climate Future: Climate Action and Adaptation Plan.” Portland and South Portland.

Papargyropoulou, Effie et al. 2014. “The Food Waste Hierarchy as a Framework for the Management of Food Surplus and Food Waste.” Journal of Cleaner Production 76: 106–15.

Petracca, Mark P. 1991. “The Rational Choice Approach to Politics: A Challenge to Democratic Theory.” The Review of Politics 53(2): 289–319.

Pingree, Chellie. 2015. “Congresswoman Pingree to introduce bill to reduce food waste.” Congresswoman Pingree Press Releases.

Popa, Florin. 2015. “Motivations to Contribute to Public Goods: Beyond rational choice economics.” Environmental Policy and Governance, 25: 230-242.

Project Drawdown. 2021. “Reduced Food Waste.” Project Drawdown (Webpage).

Reinecke, Juliane, and Shaz Ansari. 2016. “Taming Wicked Problems: The Role of Framing in the Construction of Corporate Social Responsibility.” Journal of Management Studies 53(3): 299–329.

Saber, Deborah A. and Linda Silka. 2020. “Food Waste as a Classic Problem that Calls for Interdisciplinary Solutions: A Case Study Illustration.” Journal of Social Issues 76(1): 114-122.

Schanes, Karin, Karin Dobernig, and Burcu Gozet. 2018. “Food waste matters - A systematic review of household food waste practices and their policy implications.” Journal of Cleaner Production, 182: 978-991.

Shahid, Kanwal and Eric Hittinger. 2021. “Techno-economic optimization of food waste diversion to treatment facilities to determine cost effectiveness of policy incentives.” Journal of Cleaner Production, 279, 122634.

Skumatz, Lisa A., and David J. Freeman. 2006. “Pay as You Throw (PAYT) in the US: 2006 Update and Analyses.” Environmental Protection Agency Archives.

Skumatz, Lisa A. 2008. “Pay as You Throw in the US: Implementation, Impacts, and Experience.” Waste Management 28(12): 2778–85.

Spang, Edward S. et al. 2019. “Food Loss and Waste: Measurement, Drivers, and Solutions.” Annual Review of Environment and Resources 44: 117–56.

Stern, Paul C. 1999. “Information, Incentives, and Proenvironmental Consumer Behavior.” Journal of Consumer Policy 22(4): 461–78.

Stern, Paul C. 2000. “Toward a Coherent Theory of Environmentally Significant Behavior.” Journal of Social Issues 56(3): 407–24.

Tavil, Gail. 2020. “Industry challenges and approaches to food waste.” Physiology & Behavior, (223).

Thakali, Astha. 2020. “Does Circularizing Source-Separated Food Waste Present A Risk To Our Food?” University of Maine Digital Commons, Electronic Theses and Dissertations, 3438.

Toma, Luiza, Costa Font, Monteserrat, and Thompson, Bethan. 2020. “Impact of consumers’ understanding of date labelling on food waste behaviour.” Operational Research International Journal 20: 543–560.

Turaga, Rama Mohana R., Richard B. Howarth, and Mark E. Borsuk. 2010. “Pro-Environmental Behavior: Rational Choice Meets Moral Motivation.” Annals of the New York Academy of Sciences 1185: 211–24.

United Nations Environmental Programme. n.d. “Worldwide Food Waste.” United Nations Environmental Programme Website.

Vallette, Jim. 2021. “Break up the MRC.” The Piscataquis Observer, 4 May 2021.

van der Werf, Paul, Kristian Larsen, Jamie A. Seabrook, and Jason Gilliland. 2020. “How Neighbourhood Food Environments and a Pay-as-You-Throw (PAYT) Waste Program Impact Household Food waste Disposal in the City of Toronto.” Sustainability (Switzerland) 12(17).

Vatn, Arild. 2005. “Rationality, Institutions and Environmental Policy.” Ecological Economics 55(2): 203–17.

Vilela, Carla, Mia Kurek, Zvi Hayouka, Bettina Röcker, Selçuk Yildirim, Maria Dulce C. Antunes, Julie Nilsen-Nygaard, Marit Kvalvåg Pettersen, and Carmen S.R. Freire. “A concise guide to active agents for active food packaging.” Trends in Food Science & Technology, (80): 212-222.

Walia, Bhavneet, and Shane Sanders. 2019. “Curbing Food Waste: A Review of Recent Policy and Action in the USA.” Renewable Agriculture and Food Systems 34(2): 169–77.

Warshawsky, Daniel N. 2019. “The Challenge of Food Waste Governance in Cities: Case Study of Consumer Perspectives in Los Angeles.” Sustainability (Switzerland) 11(3): 23–25.

Weber, Edward P., and Anne M. Khademian. 2010. “Wicked Problems, Knowledge Challenges, and Collaborative Capacity Builders in Network Settings.” IEEE Engineering Management Review 38(3): 57.

Wolfson, Megan D. and Catherine Greeno. 2018. “Savoring surplus: effects of food rescue on recipients.” Journal of Hunger and Environmental Nutrition, 15(1): 62-79.

Xue, L., Liu, G., Parfitt, J., Liu, X., van Herpen, E., Stenmarck, Å., O’Connor, C., Östergren, K., Cheng, S. 2017. “Missing Food, Missing Data? A Critical Review of Global Food Losses and Food Waste Data.” Environmental Science and Technology, 51(12):6618–6633.

APPENDICES

Appendix A: Interview Questions
Appendix B: PAYT Survey Questions
Appendix C: Summary of Findings from PAYT Survey
Appendix D: Institutional Review Board Approval for Interviews
Appendix E: Institutional Review Board Approval for PAYT Survey

APPENDIX A: Interview Questions

Introductory information interviews (in-person and over the phone):
Thank you for agreeing to participate in this research project.

My name is Dominique DiSpirito, and I am a fourth year undergraduate student in Political Science and Honors at the University of Maine. I'm working with Dr. Robert Glover, a faculty member in the Political Science Department at the University of Maine.

We are conducting a comprehensive study examining the logistical barriers that complicate landfill diversion of organics in Maine to identify a path forward. To accomplish this, we are interviewing professionals involved in materials management (e.g. private sector organizations, municipalities, and advocates) in Maine and Vermont. Information collected in this study will be summarized in a report that includes policy suggestions provided to advocates and legislators across the state.

Before we start, I want to remind you that we intend to include your organization and job title in association with information you provide in final reported materials. I will ask you to state your job title and organization at the beginning of the interview for internal record keeping purposes only. You will have the ability to choose what information (job title, organization, name) will be included in final materials at the end of the interview. The information you provide will still be used to inform this project if you choose not to include any identifying information. You may skip any questions or end the interview at any point, simply by letting me know.

Do you have any questions for me before we begin?

Would you be comfortable if I recorded this interview for accuracy? *[begin recording if affirmative]*

[Researcher begins asking some or all of the following questions]

For all participants:

- What is your job title?
- What is the name of your organization?

For Experts in Maine:

- Have you lived in Maine your whole life?
- How long have you worked in materials management in Maine?

- What is your role in reducing the landfilling of food waste in Maine?
- How do you think Mainers feel about food waste diversion?
- Do you think Maine is ready for bold food waste policy?
- Do you think a universal food recycling policy would be desirable in Maine?
    - Would it be feasible?
- Is collaboration necessary to make progress on diverting food waste from landfills?
    - In what ways?
    - Which organization(s) have made unique contributions to the effort?
- How would you assess the strength of Maine's solid waste infrastructure?
    - In what ways does Maine's solid waste infrastructure need to be changed to accommodate bold food waste policy?
- Do you think a universal food waste recycling policy targeting commercial producers only would be desirable in Maine?
    - Would it be feasible?

<u>General:</u>

- Is there anyone you suggest I reach out to for more information?
- Are there any materials you think I should review?

<u>End-of-Interview Script (all interviews):</u>

Thank you for participating in this interview.

Are you comfortable with your job title and organization being associated with the information you've provided today?

Thank you for your time!

APPENDIX B: PAYT Survey Questions

1. What county is your municipality located in?
    a. Knox
    b. Androscoggin
    c. Piscataquis
    d. Penobscot
    e. Aroostook
    f. Somerset
    g. Lincoln
    h. Kennebec
    i. Sagadahoc
    j. Cumberland
    k. Washington
    l. Hancock
    m. York
    n. Waldo
    o. Oxford
    p. Franklin
2. How many residents live in your municipality?
    a. Less than 1,000
    b. Between 1,000 and 2,500
    c. Between 2,501 and 5,000
    d. Between 5,001 and 7,500
    e. Between 7,501 and 10,000
    f. Between 10,001 and 15,000
    g. Between 15,001 and 20,000
    h. Between 20,001 and 25,000
    i. More than 25,000
3. Who is primarily responsible for managing your Municipal Solid Waste (MSW)?
    a. Public Works Department
    b. Town Manager
    c. Town Council
    d. Finance Manager
    e. Mayor
    f. Transfer Station Manager
    g. Other
4. Do you have a Pay as You Throw (PAYT) program in your municipality?
    a. Yes

b. No

If "Yes" to 4:

5. Please describe your PAYT program (fees per bag, size of bag, special allowances, etc.)
6. How long have you had PAYT in your municipality?
    a. Less than 6 months
    b. 6 months to 1 year
    c. 1-5 years
    d. More than 5 years
7. Has your PAYT program been well-received by residents?
    a. Yes
    b. No
8. How has your PAYT program generally been received by residents?
    a. Mostly positive
    b. Neutral
    c. Mostly negative
    d. Not sure
9. Please describe any negative reactions residents have had to your PAYT program.
10. Please describe any positive reactions residents have had to your PAYT program.
11. Have you noticed a change in the amount of organics residents put in their PAYT bags?
    a. Yes, less organics
    b. Yes, more organics
    c. No change
    d. Not enough data
12. How successful has your PAYT program been at reducing hauling costs?
    a. Very successful (more than 10% decrease in annual waste tonnage)
    b. Moderately successful (annual waste tonnage decreased)
    c. No change
    d. Unsuccessful (annual waste tonnages increased)
    e. I'm not sure

If "No" to 4:

13. Are you considering implementing a PAYT program?
    a. Yes
    b. No
14. What barriers prevent your municipality from adopting a PAYT program? Please check all that apply.
    a. Operational costs
    b. Lack of resident interest
    c. Lack of administrative interest

    d. Contamination concerns
    e. Other:
15. Please describe the barriers preventing your municipality from adopting a PAYT program.
16. Please describe the resources and/or support that would assist your municipality in implementing a PAYT program.

For all participants:

17. Do you have a municipal organics collection or composting program available to your residents?
    a. Yes
    b. No

If "Yes" to question 17:

18. What kind of municipal organics program do you have?
    a. Drop off at transfer station
    b. Curbside collection from provider
    c. Other dropoff
    d. Other
19. How are your organics processed?
    a. We run a composting program
    b. We collect organics for a provider to process
    c. Other
20. How long have you had your organics collection or composting program?
    a. Less than 6 months
    b. 6 months to 1 year
    c. 1-5 years
    d. More than 5 years
21. How many tons of organics have you diverted from the landfill through your organics collection or composting program over the last year?
    a. Less than 10 tons
    b. 10-20 tons
    c. 21-50 tons
    d. 51-100 tons
    e. More than 100 tons
    f. I'm not sure
22. What challenges have you faced while implementing the organics collection or composting program? Please check all that apply.
    a. Difficulty increasing household participation
    b. Operational costs
    c. Lack of infrastructure
    d. Lack of space for facilities

e. Educational needs
f. Contamination issues
g. Other:

23. Please describe the challenges your municipality faced when implementing an organics collection or composting program.
24. Please describe the resources and/or support your municipality would benefit from while implementing an organics collection or composting program.

If "No" to question 17:

25. How likely are you to implement a food waste collection program?
    a. Very Likely
    b. Somewhat Likely
    c. I'm not sure
    d. Somewhat Unlikely
    e. Very Unlikely
26. How likely are you to implement a food waste composting program?
    a. Very Likely
    b. Somewhat Likely
    c. I'm not sure
    d. Somewhat Unlikely
    e. Very Unlikely

For all participants:

27. Are there any additional comments you'd like to share?
28. Would you like to be contacted by the Maine Department of Environmental Protection (MDEP) for support for PAYT or organics collection/composting programs?
    a. Yes
    b. No

If "Yes" to 28, redirect to contact information survey

APPENDIX C: Summary of Findings from PAYT Survey

Data Characteristics

- 33 responses, 7 responses eliminated due to incompleteness
    - 25 responses used, **16.67% response rate**
- Respondents represented diverse municipality sizes & several counties (see Figures 1 and 2).

PAYT Programs

- 13 respondents **(54%)** indicated that they have a PAYT program.
    - Of the respondents with PAYT programs, **77%** indicated that their program is well-received by residents.
    - **77%** of respondents with PAYT programs have had PAYT in their community for more than 5 years (see figure 3).
- **39%** of respondents indicated that their PAYT program has been successful at reducing hauling costs.
    - 31% indicated no change, and 31% indicated that they had no relevant data.
    - **77%** of respondents indicated that there was not enough data for them to determine whether PAYT had reduced organics in their waste streams.
- 7 respondents **(54%)** with PAYT programs cited costs for PAYT bags as a driver of negative reactions to the program.
    - 4 respondents **(31%)** cited low quality and difficulty stocking bags as a driver of negative reactions to the program.
        - One respondent noted that there is only 1 company that offers PAYT bags at scale for municipalities.
- **66%** of respondents without PAYT programs indicated that they were NOT interested in starting a PAYT program.
    - Lack of administrative interest, lack of residential interest, and operational costs cited as barriers to adoption of PAYT programs.

Organics Programs

- **56%** of respondents have an organics program or are in the process of setting one up.
    - **46%** of respondents with organics program have been operating their program for more than 5 years (see figure 4).
    - **Every respondent** with an organics program used some sort of drop-off system.

        - One respondent's program featured curbside and drop-off.
    - **60%** of respondents collect organics for a third party to process, **30%** run their own composting program.
- Respondents with organics programs have seen varying rates of organics diversion (see figure 5).
    - **36%** of respondents with organics programs cited lack of data.
- **64%** of respondents without organics programs indicated that they were unlikely to adopt one.
    - Costs, educational needs, and lack of interest are most prominent concerns preventing municipalities from adopting an organics program.

Figures and Tables

Figure 1: Population Size of Responding Municipalities

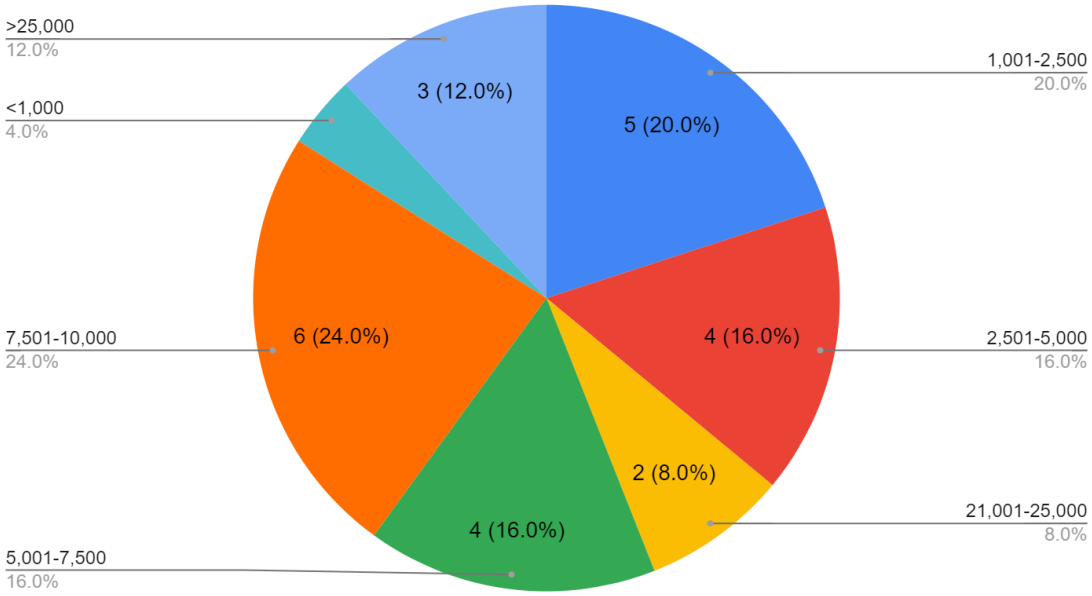


Figure 2: Counties Represented in Sample

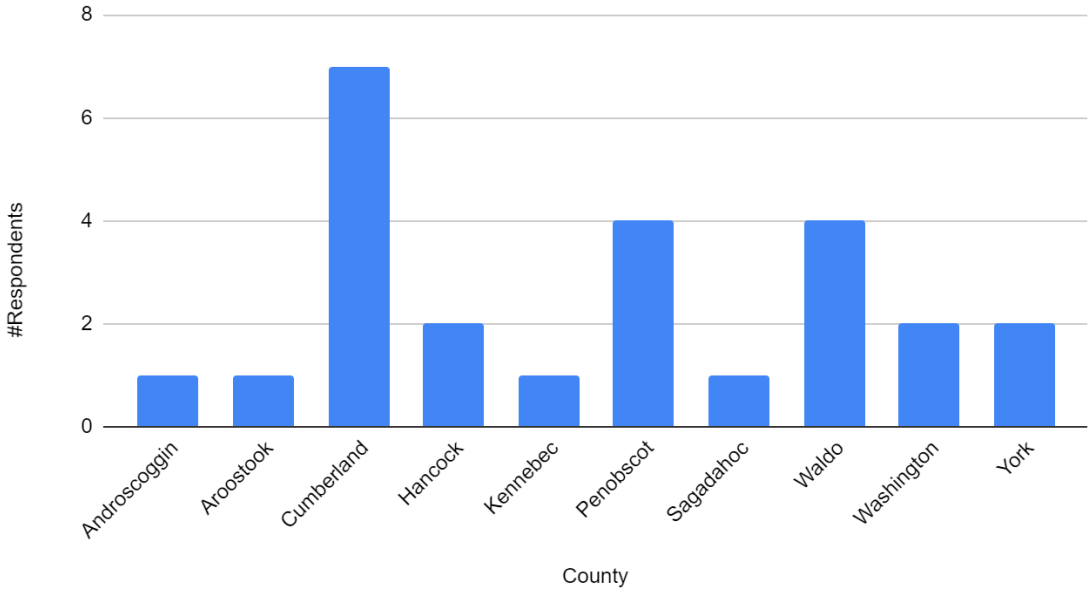


Figure 3: Length of PAYT Program among respondents

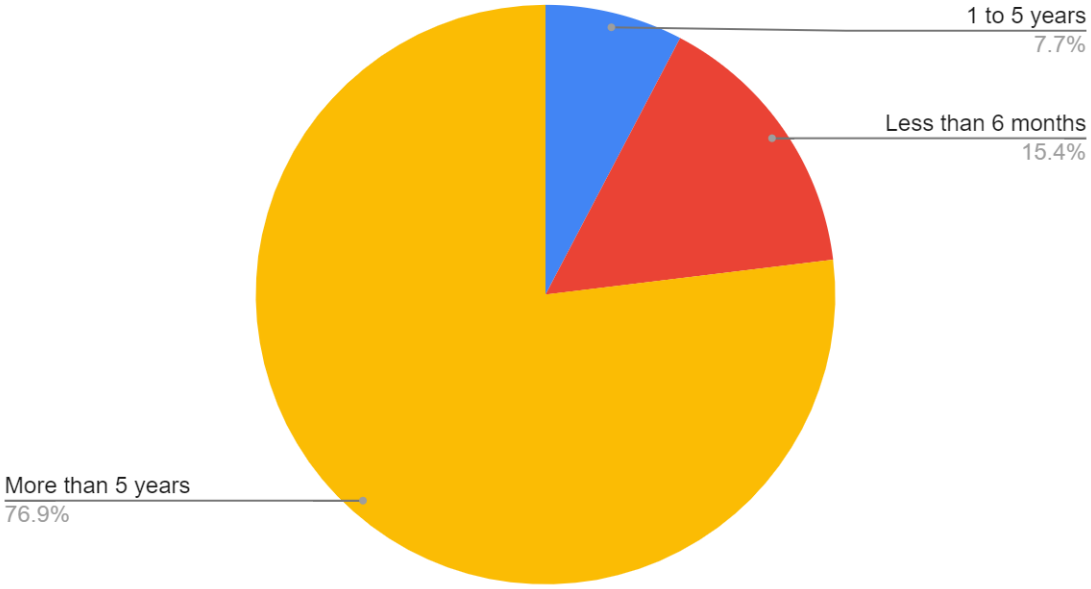


Figure 4: Length of Organics Programs in Sample

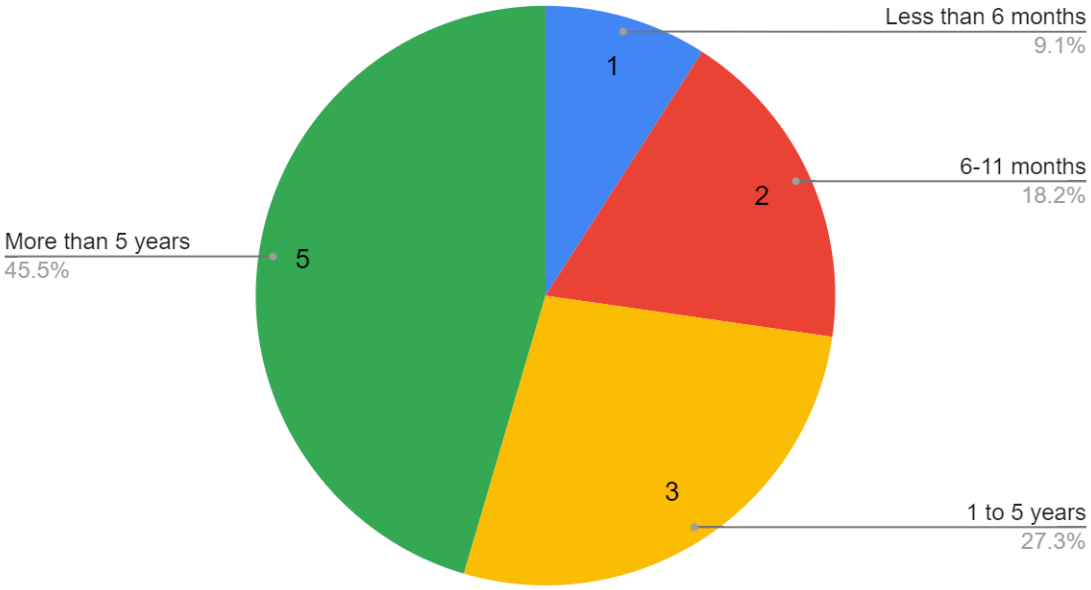
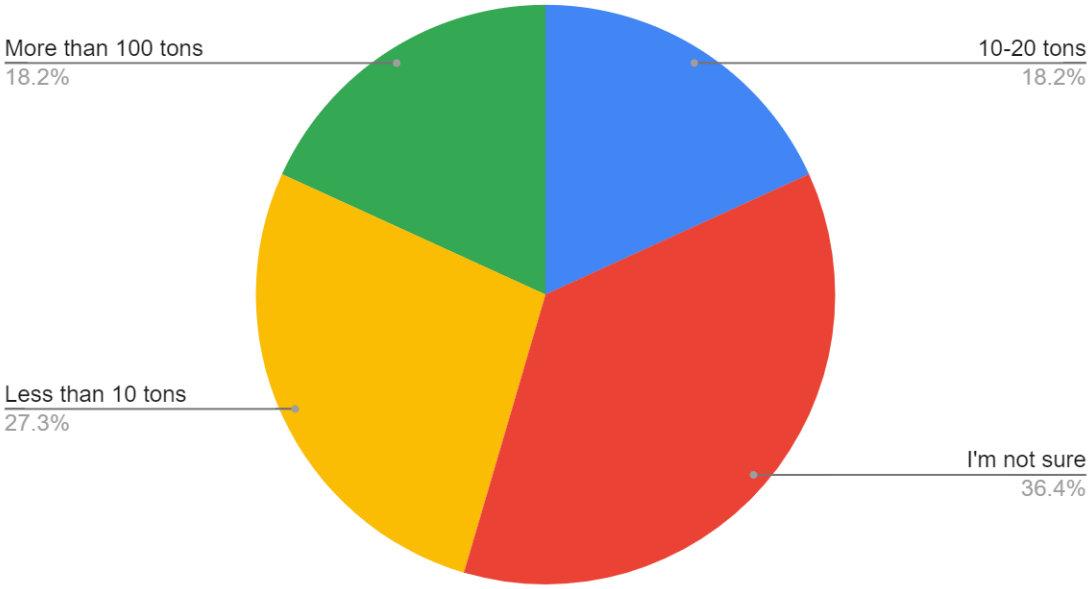


Figure 5: Tons of Organics Diverted by Programs in Sample



APPENDIX D: Institutional Review Board Approval for Interviews

APPLICATION COVER PAGE

- ***KEEP THIS PAGE AS ONE PAGE – DO NOT CHANGE MARGINS/FONTS!!!!!!!!!***
- ***PLEASE SUBMIT THIS PAGE AS WORD DOCUMENT***

APPLICATION FOR APPROVAL OF RESEARCH WITH HUMAN SUBJECTS
Protection of Human Subjects Review Board, 311 Alumni Hall

(Type inside gray areas)

PRINCIPAL INVESTIGATOR:	**Dominique DiSpirito**	**EMAIL: Dominique.dispirito@maine.edu**
CO-INVESTIGATOR:		**EMAIL:**
CO-INVESTIGATOR:		**EMAIL:**
FACULTY SPONSOR:	**Dr. Robert Glover**	**EMAIL: Robert.glover@maine.edu**
(Required if PI is a student):		
TITLE OF PROJECT:	**A Study on the Future of Food Recycling Laws in Maine**	
START DATE:	**12/02/2021**	**PI DEPARTMENT: Political Science**

STATUS OF PI: FACULTY/STAFF/GRADUATE/UNDERGRADUATE U (F,S,G,U)

If PI is a student, is this research to be performed:

- ☒ **for an honors thesis/senior thesis/capstone?**
- ☐ **for a doctoral dissertation?**
- ☐ **other (specify)**
- ☐ **for a master's thesis?**
- ☐ **for a course project?**

Submitting the application indicates the principal investigator's agreement to abide by the responsibilities outlined in Section I.E. of the Policies and Procedures for the Protection of Human Subjects.

Faculty Sponsors are responsible for oversight of research conducted by their students. The Faculty Sponsor ensures that he/she has read the application and that the conduct of such research will be in accordance with the University of Maine's Policies and Procedures for the Protection of Human Subjects of Research. REMINDER: if the principal investigator is an undergraduate student, the Faculty Sponsor MUST submit the application to the IRB.

Email this cover page and complete application to umric@maine.edu.

****

FOR IRB USE ONLY Application # 2021_11_07 Review (F/E): E Expedited Category:
ACTION TAKEN:

- ☒ **Judged Exempt; category 2 Modifications required? YES Accepted (date) 12/02/2021**
- ☐ **Approved as submitted. Date of next review: by Degree of Risk:**
- ☐ **Approved pending modifications. Date of next review: by Degree of Risk:**
  Modifications accepted (date):
- ☐ **Not approved (see attached statement)**
- ☐ **Judged not research with human subjects**

FINAL APPROVAL TO BEGIN **12/02/2021**
Date

10/2018

APPENDIX E: Institutional Review Board Approval for PAYT Survey

APPLICATION FOR APPROVAL OF RESEARCH WITH HUMAN SUBJECTS
Protection of Human Subjects Review Board, 311 Alumni Hall

PRINCIPAL INVESTIGATOR: Dominique DiSpirito **EMAIL:** dominique.dispirito@maine.edu
FACULTY SPONSOR: Dr. Robert Glover **EMAIL:** Robert.glover@maine.edu
TITLE OF PROJECT: PAYT Programs and Food Waste Diversion Activity in Maine
START DATE: 12/15/2021 **PI DEPARTMENT:** Political Science

STATUS OF PI: FACULTY/STAFF/GRADUATE/UNDERGRADUATE U **(F,S,G,U)**

If PI is a student, is this research to be performed:

- ☒ for an honors thesis/senior thesis/capstone?
- ☐ for a master's thesis?
- ☐ for a doctoral dissertation?
- ☐ for a course project?
- ☐ other (specify)

Submitting the application indicates the principal investigator's agreement to abide by the responsibilities outlined in Section I.E. of the Policies and Procedures for the Protection of Human Subjects.

Faculty Sponsors are responsible for oversight of research conducted by their students. The Faculty Sponsor ensures that he/she has read the application and that the conduct of such research will be in accordance with the University of Maine's Policies and Procedures for the Protection of Human Subjects of Research. REMINDER: if the principal investigator is an undergraduate student, the Faculty Sponsor MUST submit the application to the IRB.

Email this cover page and complete application to umric@maine.edu.

****

FOR IRB USE ONLY **Application # 2021_12_09** **Review (F/E): E Expedited Category:**
ACTION TAKEN:

- ☒ **Judged Exempt; category 2 Modifications required? YES Accepted (date) 12/15/2021**
- ☐ **Approved as submitted. Date of next review: by Degree of Risk:**
- ☐ **Approved pending modifications. Date of next review: by Degree of Risk:**
  Modifications accepted (date):
- ☐ **Not approved (see attached statement)**
- ☐ **Judged not research with human subjects**

FINAL APPROVAL TO BEGIN **12/15/2021**
Date

10/2018

AUTHOR'S BIOGRAPHY

Dominique DiSpirito is originally from Woonsocket, Rhode Island where she grew up with her mom, dad, and younger brother and two cats (Coco and Max). During her time at the University of Maine, Dominique was involved in numerous activities including the Maine Day Meal Packout, It's Personal Campaign, Honors College Student Advisory Board, All Maine Women, International Survivors of Suicide Loss Day programs, and the Interfaith Group. She is a 2021 Truman Scholar, 2021 Maine Campus Compact Heart and Soul Award recipient, two-time Servant Heart Scholarship recipient, and 2021 Robert Q. Dana Change Maker Award recipient. She graduated in May 2022 with a Bachelor's in Political Science and minors in Ecology & Environmental Sciences and Legal Studies with honors. She is a first generation college student, and the first woman in her family to earn a college degree. She will be returning to Maine to continue working on food waste solutions as a Lead For America Hometown Fellow with the Maine Department of Environmental Protection after spending the summer in the truman Foundation's Summer Institute working with the Council of State Governments. She plans to return to school to earn a Master's degree in environmental policy and a law degree when the time is right.