



A Roadmap to Reduce U.S. Food Waste by 20 Percent

Foundation Action Guide

2016



ReFED

Rethink Food Waste
Through Economics and Data

This guide was made possible with generous support from the following foundations:

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Special thanks to The Atticus Trust, The Fink Family Foundation, The Pisces Foundation, The Rockefeller Foundation, and The Walmart Foundation for providing case studies and thoughtful input on this guide.

ABOUT REFED

ReFED is a collaboration of over 30 business, nonprofit, foundation, and government leaders committed to reducing food waste in the United States. ReFED seeks to unlock new philanthropic and investment capital, along with technology, business, and policy innovation, which is projected to catalyze tens of thousands of new jobs, recover billions of meals annually for the hungry, and reduce national water use and greenhouse gas emissions.

ReFED was formed in early 2015 to create a *Roadmap to Reduce U.S. Food Waste*, the first ever national economic study and action plan driven by a multi-stakeholder group committed to tackling food waste at scale. Recently, a number of initiatives have raised awareness of the magnitude of the problem. The *Roadmap* is designed to fill the gap between awareness and action by creating transparency in the waste flows, costs, and opportunities of a more efficient food system achieved by preventing, recovering, and recycling food waste.

This Action Guide builds upon the *Roadmap* and is intended to engage foundations in food waste reduction by highlighting the most compelling solutions, and demonstrating their capacity to achieve a variety of philanthropic objectives.

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FOUNDATION ACTION GUIDE

EXECUTIVE SUMMARY

THE PROBLEM

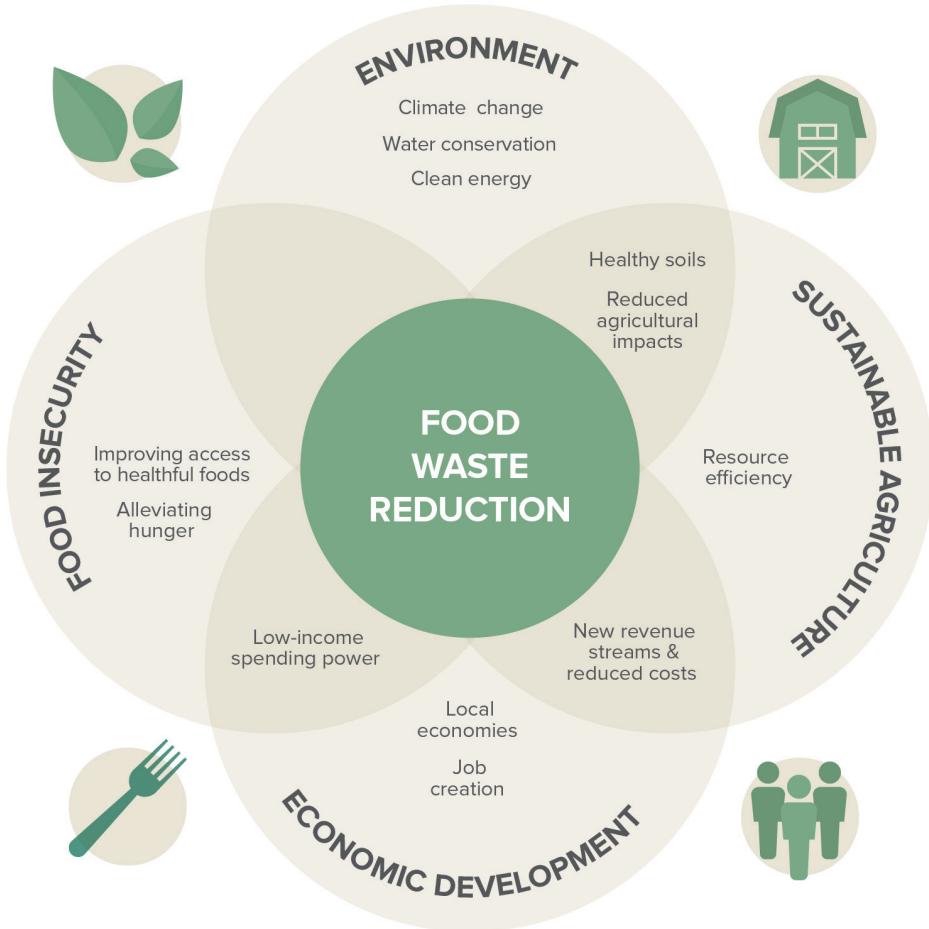
Today, the United States spends over **\$218 BILLION** – 1.3% of GDP – growing, processing, transporting, and disposing of food that is never eaten.

If all of our country's wasted food were grown in one place, this mega farm would cover roughly **80 MILLION ACRES**, over three-quarters of the state of California.

THE ROLE OF FOUNDATIONS

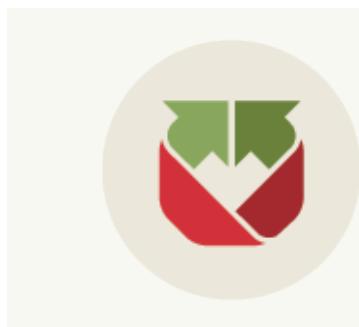
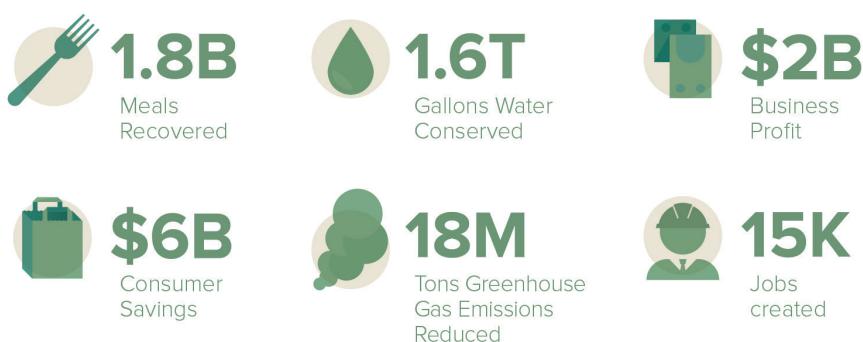
Given the scale of U.S. food waste and the magnitude of its adverse impacts, there is a clear and urgent need for action. Fortunately, a variety of cost-effective, scalable solutions can be implemented today. These solutions range from standardizing date labels and increasing market acceptance of "ugly produce" to prevent food waste from ever happening, to donation matching platforms and tax incentives to recover edible food, to anaerobic digestion and composting to recycle food.

Reducing food waste also yields a variety of additional social and environmental benefits, creating a unique opportunity for foundations.



THE IMPACTS

An estimated \$300 million is needed annually in philanthropic funding and impact investments over the next decade to reduce food waste by 20%, resulting in massive economic, environmental, and social benefits.



JOIN REFED IN TACKLING FOOD WASTE

This guide, coupled with the ReFED *Roadmap*, can empower foundations to maximize their impact. ReFED is also creating a Food Waste Funder Collaborative to enable foundations to explore emerging opportunities in food waste reduction.

Please contact us at info@refed.com or visit refed.com-foundations for more details.

KEY INSIGHTS

- Food waste solutions available today have the potential to make a scalable impact on key foundation mission areas, reducing greenhouse gas emissions by 18 million tons, cutting water use by 1.5% nationwide, creating 15,000 new jobs, and doubling food donations to impact millions of food insecure households.
- Over the next decade, \$300 million in annual philanthropic funding is needed to achieve a 20 percent reduction in U.S. food waste. This funding will bridge a critical gap between government and private-sector financing.
- As of 2014, approximately \$5 million of annual philanthropic funding was directly targeted toward food waste solutions, and another \$50 million was devoted to tangentially related projects. While complete data for 2015-2016 is not yet available, recent foundation funding commitments indicate a marked increase in funding. ReFED estimates current funding has likely tripled to \$15-20 million per year.
- Prevention currently receives the lowest levels of foundation funding, yet yields the largest positive impact per dollar invested. One barrier is that most opportunities today are investments, a philanthropic strategy that many foundations are unaccustomed to using.
- Foundations can support recovery by funding infrastructure development (e.g., transportation, storage, and processing capacity), donation matching software to connect food donors with recipients, and advocacy for favorable policy.
- Foundations can promote recycling by funding research on implementation, or by making low-interest loans for infrastructure development.
- Foundations can support five priority cross-cutting solutions to accelerate reduction: building collaboration and capacity, funding critical infrastructure, educating consumers and food businesses, supporting research and pilot programs, and advocating policy improvements.



THE ROLE OF FOUNDATIONS

Today, approximately 40% of all food grown in the United States is never eaten, totaling roughly 63 million tons of annual waste. Given the scale of U.S. food waste and the magnitude of its adverse impacts, there is a clear and urgent need for action. Fortunately, there exist a variety of cost-effective, scalable solutions to the problem, which can be implemented today with existing technology. These solutions will also yield a variety of additional social and environmental benefits, creating a unique opportunity for foundations. In addition to reducing food waste, funding the solutions described below will enable foundations to efficiently and effectively accomplish several common philanthropic objectives:

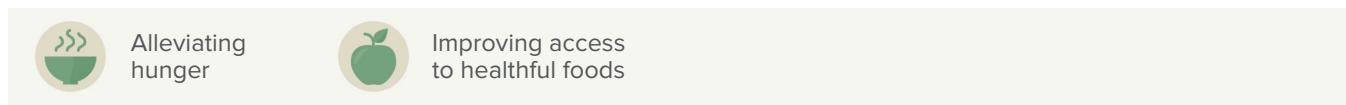
ACHIEVING PHILANTHROPIC GOALS THROUGH FOOD WASTE REDUCTION



ENVIRONMENT - Wasting food wastes all the natural resources required for its production, including water, fertilizer, and energy inputs. Food waste also releases methane when it decomposes in landfills. Combining production and disposal, food waste ultimately contributes 4.5 percent of all U.S. greenhouse gas (GHG) emissions. *Roadmap* solutions have the capacity to save 1.6 trillion gallons of water annually while lessening the strain on farmland and reducing GHG emissions by 18 million tons per year. Composting solutions can help build healthy soils, and anaerobic digesters can produce clean energy.



FOOD INSECURITY - The food recovery solutions outlined in the *Roadmap* have the capacity to provide 1.8 billion meals to food-insecure Americans over the next decade. Many solutions enable recovery organizations to offer fresh, healthful produce to clients, providing added nutritional benefit.



ECONOMIC DEVELOPMENT - ReFED estimates that implementation of *Roadmap* solutions would create or sustain more than 15,000 permanent jobs and generate \$100 billion in societal economic value over ten years. Most job creation would occur through growth of centralized composting, with additional jobs generated through donation storage and handling, and centralized anaerobic digestion.



SUSTAINABLE AGRICULTURE - Prevention and recovery solutions allow food to be used for its greatest purpose: feeding people. Several of these solutions can also provide new revenue streams for farmers, and enable them to harvest produce that's currently wasted. Some institutions have used the cost savings yielded by reduction to fund procurement of local and organic foods. On a broad scale, reducing food waste lessens the strain on our agricultural resources (currently, roughly 20 percent of all farmland, fertilizer, and freshwater is used to produce food that's eventually wasted), and recycling solutions like composting generate a valuable soil amendment for enriching cropland.



PHILANTHROPIC FUNDING, COMBINED WITH PRIVATE AND GOVERNMENT FUNDING, WILL YIELD AN EXPECTED \$100 BILLION IN SOCIETAL ECONOMIC VALUE

After conducting the most comprehensive analysis of U.S. food waste to date, ReFED published *A Roadmap to Reduce U.S. Food Waste by 20%*, which identifies an estimated \$300 million needed annually in philanthropic funding and impact investments over the next decade. Strategically focused philanthropic funding, combined with private and government funding, will yield an expected \$100 billion in societal economic value at a cost of less than a tenth of a penny of investment per pound of food waste reduced. While there are significant opportunities for business and government to reduce food waste, foundations are uniquely positioned to bring together diverse stakeholders to build collaborative approaches and address funding gaps to catalyze a new food recovery economy.

EFFECTS OF FOOD WASTE

FOOD WASTE COSTS \$218B ANNUALLY

Americans spend \$218 billion annually growing, processing, transporting, and disposing of food that is never eaten.

-  CROPLAND
-  GHG EMISSIONS
-  WATER CONSUMPTION

18% of cropland, 4.5% of U.S. greenhouse gas emissions and 21% of water consumption is associated with the production, transportation, and distribution of food that is never eaten.



ECONOMIC

IMPACT OF 20% REDUCTION

15,000 NEW JOBS AND \$100B OF NEW ECONOMIC VALUE

Over the next decade, food waste solutions could create 15,000 new jobs, and generate \$100B of economic value.



ENVIRONMENT

PREVENT NEARLY 18M TONS OF GREENHOUSE GAS EMISSIONS, ANNUALLY

Food waste solutions would reduce greenhouse gas emissions, conserve close to 1.6 trillion gallons of water per year, build healthy soils, and generate clean energy.



One in seven Americans, many of them children, is food insecure, lacking reliable access to sufficient affordable, nutritious food.



SOCIAL



Increase the recovery of food by food assistance organizations by 1.8 billion meals annually, nearly doubling the number of meals rescued today.

WHY NOW? THE CURRENT LANDSCAPE

Food waste is an issue that resonates with virtually everyone, regardless of political affiliation, ethnicity, or economic status; since we all eat, we all feel a connection to food. Food waste is a problem that can be addressed today, with technology and solutions that already exist. It is quite literally low-hanging fruit with vast opportunities to advance social, environmental, and economic goals. And the good news is, awareness of the issue is growing.

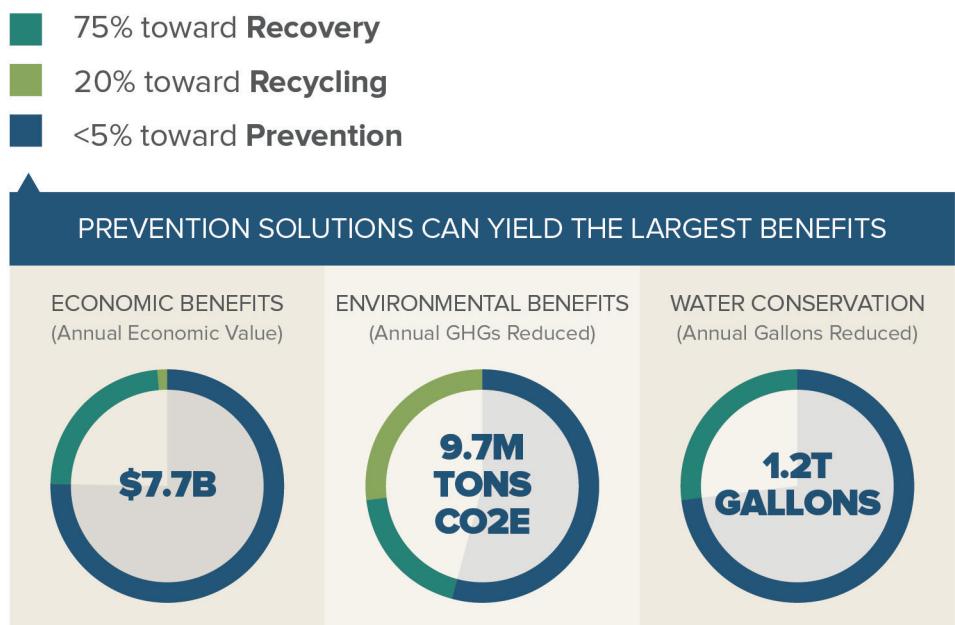
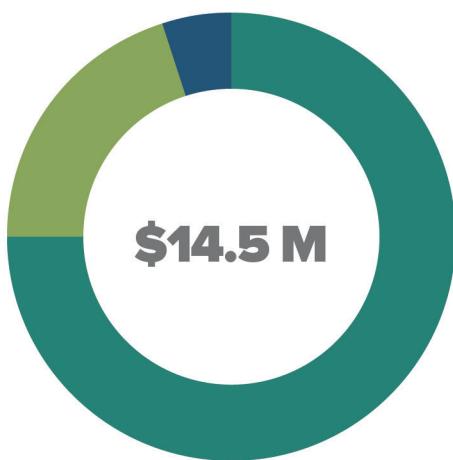
In September 2015, the United States Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (U.S. EPA) set the nation's first domestic goal of halving food loss and waste by 2030. Later that month, members of the United Nations passed the global Sustainable Development Goals, which includes a target to halve per capita food waste in the consumer and retail sectors and reduce food losses along production and supply chains by 2030. Individual states like Vermont and Massachusetts have set bans on organic waste, including food, from being disposed in landfills – and cities like San Francisco, Seattle, and New York City have similar bans in place.

BASELINE LEVEL OF PHILANTHROPIC FUNDING OF FOOD WASTE SOLUTIONS

Despite increasing public awareness and media coverage, action and investment to reduce food waste on the national scale has been slow. ReFED analyzed 2012-2014 data on philanthropic grantmaking from the Foundation Center (the most recent complete datasets available) in order to establish a baseline for foundation funding of food waste reduction. The analysis revealed that less than \$5 million in funding has been devoted explicitly to food waste projects annually. Another \$50 million of annual funding was devoted to projects tangentially related to food waste (e.g., food insecurity, soil health), but even this total falls far short of the \$300 million of annual philanthropic funding required to implement the *Roadmap* solutions.

FOOD WASTE IS A PROBLEM THAT CAN BE ADDRESSED TODAY, WITH TECHNOLOGY AND SOLUTIONS THAT ALREADY EXIST.

\$14.5 MILLION TOWARD FOOD WASTE-RELATED INITIATIVES (2012-2014)



HIGHLIGHTS FROM REFED'S BASELINE FUNDING ANALYSIS:

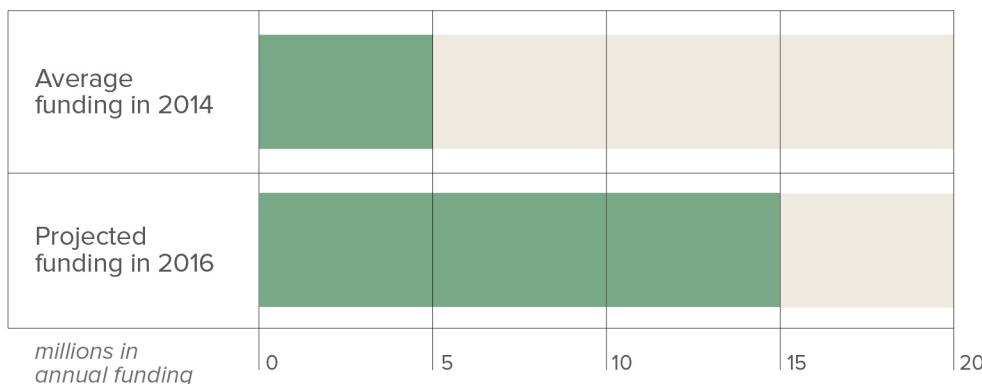
- Between 2012 and 2014, roughly 300 foundations contributed \$14.5 million toward food waste-related initiatives, with an average grant size of \$25,000.
- Approximately 75 percent of total funding went toward facilitating the recovery of edible food for donation, and 20 percent toward recycling inedible food scraps. Less than 5 percent of funding was devoted to preventing wasted food in the first place, despite the fact that prevention solutions yield the largest economic, environmental, and social benefits.
- Of the \$11 million in funding to support recovery initiatives between 2012-2014, 70 percent was dedicated to physical donation infrastructure and 30 percent to capacity building (including staff/personnel). Most infrastructure funding was devoted to community kitchens (38 percent), gleaning (22 percent), and refrigerated trucks (21 percent).
- It's likely that many funders supporting recovery were not providing grants from a "food waste" lens, but rather, were focused on hunger issues. This demonstrates the opportunity to engage additional foundations in food waste work by more effectively conveying the multiple benefits that solutions are able to achieve.
- Of the \$3.3 million in funding for recycling solutions, roughly 70 percent was devoted to composting, 20 percent to anaerobic digestion, and 10 percent to "zero waste" initiatives.
- Of the \$225,000 in prevention funding, 70 percent was devoted to education and capacity building, while 30 percent was devoted to research.

Despite the relatively low baseline level of investment in solutions, there is reason for optimism. Public awareness of food waste continues to rise, driven largely by effective advocacy efforts and increased media coverage, and ReFED's analysis reveals continued growth in the number of nonprofit and entrepreneurial food waste ventures over the past five years.

Although 2015 and 2016 funding data are not yet available, ReFED has observed a marked increase in foundation grantmaking, particularly for prevention initiatives. Based on conversations with current food waste funders, we expect the level of 2016 funding to be at least \$15 million, or triple the 2014 baseline level. This is still well below the \$300 million annual philanthropic funding target identified in the *Roadmap*, but the rapid increase in grantmaking suggests that the goal is attainable, given continued foundation engagement and ongoing collaboration.

Highlighted below are case studies from several foundations that have already made major funding commitments to food waste initiatives, including The Atticus Trust, The Fink Family Foundation, The Pisces Foundation, The Rockefeller Foundation, and The Walmart Foundation.

PHILANTHROPIC GRANT FUNDING



For more information about ReFED's analysis of philanthropic funding, please see Appendix B.

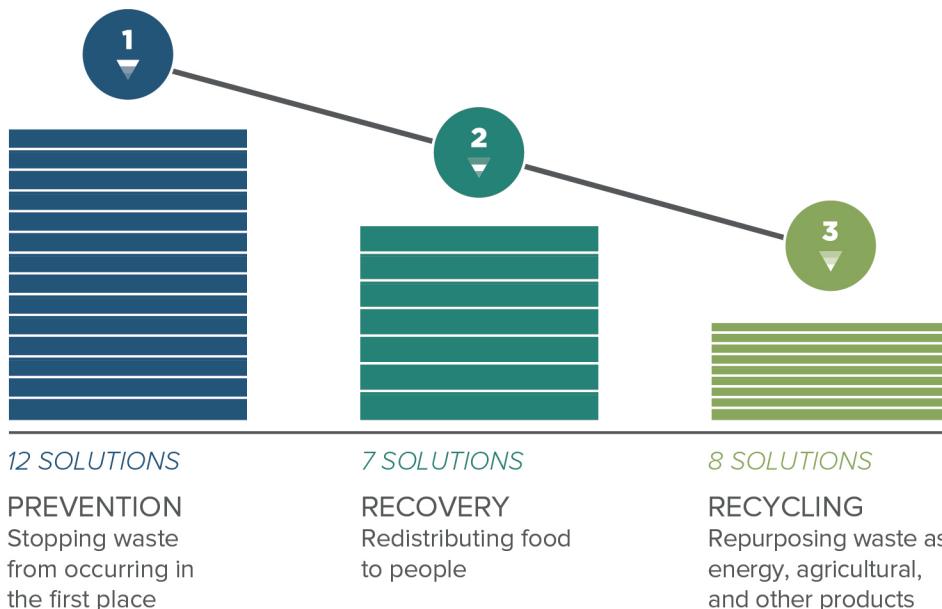
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SOLUTIONS IN DETAIL

The *Roadmap* analyzes 27 solutions, which fall into the broad food waste reduction hierarchy categories of prevention, recovery, and recycling. These 27 *Roadmap* solutions are all cost-effective, scalable, and ready to be implemented today. Collectively, they could reduce U.S. food waste by 20 percent over ten years, equating to 13 million tons diverted from landfills and on-farm losses annually.

The **bolded solutions** are explained in greater detail in Appendix A. For additional information, refer to *A Roadmap to Reduce U.S. Food Waste by 20 Percent* (refed.com/roadmap).

FOOD RECOVERY HIERARCHY



FOUNDATION PROFILE | ROCKEFELLER FOUNDATION



The Rockefeller Foundation has long been committed to strengthening the intersection of food security, economic development, and resilience. Today, with increased pressure on global ecosystems, 1.2 billion people food insecure globally, and millions of vulnerable smallholder farmers losing profits they can't spare, it is clear that improving production is not enough. We cannot afford to allow food to continue be lost or wasted at such astounding rates.

In January 2016, The Rockefeller Foundation launched YieldWise, a seven-year, \$130 million initiative aimed at cutting food loss and waste around

the globe. In the U.S., we are working with private, public, and nonprofit actors to:

- Raise awareness about the issue and connect actors to existing food waste solutions;
- Test new innovative and scalable solutions that can be replicated throughout the U.S. and globally;
- Increase productive interactions around food waste, such that actors reduce, revalue, and redeploy wasted food; and
- Build capacity and coordination by sparking new strategic partnerships.

Our goal is to make focused investments to introduce new tools and information that enable cities, corporates, and consumers to take action in preventing and reducing food waste. By raising awareness among key stakeholders, we hope to engage a larger, more diverse set of influencers in solving the food waste problem. To ensure a complete system shift, we believe we need to work together to hone in on big fixes. The Rockefeller Foundation is doing its part, but we also need cities, industries, and entire nations to begin changing their behavior in order to solve this massive problem.

PREVENTION SOLUTIONS

Prevention stops waste before it can occur, saving all the natural resources and other inputs embedded in food from going to waste as well. For this reason, prevention has the highest social, environmental, and economic benefits and should be prioritized. Prevention ranges from packaging changes that enhance and extend shelf life of highly perishable foods, to consumer education, to waste tracking that helps businesses understand and reduce their waste.

BARRIERS TO IMPLEMENTATION

- Consumers demand abundance, variety, and cosmetic perfection – expectations that naturally lend themselves to waste generation.
- Organizational silos between departments in consumer-facing businesses (e.g., retail grocers, restaurants, foodservice institutions), coupled with uncertainty about where food waste occurs and its associated value, creates information gaps that hinder the collaboration required within businesses to prevent wasted food.

OPPORTUNITIES FOR FOUNDATION SUPPORT

- Fund research and pilot programs to identify consumer demand and marketability for products that utilize technology like **Spoilage Prevention Packaging**, which prolongs the shelf life of its contents. Research grants can also be used to catalyze innovation in packaging optimization to right-size packages, reducing costs for food businesses.
- Support marketing and educational efforts to farmers and consumers to stimulate supply and demand for cosmetically **Imperfect Produce**. This also increases awareness of a major source of food waste in the United States.
- Collaborate with private and public stakeholders to fund **Consumer Education Campaigns** that increase awareness of food waste, offer tips for extending shelf life and storing perishables, and promote a culture of active waste avoidance. As consumers learn more about the social and environmental consequences of wasting food, they'll also realize how their own expectations of food businesses lead to food waste.
- Make impact investments in **Waste Tracking & Analytics** solutions, which provide consumer-facing businesses with data on wasteful practices to inform behavior and operational changes. These tools remove information gaps, identify where food is wasted, and catalyze action to reduce waste. Other solutions prime for impact investments are those with a potential business benefit, but where the business may not have the funds to pay upfront for implementation, or an adoption risk exists: **Trayless Dining**, **Smaller Plate Sizes**, **Imperfect Produce**, and **Improved Inventory Management**.

SOLUTIONS IN ACTION

SAVE THE FOOD – Launched by the NRDC and the Ad Council in April 2016, this national public awareness campaign is designed to publicize the food waste issue, and to teach consumers how to reduce household food waste.

STOP WASTE FOOD WASTE PREVENTION PROJECT – This public agency in Alameda County, CA, is incentivizing food waste reduction by providing grants to help businesses implement **Waste Tracking & Analytics** solutions like LeanPath.

FEEDING THE 5000 – This global campaign raises public awareness about food waste by hosting events in major cities at which thousands of attendees are served meals prepared entirely with foods that would otherwise have gone to waste. In the U.S., Feeding the 5000 events have been held in cities including Oakland, CA, Washington, DC, Denver, CO, and New York City.

FOOD POLICY ACTION – FPA is working to promote federal policy designed to reduce food waste and support solutions to the problem in collaboration with ReFED, Harvard Food Law & Policy Clinic, NRDC, and many others.

ANNUAL DIVERSION POTENTIAL

2.6M TONS

ANNUAL GHGS REDUCED

9.7M TONS CO2e

ANNUAL WATER CONSERVED

1.2T GALLONS

ANNUAL ECONOMIC VALUE

\$7.7B

ANNUAL BUSINESS PROFIT POTENTIAL

\$1.9B

INVESTMENT NEEDED OVER 10 YEARS

\$6.2B

IMPACT AREAS:



ENVIRONMENT



ECONOMIC DEVELOPMENT



SUSTAINABLE AGRICULTURE

RECOVERY SOLUTIONS

Recovery captures edible food that would otherwise go to waste on farms or in consumer-facing businesses, and redistributes it to food-insecure populations. Although U.S. food recovery networks – spanning food banks, pantries, soup kitchens, shelters, and other agencies – already receive and distribute 1.7 million tons of rescued food per year, over three times this amount could be feasibly recovered from food businesses.

BARRIERS TO IMPLEMENTATION

- Many recovery organizations lack efficient, reliable access to transportation to pick up food, or the capacity to process and redistribute it.
- It's challenging for food donors and recipients to establish networks for donation, especially for smaller volume or highly perishable donations.
- Businesses may not be motivated to donate excess food without sufficient economic incentive.
- Consumer-facing businesses often cite concerns over liability as a reason for not donating surplus or unsold food. Although the federal Good Samaritan Food Donation Act protects donors and recipients from civil or criminal liability short of gross negligence and misconduct, this legislation remains unproven and untested in court.

OPPORTUNITIES FOR FOUNDATION SUPPORT

- Provide grants or impact investment in innovative **Donation Matching Software** platforms to connect food donors with food recipients in real-time.
- Provide grants for physical assets required to facilitate donation, such as trucks and refrigerated vans for **Donation Transportation**, and infrastructure and labor for **Donation Storage and Handling**. Grants can also support processing infrastructure at food assistance organizations (e.g., commercial kitchen space), for **Value-Added Processing** to convert highly perishable foods into meals or other products.
- Support education and advocacy to create a robust regulatory framework that encourages donation (e.g., **Tax Incentives** and strong liability protections), while supporting **Donation Liability Education** to make food businesses aware of current regulations.
- Make impact investments for new business models that take surplus food and distribute it to secondary markets or create new food products.

SOLUTIONS IN ACTION

DAILY TABLE – This not-for-profit retail store offers fresh, healthy “grab-n-go” meals and other grocery items at bargain prices. These deals are available because Daily Table works closely with a large network of growers, supermarkets, manufacturers, and other suppliers who donate their excess, healthful food and provide special buying opportunities.

DC CENTRAL KITCHEN – Since 1989, DC Central Kitchen has demonstrated that successful food recovery efforts can do more than feed the hungry. In addition to recovering more than 700,000 pounds of food and providing 1.8 million meals in 2015, through its “community kitchen” concept, DC Central Kitchen also trains unemployed adults for culinary careers and provides them with critical job skills to enter the labor force.

FOOD RECOVERY NETWORK – This organization has successfully raised awareness about food waste on college campuses across the U.S., and, since launching in 2011, has recovered and donated more than 1.4 million pounds of food that would have otherwise been wasted.

HARVARD FOOD LAW AND POLICY CENTER – HFLPC has researched state food donation policies and regulations, creating factsheets that can be used by businesses interested in food donation.

ANNUAL DIVERSION POTENTIAL

1.1M TONS

ANNUAL MEALS RECOVERED

1.8B

ANNUAL GHGS REDUCED

3.4M TONS CO2e

JOBS CREATED

4,000

ANNUAL ECONOMIC VALUE

\$2.4B

INVESTMENT NEEDED OVER 10 YEARS

\$8.7B

IMPACT AREAS:



FOOD INSECURITY



ECONOMIC DEVELOPMENT



SUSTAINABLE AGRICULTURE



ENVIRONMENT

RECYCLING SOLUTIONS

Recycling gives a higher purpose to the inedible food scraps that remain after preventing and recovering as much as possible, either as a direct source of nutrition for animals, or by converting the material into renewable energy or a nutrient-rich soil amendment. Solutions range from centralized facilities that process thousands of tons of inedible food waste annually, to on-site solutions that process material where it's generated. Solutions can also be implemented at the community or even household levels, including small-scale composting operations or backyard compost bins.

BARRIERS TO IMPLEMENTATION

An effective recycling ecosystem can be compared to a three-legged stool: generators need to separate out food scraps, haulers must be willing to pick up those scraps separately from traditional waste collection, and processors have to recycle those scraps into compost, energy, or other products. The system won't work if any one of these elements is missing or not operating at the same pace. Several bottlenecks currently exist across the system:

- The high cost of capital for facilities.
- Transportation and collection costs.
- Roll-out of food waste collection bins and educational resources on proper source separation.
- Processing costs associated with contamination of food scraps.

OPPORTUNITIES FOR FOUNDATION SUPPORT

- Grants for consumer education on source separation or to support decentralized, **Community Composting** sites. Grants can also be used to support program roll-out costs for purchasing collection bins and compostable liners.
- Research on site permitting and policies that help overcome community resistance to **Centralized Composting**, **Centralized Anaerobic Digestion (AD)**, or **Waste Water Recovery Facilities with AD Processing** (i.e., the “not in my backyard” syndrome). Research is also needed to quantify the social and environmental benefits of centralized recycling facilities, such as reduced greenhouse gas emissions, soil enhancement from the increased supply of compost, and municipal savings from avoiding additional landfill development.
- Impact Investments supporting innovation to increase the efficiency of collection and transportation or to provide low-interest loans to fill critical project financing gaps to help lift profitability of projects with low economics.

SOLUTIONS IN ACTION

VETERAN COMPOST – In addition to diverting food waste from landfill, this veteran-owned compost facility provides jobs for veterans and their family members. The creation and expansion of composting projects like Veteran Compost can be supported through equipment and other infrastructure loans.

LOWER EAST SIDE ECOLOGY CENTER – This organization offers free food waste drop-off programs for residents of New York City, and conducts comprehensive technical community composting training as part of the city's Master Composter program.

CENTER FOR ECOTECHNOLOGY – Foundations can also support infrastructure development by funding critical research. For instance, the Center for EcoTechnology has received funding to conduct research on waste hauling capacity at state and municipal levels, facilitating more effective development of recycling infrastructure.

ANNUAL DIVERSION POTENTIAL

9.5M TONS

ANNUAL GHGS REDUCED

4.8M TONS CO2e

JOBS CREATED

11,000

ANNUAL ECONOMIC VALUE

\$121M

INVESTMENT NEEDED OVER 10 YEARS

\$2.9B

IMPACT AREAS:



ENVIRONMENT



CLEAN ENERGY



HEALTHY SOILS



ECONOMIC DEVELOPMENT



SUSTAINABLE AGRICULTURE

GEOGRAPHIC FOCUS

Some solutions are better suited for foundations with a national-level focus, whereas others rely on collaboration among local stakeholders.



NATIONAL: While 13 of the 27 solutions can be implemented nationally, three of the top opportunities in terms of scalability and economic, social, and environmental benefits include:

- Standardized Date Labels (e.g., “Sell by”, “Best by”, etc.) – These dates generally do not reflect food safety, but rather food quality, indicating when food will taste its best. Yet consumer confusion around date labels is a huge driver of waste, causing an estimated 20% of household food waste. ReFED has convened a new multi-stakeholder effort to work with industry to create a voluntary standard for consistent language. Over the next 18 months, research from a range of stakeholders will be needed on date label language, food categories to which the standard should apply, and state-level policies that may impact implementation of the voluntary standard.
- Donation Tax Incentives – Expanding federal tax benefits for food donations to all businesses and simplifying donation reporting for tax deductions is a critical solution to create a positive business case for donation. While states can pass additional tax deductions or incentives, a strong federal policy will help businesses that operate nationally. Ongoing research is also needed to identify and promote additional donation policy opportunities – such as state-level tax credit programs – and to help measure the impact and success of existing food donation legislation.
- Packaging Adjustments – An estimated 20-25% of residential food waste is attributed to either package size or design. Optimizing food packaging size and design to ensure complete consumption by consumers and avoid residual container waste is an innovative strategy to tackle consumer food waste in the home. There is a need for further research to quantify the impact of packaging adjustments on waste levels, and to build the business case for making these changes.



LOCAL: Strong national frameworks are important to help businesses operate efficiently across the country, but many solutions should be implemented at the local or regional levels to be responsive to local opportunities and challenges. *Considerations for grantmakers include:*

- Is the state or region a large agricultural producer? In top agricultural producing states like California, parts of the Midwest, and Florida, there is opportunity to work with producers to reduce on-farm waste, and prioritize recovery of healthy produce.
- What is the economic and regulatory landscape for recycling? The economic viability of recycling is highly sensitive to the local prices of labor, property, disposal fees, compost values, and energy prices. Landfill bans or incentives for separating food scraps can also promote the development of recycling ecosystems. The Northeast, Northwest, and Midwest generally show the most economic promise for Centralized Composting due to higher disposal fees and high market prices for finished compost. The Northeast and Northwest are the most promising for Centralized Anaerobic Digestion and WRRF with AD due to higher energy prices.
- What infrastructure exists today? Some cities and states already have robust food recovery or recycling infrastructure, while others are starting from scratch. In addition to funding physical assets, foundations can support the creation of asset maps of local infrastructure (e.g., trucking, refrigeration, processing facilities, etc.). Mapping identifies underutilized assets that already exist (e.g., surplus refrigerator space within existing businesses that can be used for food donation storage), ensuring that new physical assets are only purchased when needed and existing resources are leveraged to the fullest extent possible.

IMPACT INVESTMENTS

Impact investing – the practice of using financial investments as tools to achieve a foundation’s mission – has been gaining attention in philanthropic circles. Of the \$300 million in philanthropic funding needed for *Roadmap* solutions, \$100-200 million is required in catalytic impact investments. Low-interest loans and high-risk equity investment will serve a critical role in overcoming system-level bottlenecks, derisking new innovations or novel projects, overcoming agency problems, and stimulating projects with marginal economics. This capital will be most beneficial for social enterprises, infrastructure projects, early stage innovators, and nonprofits. While impact investments are a powerful tool for driving change, they often come with additional complications in structuring, compared to grants, and foundations are encouraged to review investments to ensure they meet IRS guidelines for an impact investment.

ReFED has conducted ongoing analysis of the food waste sector, tracking a range of nonprofit and for-profit entities that have introduced innovative solutions. ReFED is currently developing a database of these innovators as a resource for foundations interested in funding emerging food waste solutions through impact investment. Please contact us at info@refed.com for more information.

LOW-INTEREST
LOANS AND HIGH-
RISK EQUITY
INVESTMENT WILL
SERVE A CRITICAL
ROLE IN PROMOTING
SOLUTIONS

FOUNDATION PROFILE | FINK FAMILY FOUNDATION

The Fink Family Foundation (FFF) identified food waste as a core issue area and has remained deeply committed to promoting solutions to the problem. After funding the ReFED *Roadmap*, we were looking towards investment opportunities and, based on the *Roadmap* analysis, identified Donation Matching Platforms as a core cost-effective solution to food recovery. As a result, we provided a seed stage, mission-related equity investment to

fund growth within Spoiler Alert, a technology platform that changes how businesses manage their wasted food. Spoiler Alert offers a collaborative, online platform with value-add services that enable food businesses, farms, and nonprofits to create or recover value from surplus food and organic waste. By working with large food businesses, Spoiler Alert offers a highly scalable platform that has a clear path to catalyzing the recovery

of millions of pounds of food each year using relative modest levels of investment.

FFF’s early seed stage investment provided the startup with resources needed to continue operations and invest in growth. In addition, we sought to add value to the company through introductions to potential customers and funders and insights from our work on the food waste issue.



CROSS-CUTTING PRIORITY SOLUTIONS

In addition to the solutions above, five cross-cutting priority areas need funding:

- 1) BUILDING COLLABORATION AND CAPACITY**
- 2) DIRECT FUNDING OF CRITICAL INFRASTRUCTURE**
- 3) SUPPORTING EDUCATION FOR CONSUMERS AND FOOD BUSINESSES**
- 4) SUPPORTING RESEARCH AND PILOT PROGRAMS**
- 5) POLICY ADVOCACY AND SUPPORT**

1) BUILDING COLLABORATION AND CAPACITY

Tackling the food waste issue at scale involves systemic change that can only be accomplished through collective action. Indeed, many of the solutions outlined above require stakeholders to communicate and collaborate in order to succeed. Today, organizations like ReFED, The Rockefeller Foundation, the Food Waste Reduction Alliance, USDA/EPA, and a growing number of local and regional food policy councils are bringing together diverse stakeholders to address the issue. This work needs to be scaled, with a focus on local capacity building and partnerships. This is especially applicable in the food recovery arena; collaboration and partnerships among retailers, food recovery organizations, entrepreneurs, and logistics businesses are essential to create effective food recovery ecosystems.

Foundations can play a critical role in bringing these stakeholders together via funding mechanisms that reduce barriers for participation and coordinate a range of different efforts.

2) DIRECT FUNDING OF CRITICAL INFRASTRUCTURE

Although many food waste solutions can be implemented today with existing technologies, some solutions require new infrastructure to scale and make a meaningful impact, most notably solutions related to food recovery and recycling. Food recovery organizations need infrastructure to transport, store, and process food donations (e.g., refrigerated trucks, commercial kitchen capacity, etc.), and large-scale recycling solutions require trucks for waste-collection and extensive facilities with equipment and processing capabilities to turn inedible food scraps into value-added products.

Foundations can leverage philanthropic funding to support the development of infrastructure needed for these solutions to scale.

FOUNDATION PROFILE | WALMART FOUNDATION



In 2015, the Walmart Foundation launched an initiative to promote innovative ways to address food waste in the U.S. Through awards totaling more than \$2.3 million, the initiative is supporting 12 promising programs that have the potential to significantly reduce food waste at the production, processing, and household levels. Collectively, the programs supported by the Foundation provide creative approaches that include:

- Using crowd sourcing participation to identify new food streams and match them to those in need
- Recovering food directly through gleaning
- Addressing the needs for thought leadership and infrastructure improvement
- Preventing waste on college campuses and engaging youth in recovery efforts
- Promoting models of consumer behavior change
- Assessing food waste at the institutional level

3) SUPPORTING EDUCATION FOR CONSUMERS AND FOOD BUSINESSES

Over 40 percent of food waste occurs in consumers' homes, more than any other stakeholder group. While several *Roadmap* prevention solutions address consumer waste, Consumer Education Campaigns are a critical means of raising awareness about the issue and teaching waste reduction skills such as reducing over-purchasing, understanding food date labels, and incorporating leftovers into other recipes. These campaigns can take different forms and can be conducted at a variety of scales; while a campaign like Save the Food addresses food waste broadly at the national level, a campaign could also target a specific issue like date labeling, or be executed locally (for instance, combining prevention education with the rollout of a municipal composting program). Education has a dual benefit since consumer actions and perceptions can also drive public policy and corporate sustainability efforts to reduce waste in grocery stores, restaurants, and institutions.

Consumer-facing businesses should also provide training to help employees avoid removing products from shelves when still safe and edible, identify and prepare food that can be donated, and depackage and properly source-separate food waste to remove contaminants before recycling.

Foundations can provide grants to assist with the development and delivery of consumer and employee education campaigns, on both the regional and national levels.

4) SUPPORTING RESEARCH AND PILOT PROJECTS

Throughout the development of the *Roadmap*, several priority areas were identified that would strongly benefit from additional research:

- Quantifying food waste along the supply chain (e.g., distinguishing between edible and inedible food waste).
- Exploring drivers of consumer and employee behavior to identify effective outreach and communication strategies to promote food waste reduction.
- Identifying opportunities for creating effective end-markets for finished compost.

In addition to research, many innovative food waste solutions, like creating markets for cosmetically imperfect, off-grade produce or value-added processing solutions, will require pilot projects to demonstrate their economic, social, and environmental benefits, as well as marketability.

Foundations can create impact via grants to organizations or collaborative efforts focused on food waste research. Foundations can also make impact investments to support pilot projects for social enterprises to demonstrate the market value of their solutions.

FOUNDATION PROFILE | ATTICUS TRUST

The Atticus Trust has made a significant multi-year grant commitment to reduce food waste in Nashville by supporting a range of local and national organizations. We are doing this by supporting research, infrastructure development, advocacy, community organizing, media development, data collection, and education programs.

Because our family is from Nashville, our first goal is to measurably reduce food waste there in the next five years.

We aim to put necessary systems in place so that the city can continue to successfully address this issue. Our second goal is to advocate for improved national public policy that will make food waste reduction across the country a reality. We believe that there is no quick fix and have taken an approach that involves funding many types of efforts.

Investments from Atticus Trust have helped small start-up organizations develop new skills and broaden

their geographic reach. Our broader national investments have enabled organizations to conduct research and produce action-oriented materials. We have also worked with local advocates to develop a large anaerobic digester, and have supported capacity building in local organizations through regular stakeholder meetings.

We continue to look for funding opportunities with new and innovative organizations.

Research about food waste and related solutions is now being conducted at a variety of academic institutions, including University of California, Davis; Ohio State University; Cornell University; the Center for a Livable Future at Johns Hopkins University; and the ADM Institute for the Prevention of Postharvest Loss at the University of Illinois at Urbana-Champaign.

5) POLICY ADVOCACY AND SUPPORT

Some solutions make sense to implement on a national-scale, driven by federally mandated policy. In particular, standardizing date labels and standardizing food donation regulations at a federal level will help to overcome the current patchwork of regulations which are difficult for businesses to follow and hard for consumers to understand. Policy advocacy at a local level is also critical – states with organics landfill bans have seen a large uptick in new recycling infrastructure, which is to be expected, but have also seen increases in donation to food banks and new entrepreneurial solutions for prevention emerging.

Foundations with policy and regulatory expertise can provide credibility to national-level policy changes via research on benefits, costs, or impacts of policy and recommendations on effective language.

FOUNDATION PROFILE | THE PISCES FOUNDATION



PISCES FOUNDATION

The Pisces Foundation's Climate & Energy Program is focused on reducing short-lived climate pollutants in order to cool our planet and keep communities healthy. Short-lived climate pollutants include HFCs, black carbon, and methane – and it's because of methane that we are involved in reducing food waste.

Waste is the third largest source of methane globally and the U.S. is the largest producer of methane from the waste sector. Methane is generated when organic waste is sent to landfill

where it decomposes, releasing the potent greenhouse gas. Food waste is the largest source of this organic waste, accounting for 21% of waste found in landfills, making it a critical issue to address in order to reduce emissions from the sector.

In addition to the climate benefits, reducing food waste has additional environmental, economic, and social benefits, which means that it represents a clear opportunity to advance our vision of people and nature thriving together.

ReFED's knowledge of the landscape of organizations and key stakeholders working on food waste has been a vital resource. In addition to our support of ReFED, we are proud to be supporting organizations like NRDC in their partnership with the Ad Council to launch the Save the Food Campaign, focused on reducing the 40% of food waste that occurs at the consumer level.



ADVICE FOR FOUNDATIONS INTERESTED IN FUNDING FOOD WASTE INITIATIVES

Each geographic area has particular challenges and assets – develop a deep understanding of what those are before getting too far into funding one effort or another. This is also an area that requires working with local and national governmental entities and the particular laws governing them. It also demands big and small solutions. Take risks because this is a field that is new and where funding can help both large and small efforts.

– ATTICUS TRUST

For foundations that are interested in the food waste space, it is appropriate to understand the entire ecosystem, the challenges it faces, and how your proposed interventions fit into that ecosystem. At the same time, being aware of when it is appropriate to engage directly, and when it is most effective to leverage other resources, will help to forge the coordinated partnerships and growing dynamism necessary to advance big solutions.

– THE ROCKEFELLER FOUNDATION

Really understanding the multiple programmatic areas that can be highly impacted by supporting organizations reducing food waste in the U.S. makes this such an appealing cross-cutting issue. This information should be shared with trustees and board members so they understand the magnitude of the problem and the the breadth of societal issues a reduction [in wasted food] can address.

– FINK FAMILY FOUNDATION

CONCLUSION

The scale and immensity of food waste in the United States can be daunting, but the groundwork to make meaningful strides has been laid, and action is happening now. The information in this document, coupled with supplemental information in the ReFED *Roadmap*, can empower Foundations to create the greatest impact in food waste reduction.

Together, we can reduce food waste by 20 percent in the next decade – let's start now!

Please contact us at info@refed.com or visit refed.com/foundations for more details.



APPENDIX A: ROADMAP SOLUTIONS IN DETAIL

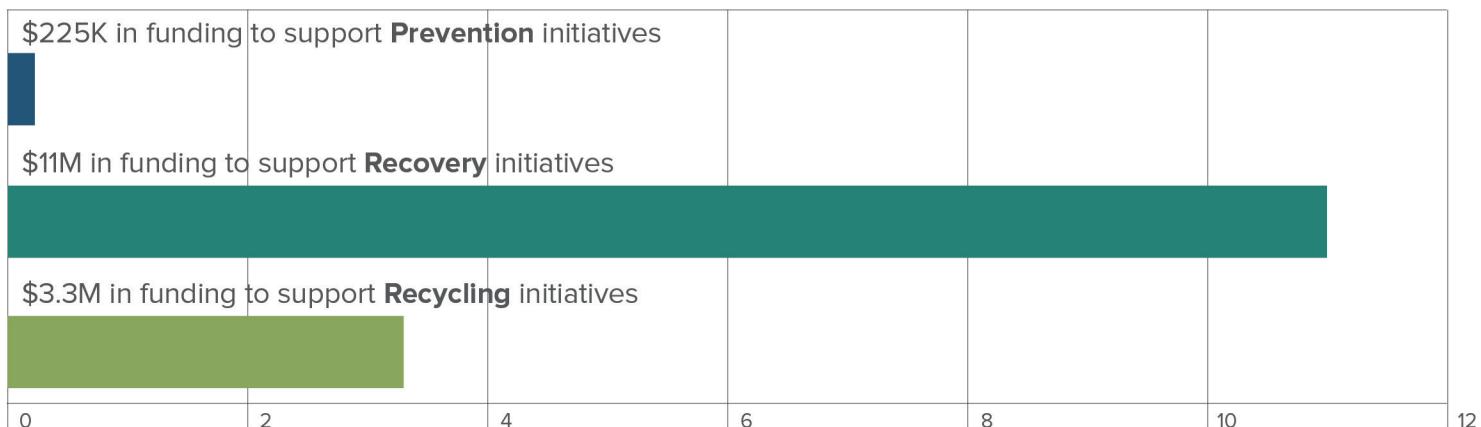
Type	Solution	Definition	Diversion Potential (K tons / year)	Economic Value (\$M / year)
Prevent	Consumer Education Campaigns	Advocacy campaigns to raise awareness of food waste and solutions to address the problem	584	\$2,648
Prevent	Waste Tracking & Analytics	Providing restaurants and prepared-food providers with data on wasteful practices to inform behavior and operational changes	571	\$1,303
Prevent	Standardized Date Labeling	Standardizing food date labels and instructions to reduce consumer confusion	398	\$1,812
Prevent	Produce Specifications	Accepting and integrating use of off-spec produce for retail sale, and use in foodservice and restaurant preparation	266	\$277
Prevent	Packaging Adjustments	Optimizing food packaging size and design to ensure complete consumption and avoid residual container waste	208	\$715
Prevent	Smaller Plates	Providing consumers with smaller plates in self-serve, all-you-can-eat dining settings to reduce consumer waste	178	\$382
Prevent	Secondary Resellers	Businesses that purchase unwanted processed food and produce direct from manufacturers and distributors for discounted retail sale to consumers	167	\$37
Prevent	Trayless Dining	Eliminating tray dining in all-you-can-eat dining establishments to reduce consumer waste	83	\$187
Prevent	Spoilage Prevention Packaging	Using active intelligent packaging to prolong product freshness and slow spoilage of perishable fruit and meat	72	\$167
Prevent	Improved Inventory Management	Improving the ability of retail inventory management systems to track an average product's remaining shelf-life (time left to sell an item) and inform efforts to reduce days on hand (how long an item has gone unsold)	59	\$71
Prevent	Manufacturing Line Optimization	Identifying opportunities to reduce food waste from manufacturing/processing operations and product line changeovers	20	\$35
Prevent	Cold Chain Management	Reducing product loss during shipment to retail distribution centers by using direct shipments and cold-chain-certified carriers	18	\$32
Recover	Donation Tax Incentives	Expanding federal tax benefits for food donations to all businesses and simplifying donation reporting for tax deductions	383	\$470
Recover	Standardized Donation Regulation	Standardizing local and state health department regulations for safe handling and donation of food through federal policy	193	\$553
Recover	Donation Matching Software	Using a technology platform to connect individual food donors with recipient organizations to facilitate smaller-scale food donations	150	\$432
Recover	Donation Transportation	Providing small-scale transportation infrastructure for local recovery as well as long-haul transport capabilities	110	\$252
Recover	Donation Storage & Handling	Expanding temperature-controlled food distribution infrastructure and labor availability to handle additional donation volumes	103	\$244
Recover	Value-Added Processing	Extending the usable life of donated foods through processing methods to create value-added products	102	\$285
Recover	Donation Liability Education	Educating potential food donors on donation liability laws	57	\$159
Recycle	Centralized Composting	Creating centralized facilities that transform organic waste into humus, a critical component of healthy, fertile soil	5,037	\$18
Recycle	Centralized Anaerobic Digestion	Creating centralized facilities that use biological processes to break down food waste, yielding two end products: biogas and digestate	1,884	\$40
Recycle	Water Resource Recovery Facility (WRRF) with AD	Delivering waste by truck or through existing sink disposal pipes to a municipal water resource recovery facility (WRRF), where it's treated with anaerobic digestion	1,637	\$38
Recycle	Commercial Greywater	An on-site treatment technology, greywater aerobic digesters use nutrients, enzymes, and bacteria to break down food organics until they're soluble, and able to be flushed into the sewage system	595	\$19
Recycle	Community Composting	Transporting food from homes by truck, car, or bicycle to small, community compost facilities that process 2,500 TPY on average	167	(\$6)
Recycle	Home Composting	Keeping a small bin or pile for on-site waste at residential buildings to be managed locally; also known as "backyard composting"	97	\$14
Recycle	Animal Feed	Feeding food waste to animals after it's heat-treated and dehydrated and either mixed with dry feed or directly fed	49	(\$3)
Recycle	In-Vessel Composting	Composting at small scale at institutions or businesses with heat and mechanical power to compost relatively quickly (less than one month versus more than two months for windrow composting)	12	(\$1)
TOTALS				13,201
TOTALS				10,181

For additional details about these solutions and their associated costs and benefits, visit refed.com.

APPENDIX B: BASELINE FUNDING ANALYSIS

ReFED's funding analysis is based on 2012-2014 data on philanthropic grantmaking from the Foundation Center (the most recent complete datasets available). ReFED's analysis revealed a baseline funding level of less than \$5 million annually. This figure includes funding devoted explicitly to food waste projects, but excludes funding of tangentially related projects (e.g., food insecurity, soil health), which totaled roughly \$50 million annually.

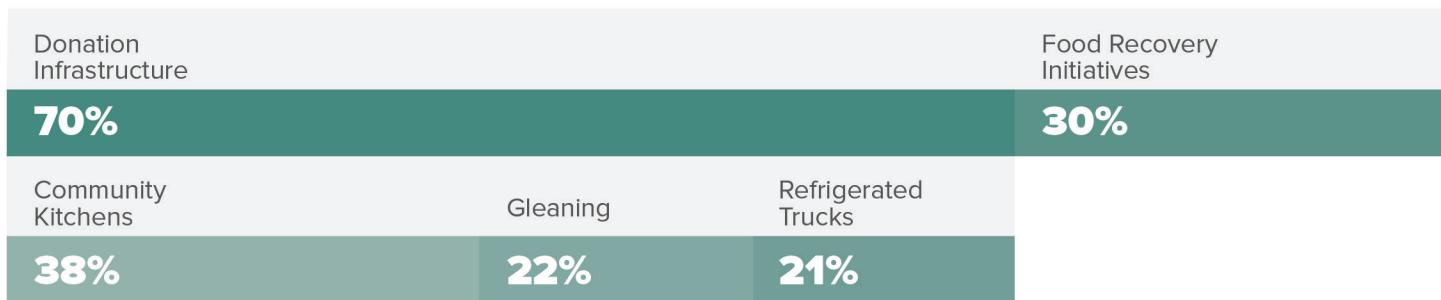
\$14.5M TOWARD FOOD WASTE-RELATED INITIATIVES (2012-2014) with an average grant size of about \$25,000.



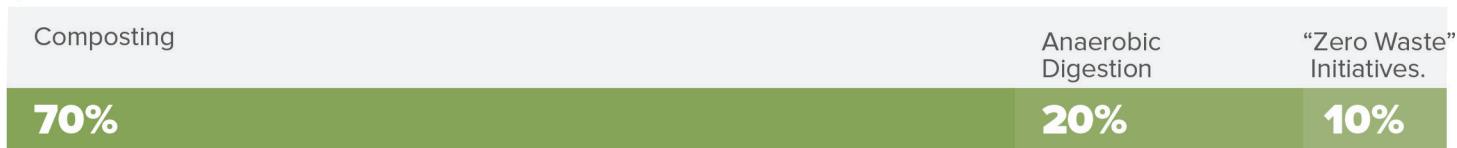
\$225K IN FUNDING TO SUPPORT PREVENTION INITIATIVES



\$11M IN FUNDING TO SUPPORT RECOVERY INITIATIVES



\$3.3M IN FUNDING TO SUPPORT RECYCLING INITIATIVES





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