

Sharing Isn't Easy:

Food Waste and Food Redistribution in Maine K–12 Schools

by Brienne Berry and Ann Acheson

Abstract

Approximately 30 percent of food in the United States is wasted. When food is landfilled instead of eaten, the economic and natural resources used to produce and transport that food are also wasted. At the same time, however, food insecurity remains a pressing issue both in the United States and within the state of Maine. This paper explores efforts to reduce food waste and address food insecurity in Maine's K–12 school system, with an emphasis on food redistribution. Research indicates that schools produce substantial amounts of food waste, but little is known about strategies that schools employ to address food waste, either through formal policy or grassroots efforts. Based on an analysis of school board waste policies and interviews with school officials in Maine, this study suggests that the adoption of specific types of practices to reduce food waste is influenced by multiple factors.

Approximately one-third of the food produced for human consumption in the United States is wasted at either the retail or consumer level (Buzby, Wells, and Hyman 2014), and this waste comes at enormous financial and environmental cost. Buzby, Wells, and Hyman (2014) estimate the retail value of this wasted food as more than \$161 billion and the caloric value as 141 trillion, more than 1,200 calories per person per day. Additionally, the production and transportation of this wasted food accounts for approximately 25 percent of US freshwater use and substantial amounts of fossil fuels (Hall et al. 2009). Waste management adds additional financial and environmental costs, with food waste costing \$1.3 billion to landfill in 2010 (Buzby, Wells, and Hyman 2014).

Yet at the same time that the United States is landfilling great quantities of food, millions of Americans are living with food insecurity, defined as the lack of access to enough food for an active, healthy life. In 2015, 12.7 percent of US households (42.2 million people) were food insecure (Coleman-Jensen et al. 2016). Patterns of food waste and food insecurity in Maine generally follow those of the country as a whole: food waste makes up close to one-third of Maine's residential waste stream (Criner and Blackmer 2011) and

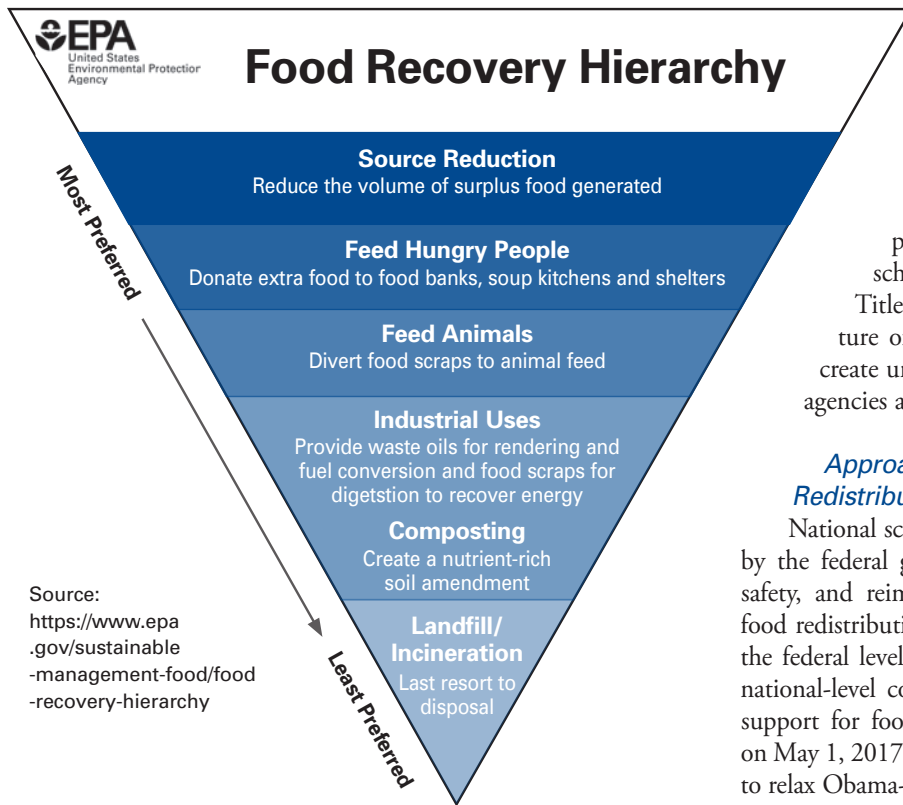
15.8 percent of Maine households are food insecure (more than 200,000 individuals) (Coleman-Jensen et al. 2016). And although food insecurity in the United States is decreasing in the wake of the 2008 recession, in Maine the rate of food insecurity continues to rise (Coleman-Jensen et al. 2016). Food waste and food insecurity are deeply connected, and their effects are felt in the state of Maine.

The Food Recovery Hierarchy, created by the US Environmental Protection Agency (EPA), prioritizes ways to reduce food waste

based on environmental, economic, and social benefits (Figure 1). The diagram lists from top to bottom the best solutions to reducing food waste: source reduction, feed hungry people, feed animals, industrial uses, composting, landfill/incineration. The second solution, feed hungry people, sits at the intersection of food waste and food insecurity. By redistributing food, we can feed people not landfills, support local communities, and save money (<https://www.epa.gov/sustainable-management-food/reduce-wasted-food-feeding-hungry-people>). Yet although food redistribution—feeding hungry people—is prioritized above nearly all other strategies on the hierarchy, it does not seem to be a common practice. Composting, on the other hand, may sit near “the bottom of the food recovery hierarchy, but it is often promoted as the first solution by companies and municipalities” (Mourad 2016: 467). Indeed, according to Mourad (2016), the strategies on the hierarchy compete with one another rather than work in tandem.

SCHOOL FOOD: A TANGLED WEB OF POLICY

Schools present a compelling setting to explore food waste and food insecurity. They produce large

FIGURE 1: **EPA Food Recovery Hierarchy**

amounts of food waste in concentrated spaces and have existing policies to support the health and wellness of students. In particular, schools have robust hunger-prevention programs through the National School Lunch Act. Established in 1946, the National School Lunch Program has served over 224 billion lunches (USDA 2013). Indeed, hunger prevention is “the most widely agreed upon goal of school food programs, and school meals make a crucial difference in the lives of literally millions of American children every school day” (Poppendieck 2010: 161). The National School Lunch Program is administered through the US Department of Agriculture (USDA), which determines meal patterns, school reimbursement rates, and safety standards (USDA 2013). Importantly, states may establish safety standards that are more restrictive than the federal requirements (Richard B. Russell National School Lunch Act 1946).

State-level oversight of school food programs can be complex. In Maine, school food is overseen at the

state level by both the Department of Education (DOE) and the Department of Health and Human Services (DHHS), which issues the Maine Food Code that outlines safety standards with which schools must comply (MDHHS 2013). Local school boards may also affect food programs as they set the policies for school administrative units in Maine (MRS Title 20-A, Chapter 101). This nested structure of local, state, and federal oversight can create uncertainty when the policies of different agencies and organizations do not align.

Approaches to Food Waste and Food Redistribution in School Lunch Programs

National school meal programs are highly regulated by the federal government in terms of meal offerings, safety, and reimbursement. Although food waste and food redistribution have not been explicitly regulated at the federal level, federal guidance suggests that there is national-level concern with food waste in schools and support for food redistribution practices. For example, on May 1, 2017, the USDA began the regulatory process to relax Obama-era school meal standards. Although the proclamation by USDA Commissioner Sonny Perdue did not mention school food waste, the press release announcing the regulatory shift did. The press release quotes Commissioner Perdue: “If kids aren’t eating the food, and it’s ending up in the trash, they aren’t getting any nutrition—thus undermining the intent of the program.” The press release also quotes Patricia Montague, CEO of the School Nutrition Association: “We don’t want kids wasting their meals by throwing them away. Some of our schools are actually using that food waste as compost. That shouldn’t be happening.”¹

The USDA has endorsed share tables as a way to redistribute food and reduce waste “if it is in compliance with local and State health and food safety codes” (Kline 2016). The USDA, however, does recognize the possibility of conflicts between federal and state policy:

Local and State health and food safety codes may be more restrictive than the [Food and Nutrition Service] requirements, or may place specific limitations on which food or beverage items may be reused. To ensure compliance with food safety requirements, [Child Nutrition Program]

operators should discuss plans for a share table with their local health department and State agency prior to implementation (Kline 2016).

States around the country are trying a variety of approaches to reducing waste and redistributing food from school meal programs. In some instances, there are

state-level guidelines or policies; in other instances, there are school district policies or guidelines; and in still other instances, there are less formalized school-level practices. Table 1 provides a summary of major strategies that schools are using to reduce waste in their lunch programs, along with the benefits and drawbacks of the

TABLE 1: Food Waste-Reduction Practices in US Schools

Practice	Explanation	Benefits	Drawbacks
Source Reduction	Ordering and preparing less food. Reconfiguring menus to serve popular meals more frequently and reduce serving of meals that frequently go uneaten.	Cost savings associated with ordering, preparing, and disposing of less food. Environmental benefits from reduced need to produce and transport food for service.	Student tastes may not match nutrition guidelines. Difficulties associated with accurately counting and preparing for student participation. Reduced student choice may result in more wasted food.
Recess Before Lunch	Scheduling recess before lunch has been shown to result in less wasted food.	Relatively simple solution, with no direct costs. Potential cost savings associated with disposing of less food. Students consume more nutrients from school lunch.	Scheduling recess before lunch can be challenging in larger schools with multiple lunch times. Not relevant for older students who do not have recess.
Offer vs. Serve	Required for high schools, offer vs. serve can be implemented in all other grades. Allows students to be offered all lunch components, but requires them to select their own combination of items that make up a reimbursable meal, with some restrictions.	Relatively simple solution, with no direct costs. Students have more choice and flexibility in their lunch options. Potential cost savings associated with disposing of less food.	This policy is already widely implemented in schools in the United States, with little further potential to reduce food waste. Meal pattern guidelines still require that students select specific combinations of lunch items.
Share Table	A station in the cafeteria where students may place whole, unopened, and untouched food from the school lunch program for others to take at no cost. This strategy is recommended by the USDA.	Potential cost savings associated with disposing of less food. Students consume more of the nutrients from school lunch. Social benefits when students who do not have enough to eat can supplement from the share table.	Concerns about the safety of food after it has left the service line. Staffing needs may be too demanding for some schools, as tables must be supervised by an adult. Food not taken from tables cannot be re-served in Maine schools, which can result in waste.
Food Donation	Whole, unopened, and untouched food can be collected in the cafeteria and delivered to a local food bank or food pantry. This strategy is recommended by the USDA.	Potential cost savings associated with disposing of less food. Social benefits when food is redistributed to community members in need.	Logistical challenges associated with collaborating with a local food bank. Concerns about safety of food after it has left the service line. Food must be stored on site unless it can be delivered or picked up on a daily basis.
Feeding Animals	Food that does not contain, or has not come into contact with meat, can be given to farmers to use as animal feed.	Potential cost savings associated with disposing of less food. Nutrients in food go to animals.	Logistical challenges associated with finding and working with local farmers and ensuring that food does not come into contact with meat products.
Compost	Schools may compost on site or partner with food-scrap collection companies or farmers.	Potential cost savings associated with disposing of less food. Finished compost can be used in school gardens. Compost can tie into science curriculum. Relatively simple to roll out in cafeteria.	Calories and nutrients in food are not consumed by people. Can result in the waste of food that is still edible. Fees associated with food-scrap collection from outside companies.

strategies. (For more detailed analysis and summaries of food waste-reduction strategies, including in schools, see Leib et al. [2016]; ReFed [2016]).²

MAINE SCHOOL FOOD WASTE-REDUCTION STRATEGIES

The senior author (Berry) recently conducted exploratory research on food waste-reduction strategies in Maine's K–12 schools, paying particular attention to institutional barriers associated with food redistribution. The research focused on the following questions:

1. How are formal policies supporting food redistribution in Maine schools?
2. In the absence of formal policy, how are schools reducing food waste?
3. How might boundary organizations contribute to more effective policies and practices?

Methods

The first step in the research involved examining available policies on reducing food waste in Maine schools. As there is little existing research on food waste-reduction practices in Maine schools, the methods used in this study were inductive and exploratory. In Maine, school administrative units (SAUs) oversee the administration of individual schools, and SAU policies are developed by local school boards.³ Although federal and state laws and regulations require that school boards address certain topics in their policies (<http://www.msmaweb.com/services/required-policies/>), these regulations do not require school boards to develop waste policies. Still, school board policies are a useful starting point because they are comparable and consistent across the state and offer insight into how waste policies are developed in the absence of a formal requirement to do so.

The findings are based on policy documents downloaded from 116 SAUs that make their policies available online. The analysis focuses on two specific sections within the policies: Section E: Support Services and Section J: Student Wellness. The Support Services section encompasses policies related to the school building, cafeteria, and other topics not directly related to students. The Student Wellness section contains policies focused on student health and wellbeing, including lunch-scheduling practices. In each policy document,

Berry searched these two sections for references to waste, including waste reduction, recycling, food waste, food sharing, food donation, and composting. Berry also searched for practices associated with food waste reduction in the literature: scheduling recess after lunch and enabling students to select their own lunch components from a set of choices (offer vs. serve) (Buzby and Guthrie 2002). Berry coded policies that contained sections on ways to reduce food waste based on policy type (offer vs. serve, recess scheduling, waste reduction) and by waste language (waste mentioned or waste not mentioned) using software designed for qualitative analysis.

The next stage of research involved exploring any factors that might be associated with the emergence of policies devoted to reducing food waste. To this end, Berry analyzed the percentage of students eligible for free and reduced-price lunch, the grades issued to schools by the Maine DOE, and per pupil operating costs for each SAU.⁴ These factors can serve as rough indicators of the poverty levels of the student population, the overall quality of education, and the resources available to the SAU, respectively. Each factor is an average of the entire SAU. School grades, the only non-numerical component, were calculated by assigning a number to the grades determined by the Maine DOE (A=5, B=4, C=3, D=2, F=1).

The final stage of research was intended to determine whether practices to reduce food waste exist in the absence of policy, and if so, how these practices emerge. This research stage was informed by preliminary informational interviews with stakeholders engaged in reducing food waste in schools. These preliminary interviews provided much-needed insight into the food waste landscape in Maine schools and guided the development of interview questions and the selection of interview participants. Berry conducted semistructured interviews with six school officials to provide a deeper understanding of school practices than the formal policy analysis could provide.

Because the participants were referred to Berry by nonprofit partners active in food waste reduction in Maine's schools, the participants all had active food waste-reduction efforts in their schools and SAUs, which is not likely to be the case in the state as a whole. The participants were teachers, facilities managers, or food services professionals and represented four counties: Cumberland, York, Androscoggin, and Penobscot. All interviews were conducted over the phone, lasted between 30 and 50 minutes, and consisted of open-ended

questions covering topics such as current food waste-reduction procedures, how practices and procedures emerged, perceptions of food redistribution as a waste-reduction strategy, perceptions of composting as a waste-reduction strategy, and perceptions of food insecurity as an issue within the school and surrounding community.

Formal Waste-Reduction Policy

Of the 116 school board policies publicly available online, eight (6.8 percent) contained dedicated waste-reduction policies, eighteen (15.5 percent) contained passing references to food waste, and eleven (9.4 percent) promoted strategies that have been shown to reduce food waste, but did not mention food waste reduction. None of the policies examined promoted food redistribution, and four school board policies prohibited food sharing.

Dedicated waste-reduction policies

Eight SAUs had dedicated waste-reduction policies. These were stand-alone components within Section E: Support Services and were framed in terms of either environmental sustainability or waste management and recycling. While all of the dedicated waste-reduction policies addressed recycling, only two mentioned food waste. In both, composting was mentioned as a strategy to reduce food waste, but food redistribution and food sharing were not included as waste-reduction strategies. One school policy explicitly links composting with recycling with a goal to “minimize the amount of waste sent to landfills and maximize the amount of waste, including food waste, that gets recycled while striving for zero waste.” It is possible that the six SAUs that did not address food waste in their dedicated waste-reduction policies intended for food waste to be included as part of an overall recycling strategy; however, we only consider the policies that directly mentioned food as having a food waste-reduction policy.

Policies that reference food waste

Eighteen SAUs had policies that referenced food waste, but were not about food waste. These policies took two distinct forms: offer vs. serve and scheduling recess before lunch. As discussed previously, allowing students to select their own lunch components is associated with reduced food waste. Offer vs. serve is a policy established in the 1970s that permits students to choose three of five offered menu items rather than requiring that they receive all five items. This policy is required for

high schools and is optional, but widely used, in elementary schools (Poppendieck 2010). Offer-vs.-serve policies were located in Section E: Support Services. Schools that mentioned food waste within an offer-vs.-serve policy did so in nearly identical ways:

The “Offer vs. Serve Option” is designed to be more economical for the school unit and result in less waste. All lunches offered must contain five food items, but students have the freedom of choice in selecting the three, four or five items they intend to consume. They may refuse up to two items.

This passing reference to waste reduction was the only place where waste was mentioned in these SAUs’ policy documents.

Less common than offer vs. serve was the policy of scheduling recess before lunch. This practice is also associated with reduced plate waste (Buzby and Guthrie 2002), both because students who play before lunch have bigger appetites and because they do not feel compelled to rush through lunch in an attempt to get more time at recess. Policies that recommended or mandated scheduling recess before lunch were located in Section J: Student Wellness. As with offer vs. serve, these policies used similar language across different SAUs:

Since research indicates that physical activity prior to lunch can increase the nutrient intake and reduce food waste, whenever possible, consider planning physical activities such as recess, before lunch.

What separates the offer-vs.-serve and recess scheduling policies from the dedicated waste-reduction policies is their focus and intent. Dedicated waste-reduction policies highlight waste as an issue. SAUs that reference food waste within another policy do not have the same emphasis on waste as an issue meriting attention and instead frame waste reduction as an ancillary benefit.

Policies that reduce food waste without waste-reduction language

A final set of policies promote food waste reduction, but do not explicitly mention food waste. There were 11 SAU policy documents that fit into this category. These policies mentioned either offer vs. serve or scheduling recess before lunch, but did not discuss them in terms of food waste reduction. For example, one offer-vs.-serve policy simply read, “The School Committee authorizes

‘Offer vs. Serve’ for grades 1-12.” A recess scheduling policy stated, “To the extent possible: Schedule lunch periods to follow recess periods.” These policies have the effect of reducing food waste, but did not explicitly state reducing food waste as a desired or expected outcome.

Factors in the emergence of formal policy

The analysis yielded a limited number of SAUs with any kind of food waste-reduction policy. Berry sought to determine whether these SAUs had common characteristics that might affect the emergence of food waste-reduction policy. SAUs with waste policies were compared to the rest of Maine’s public school system although 73 SAUs were missing one or more of the above criteria, resulting in a total of 169 records for comparison (Table 2).

SAUs with formal waste-reduction policies had a lower percentage of students who were eligible for free or reduced-price lunch and higher SAU grades and per pupil spending. Because of the small sample size, however, it is not possible to determine whether these results are significant in comparison to the larger group. With such limited results from the formal policy analysis, questions remain about how food waste-reduction policies emerge within schools and whether formal policy captures all efforts to reduce waste in Maine K–12 schools.

Beyond Policy: Action and Uncertainty

Do school board policies reflect the actions SAUs are taking to reduce waste? If not, how are SAUs approaching food waste reduction, and what barriers do they face? The next stage in the project involved

interviewing school officials from SAUs with and without formal policy. These results do not represent the state of Maine, but rather may be used to better understand how practices have emerged and what barriers to action exist within SAUs.

Participants held different roles within their SAU; some worked at an individual school, while others worked at the administrative level. The six interview participants represented six SAUs. One SAU had a formal waste-reduction policy that mentioned food waste; one SAU had an offer-vs.-serve policy that mentioned food waste; two SAUs did not have any food waste-reduction policies; and two SAUs did not have policy documents publicly available online. All the SAUs had active composting and recycling programs in at least one school within the administrative unit, while food redistribution practices varied. Participants cited food redistribution practices including share tables (1), food donation to local pantries (1), and re-service of surplus food to students (1). Two participants were actively working to establish share tables, while one participant did not have any food redistribution programs. The following sections explore the development of food-waste reduction policies based on themes that emerged from these interviews.

Partnerships

The participants identified partnerships as critical components of food waste-reduction programs, particularly in reference to compost programs. Participants frequently referenced the support of waste-management companies, food scrap-collection companies, environmental nonprofits, and Maine’s Department of Environmental Protection (DEP) when discussing their school composting programs. This support took the form of site visits, logistical planning, and troubleshooting and was tailored to the specific needs of SAUs. Waste-management companies provided grants and educational activities, while food scrap-collection companies supplied templates for the schoolwide rollout of composting programs. Site visits from the DEP allowed schools to discuss site-specific details and access information from a trusted

TABLE 2: **Maine School Food Waste-Reduction Policies and Practices**

Policy Type	Number SAUs Analyzed	Mean Free and Reduced Price Lunch Eligibility (%)	Mean SAU Grade	Mean Per Pupil Spending (\$)
Waste-reduction policy	8	43.0	3.36	12,362
Waste reduction mentioned in policy	18	55.5	2.93	10,649
Waste-reduction practices, no mention of waste	11	60.9	2.80	10,758
State Total	169	52.5	2.92	11,349

source. A robust network of partners was critical to the adoption of composting programs in schools.

Participants also mentioned partnerships in association with the establishment of food-redistribution programs, but the relationships described were quite different from those described in the preceding paragraph. The off-the-shelf solutions that exist for composting were not mentioned for food redistribution. One participant mentioned attending a workshop on share tables, noting, “they were a good support system and I was able to sort of bounce some questions and ideas off them.” Two participants mentioned the presence of hunger-prevention nonprofit organizations within their schools. While these organizations focus on food insecurity, they function independently of waste-reduction efforts with food sourced from outside the schools. Although a robust network of partners seems to have made a difference in the adoption of composting as a food waste-reduction strategy, fewer partners seemed to be available to support food redistribution efforts.

Policy uncertainty

Uncertainty is an important factor in the emergence of particular forms of waste-reduction practices in schools. Composting is an example of certainty. With strong networks of support from both the public and private sectors, schools seem to be well aware that composting is an acceptable practice for food waste reduction. A greater level of uncertainty surrounds food redistribution, however. One participant commented on this uncertainty explicitly:

I’ve been to a couple of places...even at a PTA meeting where I heard someone from the EPA say that there wasn’t a policy, but yet I’ve come across Good Samaritan Law, where it says you can donate as long as you’re not reselling it or distributing it outside of the school, so I feel like that’s sort of still a vague area, or gray at least.

Uncertainty was pervasive in discussions of food redistribution. Another participant questioned the types of items that might be acceptable to redistribute in schools:

We have some questions about fruit. Can we put apples out? Bananas seem to be okay because you have a peel, but apples I’m not so sure about. So there are a lot of little issues that we need to overcome before we go full-bore with the sharing tables.

Unlike composting, where site visits and extensive support was available, participants had detailed questions about food redistribution and some struggled to find answers.

Uncertainty was particularly problematic for some participants because of the perceived risks associated with food redistribution. Concerns about liability and student illness made it difficult for participants to adopt redistribution practices as quickly as they did with composting. One participant commented, “we had to do a bit of research just to make sure there was no insurance issue if anybody ate some rotten broccoli and got sick.” Another participant, whose SAU does not have food redistribution practices in place, noted, “we would certainly be willing to donate any of the surplus that we had, but again it would have to be done in a manner that the food safety is ensured.”

Concerns about liability and student illness made it difficult for participants to adopt redistribution practices as quickly as they did with composting.

In the absence of certain policy regarding food redistribution, concerns about food safety and liability fall onto school officials. This uncertainty can prevent action, but it also provided the flexibility some participants needed to move forward. For these participants, the absence of policy concerning food redistribution allowed for action that made sense to them. A lack of policy led one participant to take the lead on a food redistribution program:

The principal is very supportive of anything I’ve come up with. So I didn’t necessarily go through him to do the share table. I just kind of threw up some flyers and reached out to some teachers that I thought would be interested.

Action in the face of uncertainty was not common among participants. Many participants performed extensive research before implementing food redistribution programs, with some involving students, cafeteria employees, and teachers in the process.

Seamless school integration

Food waste-reduction practices may be selected based on how easily they can be integrated into existing school practices. For a school to start collecting food scraps for composting, the first step is to set out a dedicated bin in the cafeteria waste-sorting station. The simple integration was noted by one participant who commented, “It’s relatively simple. It’s just a matter of setting up labeled barrels in specific locations so kids know what goes where.” Another participant mentioned, “you just show them what to do, and they do it for a week, maybe two, and they’ve got it. And that’s sorting and everything.” While participants mentioned initial challenges with getting compost piles in order, others worked with local farmers or for-profit companies to outsource that aspect of the process.

In many ways, food redistribution is fundamentally different from composting. Rather than simply putting food into a separate bin, food-redistribution programs keep food outside of the waste stream altogether. Whereas food waste intended for compost can be left unattended in a bucket, food that is redistributed must be monitored for safety. While schools are familiar with the process of hiring companies to manage their waste, the process of redistributing food either outside or within the school is often unfamiliar. With fewer partners to smooth the process and greater policy uncertainty, there are hurdles to overcome in establishing food-redistribution programs in schools.

A green identity

A final consideration in selecting a food waste-reduction strategy is the extent to which it is perceived as *green* or sustainable. In many of the interviews, participants discussed composting and food redistribution in different ways. Compost fits neatly into other school green efforts like gardens. One participant noted that their food waste-reduction efforts “started with composting and gardening and where your food comes from...just eating healthier, really.” Participants frequently mentioned the connection between school gardens and compost and perceived gardens to be a waste-reduction strategy, where students eat things that they never would eat previously because they have grown it. Compost is also part of a cycle that can be an educational tool as well as a source of school pride.

While participants were proud of their food-redistribution systems and saw these practices as important for both students and the community, food

redistribution was discussed differently. Whereas gardens and compost were components of a sustainable school, food insecurity and food redistribution were things to be kept quiet. One participant commented on the secrecy and need for confidentiality associated with food redistribution:

Food donations are kind of funny because you have to keep them on the low-down. I know that a number of kids in the school itself benefit, their families benefit from the food pantry. We don’t know which ones, but I know that a fair number do.

Further, some participants thought that a lack of exposure to food insecurity reduced support for food-redistribution programs. One participant commented, “if you don’t live that every day, or if you’re not around that every day, you have no reason to worry about it, right?” The need for discretion and confidentiality may affect the adoption of food redistribution as a strategy in schools, especially when programs such as composting can be celebrated and widely shared with the community as part of a sustainability program.

Discussion

This research suggests that formal food waste-reduction policy in Maine schools does not tell the whole story. In the absence of formal policy, some SAUs are taking action to reduce food waste. These actions do not seem to be determined by school resources or community poverty levels, but the lack of comprehensive data on school waste-reduction efforts makes it impossible to state decisively what factors affect waste-reduction practices. Instead, interview data suggest that these practices may be determined by a host of other factors including the presence of robust support networks, policy uncertainty, ease of integration into school practices, and associations with sustainability.

What does this research say about how we might move food waste reduction “up the hierarchy” in Maine schools—from waste reduction to food redistribution? Although education and awareness are often promoted as first steps to changing behavior, even in SAUs without food-redistribution programs, these study participants were aware of the issue of food insecurity. Every interviewee identified food insecurity as a problem both in their SAU and the state as a whole. One commented that for many students, “their opportunity for food is at school and when they go home there’s not much there.” Participants showed a clear desire to connect students to

surplus food. Given the paucity of data available on school officials' awareness of food insecurity and food waste as issues, we hesitate to suggest that all officials are well versed on these statistics. Yet from this research, there is evidence that knowledge of food insecurity was insufficient to promote food redistribution as a waste-reduction strategy. Perhaps, as Pidgeon and Fischhoff suggest, "Well-informed individuals can rationally do nothing if they see no viable actions" (2011:38).

Faced with policy uncertainty and a lack of robust networks, perhaps school officials perceive a lack of viable options for food redistribution. So rather than relying on knowledge and awareness, perhaps policy is the answer. Interview participants, however, had decidedly mixed responses to the idea of policy to support food redistribution. One participant feared the loss of autonomy and commitment through top-down solutions:

I'm not a big fan of policy and rule making if it makes sense to do it. And I know that, I know that's kind of how the world is changing. I would much rather go to a school and say "who's got interest here? This is what we want to do, these are the reasons we want to do it and we know it can work and it's really not that much extra" and get it going that way. You're going to have so much more buy-in....If you load up the schools with another policy and another procedure and another something that has to be done, I can eventually see some teacher saying, or staff member saying "well I'm doing this and this isn't my everyday whatever and I want to be paid for this because we have to do it, and somebody has to do it so I'll take it on" and then getting compensated for it, and I don't think, personally, that's the way it should go.

Other interviewees thought that policy could nudge recalcitrant schools in the right direction or legitimize existing practices. These responses seem to indicate a degree of skepticism about the role of policy in Maine's schools.

FUTURE DIRECTIONS

School food waste is a complicated terrain, fraught with concerns over safety, liability, and competing definitions of sustainability. The nested structure of food oversight in schools has amplified uncertainty,

MAINE CDC HEALTH INSPECTION PROGRAM

Food Sharing Tables—Guidance for Schools

Share tables help reduce food waste and encourage consumption of foods served at schools. These guidelines are intended to assist school staff who implement share tables. The Department is exercising its authority per 8-103.10 10-144 CMR Ch. 200 to grant a variance to the Maine Food Code to allow for the following procedure for share tables. Health Inspectors will review compliance with this variance during their inspections.

Prior to sitting down, students or staff may place unwanted served food on the share table, so that another student may select the food item.

- A school staff person must be designated to monitor the share table.
- *Only food served by the school nutrition program may be placed on the share table.
- **Only intact packaged items (i.e., pre-packaged crackers, fruit snacks, juices, etc.) or fruits with thick skins that can be peeled, such as oranges, bananas or tangerines, are suggested for placement on the share table.
- Fruits having thin skins in which the skins are normally consumed, such as apples, pears, grapes and plums are not allowed.
- ***Temperature-controlled intact packaged foods (i.e., milk, yogurt) must be held at proper temperature. Students may place milk, etc. in a small refrigerator, cooler or ice bath (provided by the school nutrition program) to prevent temperature abuse.
- ****Food may not be returned to the kitchen for re-service and shall be disposed at the end of the 4-hour period or the end of the meal service.
- Share tables should be used in combination with Offer Versus Serve and careful portion control to combat excess waste on trays.

For more information about Offer Versus Serve visit www.fns.usda.gov/school

For more information see 2013 Maine Food Code: *3-201.11A, **3-306.11, ***3-501.16, ****3-501.19

Source: <http://maine.gov/doe/nutrition/resources/documents/ShareTableGuidanceHandout.pdf>

particularly when it comes to food redistribution. Some of the uncertainty about safety and liability over food redistribution has begun to be addressed through recently issued guidelines on share tables issued by the Maine CDC Health Inspection Program (see sidebar). Although these guidelines are a start, they only cover some foods that could potentially be included for redistribution, e.g., they exclude fruits where the skins are consumed such as apples and pears, and the only redistribution mechanism addressed in the guidelines is share tables. As yet unanswered is how these guidelines will be disseminated so that schools may be supported and encouraged to establish share tables or other means of food redistribution.

On Maine's legislative front, a broad-based bill was introduced in the 128th Maine Legislature in 2017, sponsored by Rep. Craig Hickman (D, Winthrop), An Act To Address Hunger, Support Maine Farms and Reduce Waste (LD 1534). The bill explicitly references both food waste and food insecurity in Maine and provides strong support for food redistribution. Its provisions include creating guidance for homeowners, businesses, municipalities, and large institutions such as K–12 schools to set up food recovery and composting programs and strengthening liability protections for donors of food. The bill received strong support in testimony at the public hearing held by the Maine House Committee on Environment and Natural Resources from the Natural Resources Council of Maine, Maine Organic Farmers and Gardeners Association, the Conservation Law Foundation, and the Environmental Priorities Coalition (EPC), a group of 34 conservation, environmental, and public health organizations that unify around a common agenda every year. Following a committee work session, LD 1534 was tabled and carried over for the next legislative session.

On the national level, Maine Congresswoman Chellie Pingree has been in the forefront of legislative efforts to reduce food waste and address food insecurity. In the 114th Congress (2015–2016) she introduced two bills on this issue: the Food Recovery Act (HR 4184)—comprehensive legislation to address food waste through federal investments and tax credits, research, and a public awareness campaign—and the Food Date Labeling Act of 2016 (HR 5298), which would establish a uniform national date labeling system as a way to reduce confusion and the waste of food and money and simplify regulatory compliance. Both bills were referred to committee, and Pingree intends to reintroduce them

in the 115th Congress (2016–2017). Pingree is also an original cosponsor of a bipartisan bill, the Food Donation Act of 2017, introduced by Congresswoman Marcia Fudge (D, Ohio), to modernize food donation protections.

These state and national legislative and policy efforts make it clear that food waste and food insecurity are being recognized as important and interrelated issues that need to be addressed. At the same time, our preliminary research on food waste and food redistribution in Maine's schools reveals some hesitancy toward formal policy. This hesitancy suggests that boundary organizations—organizations formed to create links between knowledge producers and users—might help negotiate the need for structure and certainty with the desire for flexibility and independence. Social scientists define boundaries as the “socially constructed and negotiated borders between science and policy, between disciplines, across nations, and across multiple levels” (Cash et al. 2002:1). In the context of school food waste, there are boundaries between schools, SAUs, food insecurity organizations, and policymakers, and the lack of shared understanding across these boundaries can prevent collaboration and effective problem solving. Boundary organizations mediate, translate, and coordinate action across boundaries (Cash et al. 2002), making it possible for institutions to collaborate. Boundary organizations could provide critical support for food redistribution and policy clarity and support for school officials. The school officials interviewed for this study were passionate about both reducing food waste and serving their students, but as educators and administrators, their primary focus was on students not policy. Some spent years establishing food waste-reduction programs in their schools, constantly proving the value of these programs to decision makers. For many interviewees, the support of outside organizations provided the final push needed to legitimize their efforts. Boundary organizations promoting food redistribution would be an effective tool for moving waste reduction in schools up the hierarchy while addressing food insecurity. 🐙

ACKNOWLEDGMENTS

Brianne would like to acknowledge the support of the Margaret Chase Smith Policy Center and the Senator George J. Mitchell Center for Sustainability Solutions. Thank you, as well, to the school staff members who generously gave their time to participate in this research.

ENDNOTES

- 1 The proclamation is available at <https://www.usda.gov/sites/default/files/documents/secretary-perdue-child-nutrition-proclamation.pdf> and the press release at <https://www.usda.gov/media/press-releases/2017/05/01/ag-secretary-perdue-moves-make-school-meals-great-again>.
- 2 The Center for Health Law and Policy Innovation of Harvard Law School has a subdivision focused on food law and policy (<http://www.chlpi.org/food-law-and-policy/>), which has excellent resources on legal and policy aspects of food waste.
- 3 In Maine, 242 SAUs in Maine govern 620 public schools (<https://maine.gov/doe/schools/summary.html>).
- 4 School grades are available at <https://maine.gov/doe/schoolreportcards/index.html> and per pupil operating costs at <https://www1.maine.gov/education/data/ppcosts/index.html>.
- 5 More information about Congresswoman Pingree's efforts are available at <https://pingree.house.gov/media-center/press-releases/introducing-commonsense-bill-standardize-food-date-labeling> and <https://pingree.house.gov/media-center/press-releases/pingree-kicks-her-efforts-reduce-food-waste-115th-congress>.

REFERENCES

- Buzby, Jean C., and Joanne F. Guthrie. 2002. Plate Waste in School Nutrition Programs: Final Report to Congress. US Department of Agriculture, Economic Research Service, Washington, DC. <http://www.d11.org/FNS/Recess%20Before%20Lunch/efan02009%20Plate%20Waste%20Study.pdf>
- Buzby, Jean. C., Hodan F. Wells, and Jeffrey Hyman. 2014. The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States. Economic Information Bulletin No. EIB-121. US Department of Agriculture, Economic Research Service, Washington, DC. https://www.ers.usda.gov/webdocs/publications/43833/43680_eib121.pdf?v=41817
- Cash, David, William Clark, Frank Alcock, Nancy Dickson, Noelle Eckley, and Jill Jäger. 2002. Salience, Credibility, Legitimacy and Boundaries: Linking Research, Assessment and Decision Making Faculty Research Working Papers Series, John F. Kennedy School of Government, Harvard University, Cambridge, MA.
- Coleman-Jensen, Alisha, Matthew P. Rabbitt, Christian A. Gregory, and Anita Singh. 2016. Household Food Security in the United States in 2015. Economic Research Report No. 215. US Department of Agriculture, Economic Research Service, Washington, DC.
- Criner, George K., and Travis L. Blackmer. 2011. 2011 Maine Residential Waste Characterization Study. School of Economics Staff Paper No. 601. University of Maine, Orono.
- MDHHS (Maine Department of Health and Human Services). 2013. State of Maine Food Code. DHHS-Health Inspection Program, and Department of Agriculture, Conservation and Forestry. <https://www1.maine.gov/dhhs/mecdc/environmental-health/el/site-files/rules/Food%20Code%20October%202013.pdf>
- Hall, Kevin. D., Juen Guo, Michael Dore, and Carson Chow. 2009. "The Progressive Increase of Food Waste in America and Its Environmental Impact." *PLoS ONE* 4(11): e7940. <https://doi.org/10.1371/journal.pone.0007940>
- Kline, Angela 2016. The Use of Share Tables in Child Nutrition Programs. Memorandum to Regional and State Directors SP 41-2016, CACFP 13-2016, SFSP 15-2016. USDA, Food and Nutrition Service, Alexandria, VA. https://www.fns.usda.gov/sites/default/files/cn/SP41_CACFP13_SFSP15_2016os.pdf
- Leib, Emily Broad, Christina Rice, Ona Balkus, Jill Mahoney, Alene Anello, Jabari Brown, Robin Cheng, Erika Dunyak, Daniel Edelstein, Claudia Golden, Candace Hensley, Meaghan Jerrett, Molly Malavey, Sydney Montgomery, Katherine Sandson, Marina Shkuratov, Steven Xie, and Conrad Zhong. 2016. Keeping Food Out of the Landfill: Policy Ideas for States and Localities. Harvard Law School Food Policy Clinic, Cambridge, MA. http://www.chlpi.org/wp-content/uploads/2013/12/Food-Waste-Toolkit_Oct-2016_smaller.pdf
- 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* 126:461–477.
- Pidgeon, Nick, and Baruch Fischhoff. 2011. "The Role of Social and Decision Sciences in Communicating Uncertain Climate Risks." *Nature Climate Change* 1(1): 35–41.
- Poppendieck, Janet. 2010. *Free for All: Fixing School Food in America*. University of California Press, Berkeley.
- ReFed. 2016. A Roadmap to Reduce U.S. Food Waste by 20 Percent. ReFed (Rethink Food Waste Through Economics and Data). https://www.refed.com/downloads/ReFED_Report_2016.pdf
- USDA (US Department of Agriculture). 2013. National School Lunch Program. USDA, Alexandria, VA. <https://www.fns.usda.gov/sites/default/files/NSLPFactSheet.pdf>
- US EPA (US Environmental Protection Agency). 2017. Sustainable Management of Food Basics. <https://www.epa.gov/sustainable-management-food/sustainable-management-food-basics> [Accessed June 1, 2017]



Brienne Berry is a PhD student in the Anthropology and Environmental Policy Program at the University of Maine. She is a research assistant at the Margaret Chase Smith Policy Center and the Senator George J. Mitchell Center for Sustainability Solutions, where her work focuses

on consumption and waste.



Ann Acheson a research associate at the Margaret Chase Smith Policy Center at the University of Maine and past editor of *Maine Policy Review*. She has published extensively on poverty in Maine.