



Building Momentum in the Fight Against Food Waste: Five Promising Areas For Change

The New Venture Fund with support from the Rockefeller Foundation's YieldWise initiative, retained Arabella Advisors to identify transformational opportunities and implementation requirements to accelerate food waste reduction. This process included assessing the landscape of food waste actors, innovative new voices, and existing efforts; identifying gaps in the field; and engaging partners across the food industry to shape thinking on five crucial intervention areas in food waste reduction.

Funders, advocates, and NGO leaders are working to eliminate food waste, and to create a food system that is efficient and effective in providing food for all Americans and that preserves our land, water, and other natural resources. Early efforts, including ongoing work to clarify date labels and the groundbreaking analysis of the ReFED Roadmap, have created momentum in the field. Going forward, to achieve the EPA and USDA's goal of reducing food waste by 50 percent by 2030, we must test, refine, and implement proven, broad-scale solutions for reducing waste across the food industry. Arabella Advisors reviewed existing interventions and received input from over 100 food waste experts across a range of sectors to identify five intervention areas that, when implemented, can make meaningful progress toward the federal food waste reduction goal. While these interventions—in packaging, the culinary field, anaerobic digestion systems, kitchen design, and food retail—are not enough to eradicate food waste on their own, they are powerful springboards for significant systems change.



PACKAGING: SLOW DOWN THE CLOCK FOR FOOD

Sustainable packaging innovations have the potential to reduce food waste along the entire food supply chain, including in grocery stores and homes,

which together account for 66 percent of food waste.¹ In addition to the valuable work being done on date labeling, innovations in packaging material provide an opportunity to reduce food waste by increasing flexibility in portion size and extending the life of the product while reducing plastic in landfills.

Two such current innovations are modified atmosphere packaging (MAP) and right-sized packaging. MAP is permeable packaging filled with an environmental gas blend that is customized to meet the respiration needs of a food product. For example, Buitoni pasta packaging includes a MAP film that removes oxygen from the package and prevents air from dissolving into the pasta. While MAP technology is used for some product categories, it has yet to be scaled to all perishable products due to the cost of changing existing packaging designs, misconceptions about the safety of the gases injected into MAP packaging, and consumer perceptions that packaged food is less fresh. As a food retail executive explains, “When consumers see a cut of meat encased in packaging, they assume that product is less fresh or was not cut in the store.” Foods that experience high loss rates in stores, such as meat or bakery items, could double their shelf life with MAP technology.

Right-sized, sustainable packaging innovation can reduce food waste by delivering the exact amount of food needed in farms, warehouses, stores, and homes. On the consumer level, shoppers buy and open products they won’t finish because of the lack of variety in portion sizes. This is exacerbated by the fact that the average family size is shrinking and more Americans are cooking for one. Future innovations that allow customers to choose the amount of food they need—such as 3D printers that produce packaging in the exact size that customers demand—would empower them to waste less. In addition, says a government official, single-portion sizing “gives stores greater opportunities to donate food.”

There are barriers to these solutions, however, including the risk of generating more material waste. Even the shorter supply chains that food advocates call for will still require some packaging, so there is a need for more sustainable

solutions to reduce waste at the local level. What’s more, food systems will not go entirely local by 2030, which also makes packaging innovations necessary. These needs call for testing and scaling of near-term solutions that work within the current packaging industry while also exploring transformational long-term innovations, such as biodegradable and edible packaging, and 3D printers that produce packaging on demand.



CULINARY: EMPOWER ANTI-WASTE CHEFS

Food waste education and training for chefs can have an outsized impact on the combined 32 percent of food waste that the restaurant, food service, and

hospitality industries contribute to landfills annually while also improving restaurants’ bottom lines.² Well-known chefs and experts in the culinary industry point to chef-to-chef networks as a powerful way to spread food waste reduction tools and messages. Many chefs don’t find existing culinary-focused food waste materials compelling because they don’t come from the trusted resources or platforms they typically turn to, nor do they come in formats that match their needs. The typical chef spends the day on his or her feet and lacks the time and office environment to read lengthy written reports, participate in webinars, or watch instructional videos. Chefs need easy-to-digest content that quickly informs them of actionable solutions to reduce food waste. Chefs like Joe Bruno of Brucolino restaurant in Norwalk, CT, who has close to zero food waste in his restaurant, are potential partners in developing and amplifying materials that meet chefs where they are and provide a message that aligns with their on-the-ground realities.

Another opportunity to spread the food-waste message is to influence the next generation of chefs by implementing food waste curricula in culinary schools. One notable chef told us, “No culinary school is pitching food waste as a business success right now,” and explained that chefs need to change their mindset to see the impact of waste on their bottom line. Funders in the field could support an organization such as the Drexel Food Lab to develop a food waste curriculum and establish a faculty food waste collaborative to further develop and implement the curriculum. To make these efforts accessible to a wider audience, the initiative could repurpose its materials for culinarians in all restaurant kitchens, including large chain restaurants. In institutions where implementing a new class or curriculum

is challenging, culinary schools and cooking programs can develop food waste modules and integrate them into existing courses to promote a zero waste mentality. For instance, courses could include instruction on using all parts of a vegetable or repurposing extra food into stews and soups. Culinary education efforts should emphasize the dual effects of culinary food waste: its impact on kitchens' bottom lines and the flavor lost when delicious food, such as vegetable trimmings, is wasted. Culinary food waste advocates should capitalize on momentum being generated by influential chefs and use existing vehicles for chef professional development, such as conferences, culinary school, and media to equip chefs to be food waste champions.



ANAEROBIC DIGESTION: FEED THE ENERGY MARKETPLACE

There is a wave of private-sector interest in anaerobic digesters (ADs)—machines that convert organic material

to biogas—as this model taps into the demand for new sources of energy, making it a particularly useful tool for reducing food waste. In our conversations with food waste reduction experts, we found that establishing networks of small-scale ADs at the institutional and municipal level is a strong alternative to large regional ADs because their relatively smaller cost and size allow for more flexibility in scale and waste management. Large-scale, expensive AD systems encounter zoning problems and require waste in high volumes, which can unintentionally incentivize maintaining (or even increasing) current levels of food waste to keep up with the ADs' demand. As a federal agency official told us, "We want to eliminate food waste, not encourage it."

Localized AD networks allow each municipality to capture the economic benefit of gas generated by ADs in its community instead of sending waste to a large regional AD that would not allow the municipality to do so. In addition, pioneers in anaerobic digestion have shown success in co-locating small ADs with institutions such as offices, zoos, warehouses, restaurants, and universities. As an example, the University of Wisconsin Oshkosh worked with a foundation to establish an AD on campus that is managed through a public-private partnership. The City of Edmonton is co-locating an AD with an existing composting facility. Co-locating presents opportunities for backhauling, which is when a truck delivers food to a store and then transports the store's food waste on a

return journey to a central warehouse or processing facility. When scaling these networks, it's important that municipalities take advantage of the flexibility of small ADs to right-size AD networks and align them with how quantities of available waste might change with increased source reduction efforts.

More work is necessary to overcome barriers regarding the reliability of the technology and processing capacity, and challenges with financing the large up-front costs of ADs. Successful financing models include government grants and loans, public-private partnerships with corporations or universities, and grants from foundations. There are also negative consumer perceptions of ADs due to smell and safety concerns. Biofilters, such as those used by the University of Wisconsin Oshkosh, have proven to mitigate odor issues. Engineers, advocates, and partners in government and the private sector need to continue to seek solutions to these challenges to ensure the success of local AD systems.



IN-HOME: BUILD A ZERO WASTE KITCHEN

Among food waste experts, there is a strong desire to adapt home kitchens to equip consumers to tackle the 51

percent of food waste that homes contribute to landfills annually.³ There is an opportunity to test changes to refrigerator, cabinet, shelving, and storage container designs that help consumers see and remember to eat food before it spoils, preserve food longer via more effective temperature control, and streamline waste management (e.g., seamless integration of composting collection). In addition to kitchen design changes, complex technical advances have further potential to change the way we store, prepare, and consume food. For example, machine vision research—a computer image analysis that allows software to understand what it is seeing—alerts consumers to what food is going bad and what food was wasted.

In-home food waste reduction tools should be easy to use or automatic: "You either have to design a perfect system for the consumer, or you design a system that takes the consumer out completely," says a prominent kitchen designer. Others have pointed out that kitchen innovations should also capitalize on changing retail models. "Instant delivery will be common. You won't need six cupboards for storage," says a product design expert we interviewed.

Innovations in home kitchens can be an important on-ramp to consumer behavior change while capturing significant waste reductions. However, these changes must be coupled with larger education efforts to be effective, as fewer consumers prepare food in the home. A notable barrier in this area is the investment required to scale kitchen redesign across individual homes, especially for low-income individuals. In the near term, there is a need to test and scale incremental kitchen design changes and digital tools that residential designers and innovators can deploy now, while working to demonstrate the value to consumers of shifting home kitchen design and architectural preferences over the long run.



FOOD RETAIL: REVOLUTIONIZE THE IN-STORE EXPERIENCE

Innovations in grocery stores and the systems that support them have a high potential to impact the food waste generated by food retailers. Promising areas for intervention include procurement, transportation, store infrastructure, storage and handling practices, customer perceptions, merchandising programs, and industry standards. Many of these retail innovations hold potential for positive benefits up and down the supply chain that impact production, consumption, and access to food. For instance, expanding temperature control systems on shipping containers, trucks, and warehouses can preserve food as it travels along the supply chain. Investable in-store interventions include innovations in controlled atmosphere storage, temperature lighting technologies that extend shelf life, and in-store farming. Target is currently testing in-store farming, which involves growing produce indoors in climatized conditions. This innovation is exciting because it allows stores to have produce on-demand in the quantity they need. It also drastically shortens the supply chain and allows urban customers the chance to interact with the early stages of the food system.

There are also opportunities for stores to address consumer perception through digital food waste tools, both in-store and on the go, and merchandising programs. Digital tools include in-store interactive displays that educate

consumers about preparing and storing products, and digital apps that remind shoppers of what they already have at home and help them keep track of goods once they bring them home. A notable merchandising program is the buy-one-get-one later model that discourages consumers from buying excess food. Funders interested in in-store initiatives have an opportunity to support pilot programs that prove the economic and environmental value of these interventions.

Leaders in retail food waste reduction have pointed to the value of retailers anonymously sharing forecasting and food waste data so it can be aggregated and circulated industry wide to identify macro-trends in customer buying patterns. Beyond brick-and-mortar stores, there is an opportunity for alternative purchasing and distribution models to disrupt food retail in a way that reduces waste, such as just-in-time ordering and direct-to-consumer models that deliver the exact amount of food that consumers need. The expansion of meal kit delivery is already impacting how much food consumers are throwing away.

WHAT'S NEXT

These five intervention areas provide funders, advocates, and stakeholders with opportunities to bring about broad changes within the food industry. Funders have the opportunity to support programs that test and pilot these solutions to ready them for implementation across the industry. Advocates can use their platform to draw attention to these areas and broadcast interventions that achieve progress and demonstrate scalability. There are currently NGOs that are well-positioned to take on the work of testing, piloting, and scaling these interventions. Each of these efforts is necessary to reduce food waste by 50 percent by 2030, ultimately leading to a more efficient food system and better preserved environment.

ENDNOTES

¹ ReFED, *A Roadmap to Reduce US Food Waste by 20%*: Technical Appendix, March 2016, p. 8. https://www.refed.com/downloads/ReFED_Technical_Appendix.pdf.

² Ibid.

³ Ibid.