



Advancing Data-Driven Solutions  
to Reduce Food Loss and Waste

## America's Food Waste Challenge

December 10, 2021



# Who We Are

ReFED is a national nonprofit working to end food loss and waste across the food system by advancing data-driven solutions to the problem.

# Our Vision

A sustainable, resilient, and inclusive food system that optimizes environmental resources, minimizes climate impacts, and makes the best use of the food we grow.



## DATA & INSIGHTS

Leveraging data and insights to highlight supply chain inefficiencies and economic opportunities



## CAPITAL & INNOVATION

Catalyzing capital to spur innovation and scale high-impact initiatives

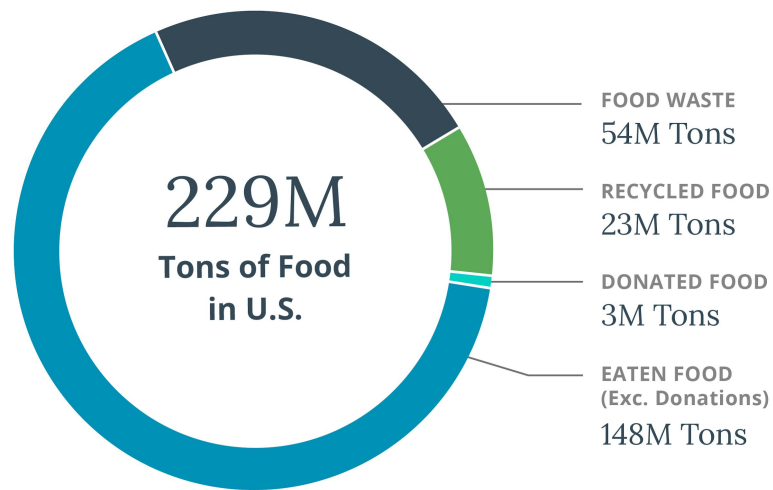


## STAKEHOLDER ENGAGEMENT

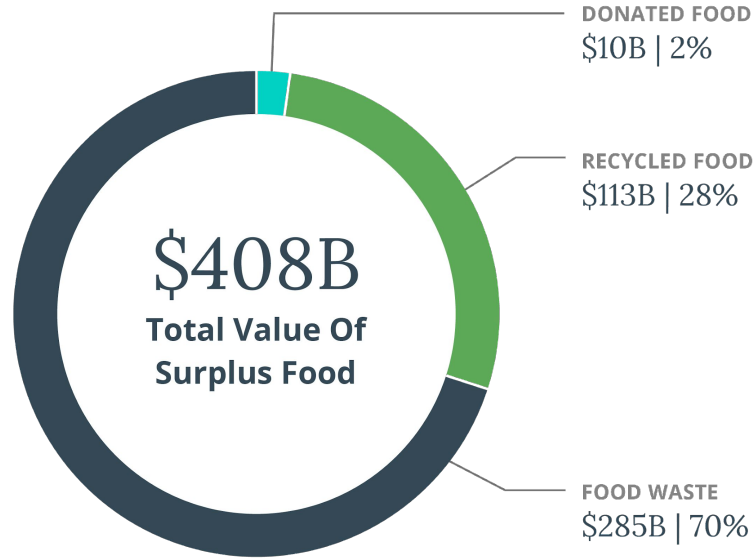
Mobilizing and connecting supporters to take targeted action

# The Food Waste Challenge





35% of all food  
went unsold or  
uneaten in 2019...



That surplus food was valued at \$408 billion – nearly 2% of U.S. GDP.

## Impacts of Uneaten Food: Environmental



4%  
of U.S. GHG  
Emissions



14%  
of all  
Fresh Water Use



18%  
of all  
Cropland Use



24%  
of Landfill Inputs  
**#1 material** (EPA Estimate)

# Farm-to-Kitchen Environmental Footprint of U.S. Food Loss and Waste

(excluding impacts of waste management,  
such as landfill methane emissions)



GHG emissions of  
**42 coal-fired power plants**



Enough water and energy to supply  
more than **50 million homes**



The amount of fertilizer used  
to grow **all plant-based foods**



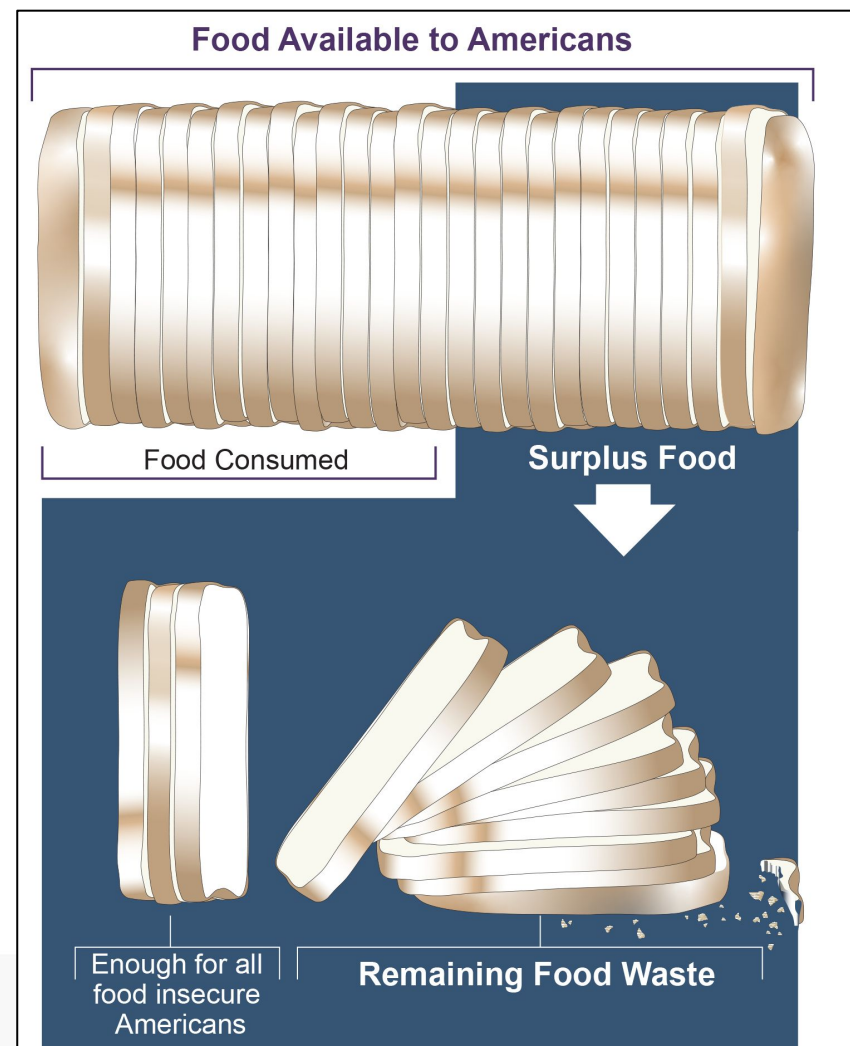
An area of agricultural land  
equal to **California and New York**

## Impacts of Uneaten Food: Hunger and Food Insecurity

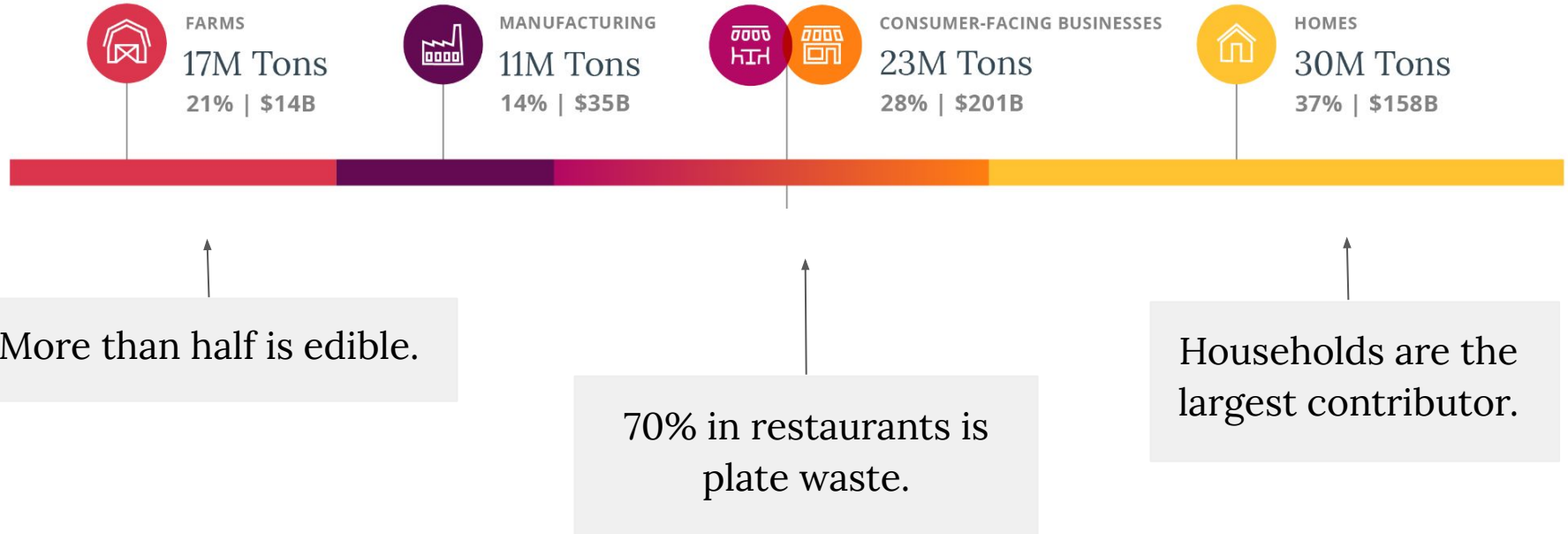


Source: Feeding America

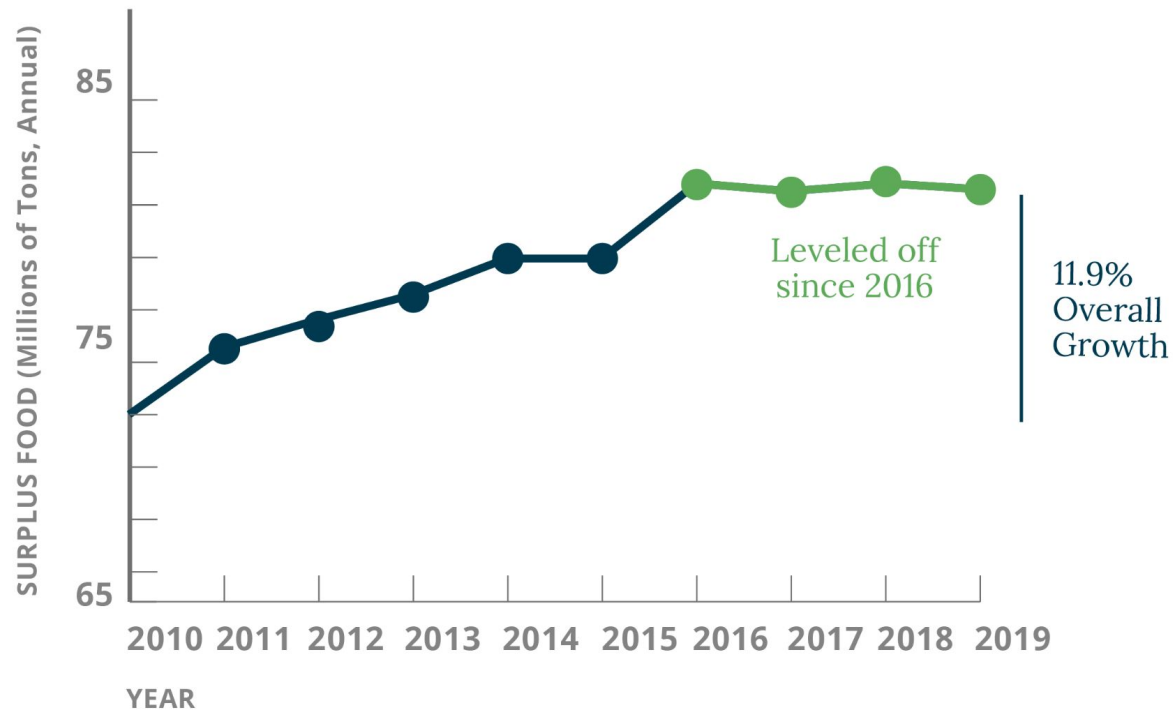




Surplus food occurs across the supply chain.

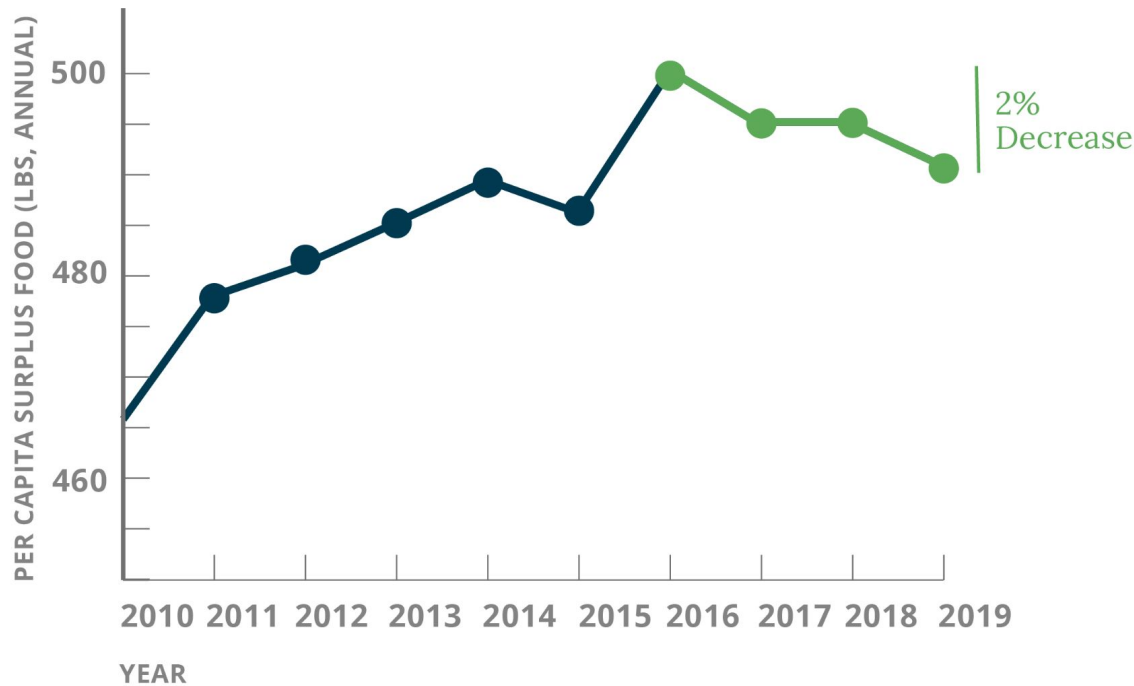


Surplus food has leveled off since 2016...



Source: ReFED

And *per capita* surplus food has actually declined to 2014 levels.



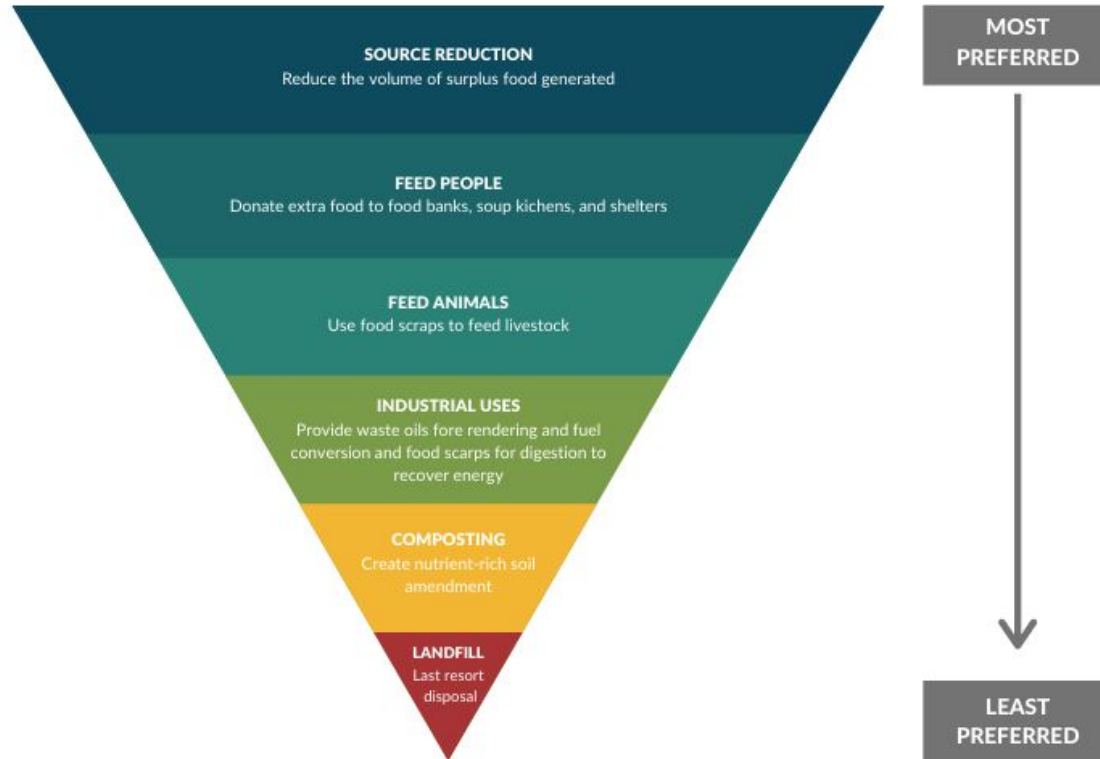
Source: ReFED



# 50%

National and international goal  
for the amount of food waste  
that must be reduced by the year  
2030

# EPA Food Recovery Hierarchy



# Reaching Our 2030 Goal



## WHAT'S NEEDED

40+  
SOLUTIONS

\$14B  
INVESTMENT ANNUALLY

POLICY CHANGES

INNOVATION

ENGAGEMENT

## WASTE REDUCTION

45M  
ANNUAL FOOD WASTE  
DIVERSION (TONS)

## IMPACT PER YEAR



\$73B NET FINANCIAL BENEFIT



4T GALLONS IN WATER SAVINGS



75M TONS GHG EMISSION REDUCTION  
POTENTIAL (MT CO2e)



4B MEALS FOR PEOPLE IN NEED



51K JOBS CREATED THROUGH SOLUTION  
IMPLEMENTATION OVER 10 YEARS



A Five-to-One Annual Return

\$14B



\$73B

## Mobilizing Capital is Essential



### Project Finance (Gov't.)

\$714M / 5%

### Tax Incentives (Gov't.)

\$97M / 1%

### Grants (Gov't.)

\$1,024M / 7%

### Grants (Non-Gov't.)

\$1,217M / 9%

### Impact-First Investments

\$909M / 6%

### Venture Capital

\$1,421M / 10%

### Private Equity

\$1,085M / 8%

### Corporate Finance & Spending

\$7,124M / 50%

### Project Finance (Commercial)

\$617M / 4%

**\$3B**  
Catalytic Capital

- De-risks new innovation
- Unlocks bottlenecks
- Overcomes agency problems
- Simulates marginal projects

# A Blueprint for Action

The *Roadmap to 2030* looks at the entire food system and provides a framework to focus waste reduction efforts. Powered by the Insights Engine, the *Roadmap to 2030* is an indispensable resource for reaching our 2030 goal.

7

ReFED outlined seven key action areas for the food system to focus its efforts over the next ten years to *prevent*, *rescue*, and *recycle* food at risk of going to waste.

## PREVENTION



Optimize  
The  
Harvest



Enhance  
Product  
Distribution



Refine  
Product  
Management



Maximize  
Product  
Utilization



Reshape  
Consumer  
Environments



Strengthen  
Food  
Rescue



Recycle  
Anything  
Remaining

## RESCUE

## RECYCLING

## Action Areas



### OPTIMIZE THE HARVEST

Avoid over-production, then harvest as much as possible. For wild caught products, source only what is needed.



### ENHANCE PRODUCT DISTRIBUTION

Leverage technology to create smart systems that help efficiently move products to maximize freshness and selling time.



### REFINE PRODUCT MANAGEMENT

Align purchases with sales as closely as possible and find secondary outlets for surplus. Build out systems and processes for optimal on-site handling.



### MAXIMIZE PRODUCT UTILIZATION

Design facilities, operations, and menus to use as much of each product as possible. Upcycle surplus and byproducts into food products.



### RESHAPE CONSUMER ENVIRONMENTS

Drive consumers towards better food management and less waste by creating shopping, cooking, and eating environments that promote those behaviors. Shift culture to place more value on food and reduce waste.



### STRENGTHEN FOOD RESCUE

Further the rescue of high-quality, nutritious food by increasing capacity, addressing bottlenecks, and improving communication flow.



### RECYCLE ANYTHING REMAINING

Find the highest and best use for any remaining food or food scraps in order to capture nutrients, energy, or other residual value.

Modeled Solutions

Unmodeled Solutions

Best Practices

OPTIMIZE THE HARVEST	ENHANCE PRODUCT DISTRIBUTION	REFINE PRODUCT MANAGEMENT	MAXIMIZE PRODUCT UTILIZATION	RESHAPE CONSUMER ENVIRONMENTS	STRENGTHEN FOOD RESCUE	RECYCLE ANYTHING REMAINING
Buyer Spec Expansion	Decreased Transit Time	Assisted Distressed Sales	Active & Intelligent Packaging	Meal Kits	Donation Coordination & Matching	Centralized Anaerobic Digestion
Gleaning	First Expired First Out	Decreased Minimum Order Quantity	Manufacturing Byproduct Utilization (Upcycling)	Buffet Signage	Donation Education	Community Composting
Imperfect & Surplus Produce Channels	Intelligent Routing	Dynamic Pricing	Manufacturing Line Optimization	Consumer Education Campaigns	Donation Storage Handling & Capacity	Centralized Composting
Partial Order Acceptance	Temperature Monitoring (Pallet Transport)	Enhanced Demand Planning	Edible Coatings	K-12 Lunch Improvements	Donation Transportation	Co-digestion at Wastewater Treatment Plants
Field Cooling Units	Reduced Warehouse Handling	Increased Delivery Frequency	Improved Recipe Planning	Package Design	Donation Value-Added Processing	Home Composting
In-Field Sanitation Monitoring	Advanced Shipment Notifications	Markdown Alert Applications	In-House Repurposing	Portion Sizes	Blast Chilling to Enable Donations	Livestock Feed
Innovative Grower Contracts	Early Spoilage Detection (Hyperspectral Imaging)	Minimized On-Hand Inventory	Precision Food Safety	Small Plates	Donation Reverse Logistics	Waste-Derived Agricultural Inputs
Labor Matching	Inventory Traceability	Temperature Monitoring (Foodservice)	Discount Meal Plates	Standardized Date Labels	High-Frequency Reliable Pickups	Insect Farming
Smaller Harvest Lots	Modified Atmosphere Packaging System	Waste Tracking (Foodservice)	Employee Meals	K-12 Education Campaigns	Established Relationships with Businesses	Rendering
Improved Communication for Planting Schedules	Vibration & Drops Tracking	Low Waste Event Contracts	Larger Quantities for Take Home	Trayless	Culling SOPs	Waste-Derived Processed Animal Feed
Sanitation Practices & Monitoring	Optimized Truck Packing, Loading & Unloading (e.g., Cross-Docking)	Direct to Consumer Channels	Small and Versatile Menus	Home Shelf-life Extension Technologies		Waste-Derived Bioplastics
Optimized Harvesting Schedules	Enforcing Cold Chain SOPs	Online Marketplace Platform	Sous-Vide Cooking	Smart Home Devices		Waste-Derived Biomaterials
On-Farm / Near-Farm Processing	Regular Maintenance on Refrigerated Trucks	Online, Advanced Grocery Sales		Waste Conscious Promotions		Enabling Technologies (e.g. depackaging and pre-treatment)
Local Food Systems	Cross-Docking	Precision Event Attendance		Frozen Value-Added Processing of Fresh Produce		Separation & Measurement
Clear Product Ownership		Repackaging Partially Damaged Products		Customizable Menus/Options		Relationships with Waste Haulers
		Retail Automated Order Fulfillment		To-Go Offerings		Waste Audits by Waste Haulers
		SKU Rationalization		Free Items Offered Upon Request (e.g., bread, chips)		
		Markdowns		Storytelling (e.g. product impact, source, upcycled ingredient components)		
		Optimal Storage				
		Reduced Displays				
		Optimized Walk-In Layouts				



## PREVENTION

Optimize  
The  
Harvest

IMPERFECT & SURPLUS  
CHANNELS



Enhance  
Product  
Distribution

INTELLIGENT ROUTING &  
INVENTORY TRACEABILITY



Refine  
Product  
Management

ENHANCED DEMAND  
PLANNING & SECONDARY  
RESALE



Maximize  
Product  
Utilization

UPCYCLING



Reshape  
Consumer  
Environments

MEAL KITS



## RESCUE

Strengthen  
Food  
Rescue

DONATION  
COORDINATION,  
MATCHING &  
TRANSPORTATION



## RECYCLING

Recycle  
Anything  
Remaining

COMPOSTING & AD



GLEANNING



TEMPERATURE  
MONITORING &  
COLD CHAIN



DYNAMIC PRICING &  
MARKDOWN ALERTS



SHELF-LIFE EXTENSION



HOME SHELF-LIFE  
EXTENSION



IMPROVED PLANNING &  
LABOR MATCHING



EARLY SPOilage  
PREVENTION & DETECTION



WASTE TRACKING



ACTIVE & INTELLIGENT  
PACKAGING



CONSUMER & K-12  
EDUCATION



WASTE-DERIVED  
AG INPUTS



## RESEARCH, MEASUREMENT, CONVENING, POLICY & ADVOCACY



# Growing Awareness and Investment in Food Waste Solutions

## FAST COMPANY

### Katy Perry and Oprah Winfrey just invested in this startup to eliminate food waste, one avocado at a time

Apeel Sciences combats greenhouse gas emissions via its ingenious coating to preserve the shelf life of fruits and vegetables—and it's the ideal investment for a sustainability-minded celebrity.



## THE WALL STREET JOURNAL.

English Edition | Print Edition | Video | Podcasts | Latest Headlines

### Food-Waste Startups Attract Funding as Grocers, Others Go Green

Venture-capital firms are investing in startups offering tech-savvy ways to make sure more food is eaten, not thrown away



## The Washington Post

A third of all food in the U.S. gets wasted.  
Fixing that could help fight climate change.



# ReFED Insights Engine

An interactive knowledge hub for food loss and waste launched in 2021, the Insights Engine lets users:

1. Understand the Problem

2. Explore the Solutions

3. Find Solution Providers

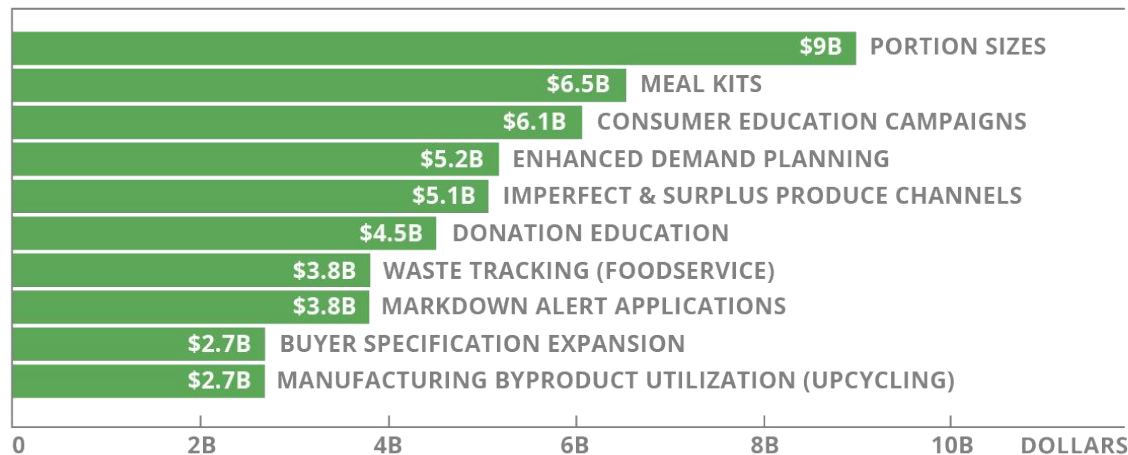
4. Calculate Impact

Launch the Insights Engine





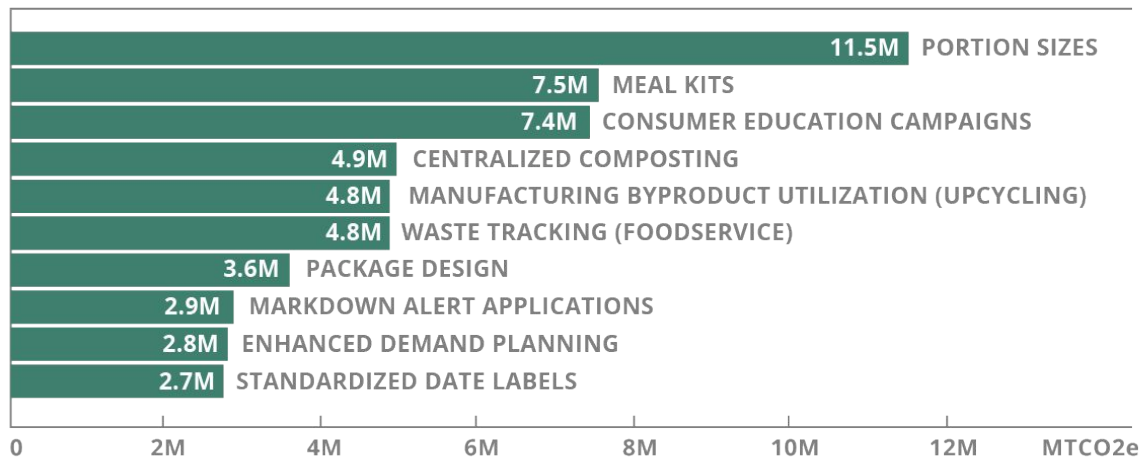
## Top Ten Solutions | **NET FINANCIAL BENEFIT**





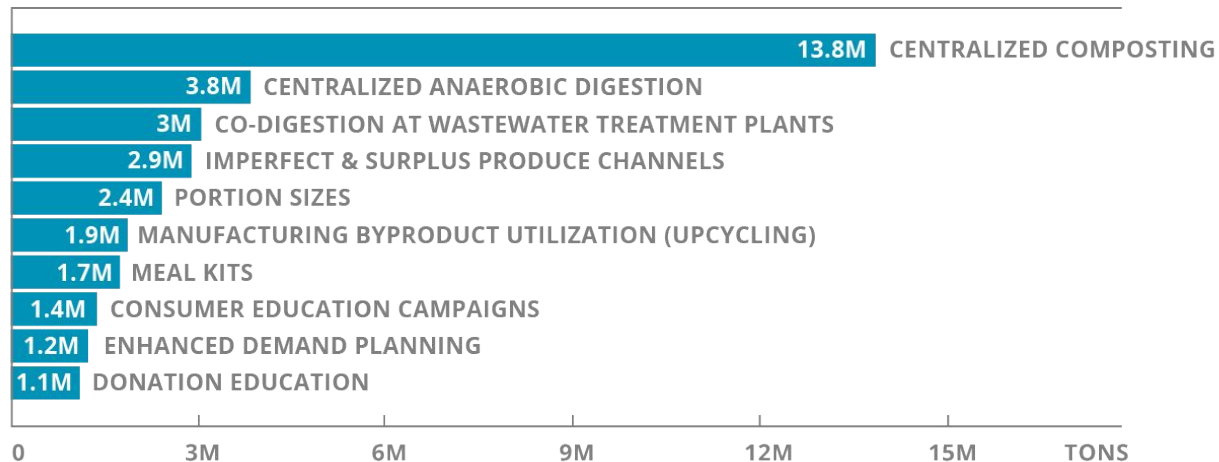


## Top Ten Solutions | GHG EMISSIONS AVOIDED IN MTCO<sub>2</sub>e





## Top Ten Solutions | **TONS WASTE DIVERTED**

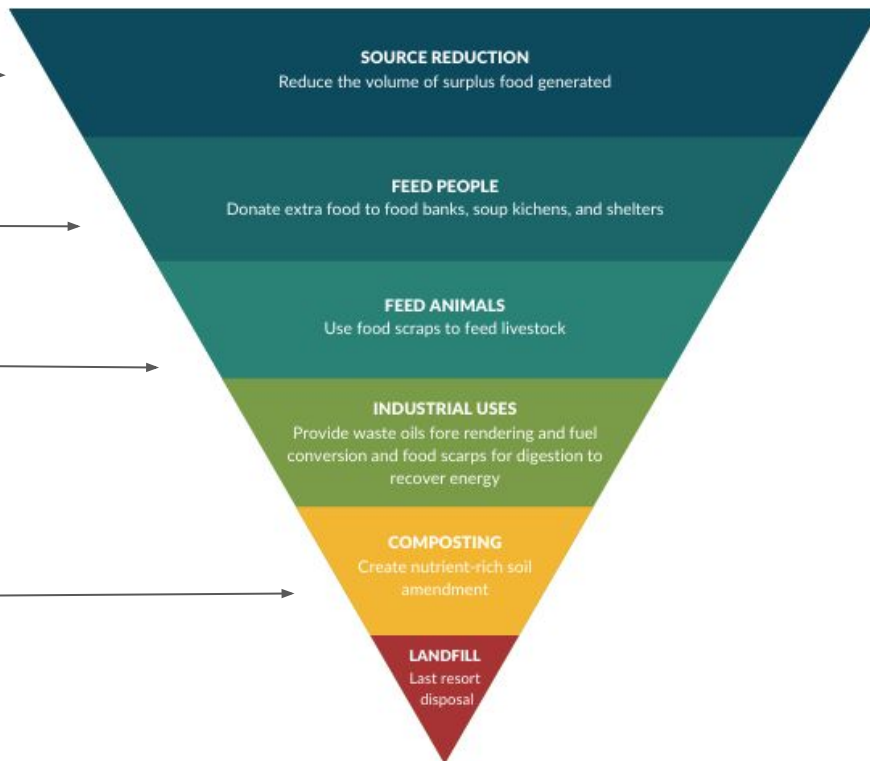


Date Labeling  
Measurement/Reporting  
Incentives  
Technical Assistance/PPPs  
Public education  
Reduction in schools

Tax Incentives  
Liability Protections  
Farm surplus purchasing  
Grant programs/Infrastructure

Removal of Animal  
Feed Restrictions

Support of state/local programs  
Infrastructure grants  
Compost use directives



**MOST  
PREFERRED**

**LEAST  
PREFERRED**

# Stay Connected



@refed

refed.org  
insights.refed.org

