ReFED
Rethink Food Waste through Economics and Data

Food Waste Solutions, Economics, and Agriculture

Presentation to the Farm, Ranch, and Rural Communities Committee, November 13, 2021
**Our Mission**

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

**Our Vision**

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

<table>
<thead>
<tr>
<th>DATA &amp; INSIGHTS</th>
<th>CAPITAL &amp; INNOVATION</th>
<th>STAKEHOLDER ENGAGEMENT</th>
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<tbody>
<tr>
<td>Leveraging data and insights to highlight supply chain inefficiencies and economic opportunities</td>
<td>Catalyzing capital to spur innovation and scale high-impact initiatives</td>
<td>Mobilizing and connecting supporters to take targeted action</td>
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Aligning with the United Nations 2030 Sustainable Development Goals, we are working toward a **50% reduction in food loss and waste** by the year 2030. We'll get there by:

**Motivating More Actors**: We use compelling data, actionable guidance, and strategic communications to inspire, inform, and guide people towards action.

**Mobilizing More Action**: We catalyze capital, collaboration, and innovation to accelerate adoption of solutions.

**Advancing More Solutions**: We break down barriers to solution innovation and adoption, and drive scale.

Our Work
THE PROBLEM

40% of all food goes uneaten

$218B a year is spent on food that is never eaten

Meanwhile

50M+ Americans are food insecure
Environmental Impact of Food that is Produced But Never Eaten

- 8% of Global GHG Emissions
- 21% of All Freshwater*
- 19% of All Fertilizer*
- 18% of All Cropland*
- 21% of Landfill Volume*

*statistics are based on US numbers
ReFED estimates that reducing food waste by just 20% would have the following positive impacts annually:

- 1.8 billion meals recovered
- 1.6 trillion gallons of water conserved
- 18 million tons of GHG emissions avoided
- $6 billion of consumer savings
What is Food Waste?
EPA Food Recovery Hierarchy

Source Reduction
Reduce the volume of surplus food generated

Feed Hungry People
Donate extra food to food banks, soup kitchens and shelters

Feed Animals
Divert food scraps to animal food

Industrial Uses
Provide waste oils for rendering and fuel conversion and food scraps for digestion to recover energy.

Composting
Create a nutrient-rich soil amendment

Landfill/Incineration
Last resort to disposal

EPA/USDA/FDA goal to reduce by 50% by 2030
Definition of “Food Loss and Waste”--International Goals

**Figure 2: Recommended scope for interpreting SDG Target 12.3**

- **Timeframe:** 12 months
- **Material Type:** Food, Inedible parts
- **Destination:** Animal feed, Biomaterial/processing, Composting, Anaerobic digestion, Compost/aerobic, Controlled combustion, Land application, Landfill, Not harvested, Refuse/discard, Sewer
- **Boundary:** Food category, Lifecycle stage, Geography, Organization
- **Related Issues:** Pre-harvest losses and the weight of product packaging are excluded from the weight of FLW.

Source: Adapted from FLW Protocol 2016.
Definition of “Food Loss and Waste”--U.S. Goals

**FIGURE 2: Recommended scope for interpreting SDG Target 12.3**

**TIMEFRAME**
- 12 months

**MATERIAL TYPE**
- Food
- Inedible parts

**DESTINATION**
- Animal feed
- Biomaterial/processing
- Compost/aerobic
- Controlled combustion
- Land application
- Landfill
- Not harvested
- Refuse/discard
- Sewer

**BOUNDARY**
- Food category
- Lifecycle stage
- Geography
- Organization

**RELATED ISSUES**
- Pre-harvest losses and the weight of product packaging are excluded from the weight of FLW.

Source: Adapted from FLW Protocol 2016.
ReFED’s Original Roadmap
How much food waste is there?

FOOD WASTED BY WEIGHT — 63 MILLION TONS

- Farms: 10M (16%)
- Manufacturers: 1M (2%)
- Consumer-facing businesses: 25M (40%)
- Homes: 27M (43%)

CONSUMER-FACING BUSINESSES INCLUDE

- Supermarkets, Grocery Stores & Distribution Centers: 8M
- Full-Service Restaurants: 7M
- Institutional & Foodservice: 5M
- Limited-Service Restaurants: 4M
- Government: 0.5M
How much is it worth?

VALUE OF WASTE — $218 BILLION
The financial cost of food waste ends up costing consumers the most due to the difference in retail pricing versus wholesale pricing for consumer-facing businesses.
The aggregate financial benefit to society (consumers, businesses, governments, and other stakeholders) minus all investment and costs per ton of food waste diverted. It shows the amount of benefit received per ton of reduction and is calculated as the Economic Value per Ton.
The tons of annual waste that can feasibly be diverted from landfills and on-farm losses per solution.

<table>
<thead>
<tr>
<th>Financial Benefit</th>
<th>Waste Diverted</th>
<th>Emissions Reduced</th>
<th>Water Saved</th>
<th>Jobs Created</th>
<th>Meals Recovered</th>
</tr>
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The diagram shows the tons of waste in thousands per year for various solutions, with the highest being a centralized composting facility with anaerobic digestion (AD) and water resources recovery facility (WRF) with AD.
Greenhouse gases are reduced per solution by avoiding the resources that go into producing, processing, and transporting food, as well as the methane emissions from food disposed of in landfills.
The ReFED Insights Engine and Roadmap to 2030
Informing the Future: The ReFED Insights Engine

The ReFED Insights Engine is an online data center designed to serve as the next generation of data, insights, and guidance on U.S. food waste reduction.

Through a variety of online tools and resources, users will be able to:

- View a quantitative analysis of solutions
- Generate customized analyses of solutions pertinent to a stakeholder’s situation
- Understand the public, private, and philanthropic investments needed
- Identify and connect with solutions providers
- Calculate the environmental and social impacts of each solution

Live Demo: https://refed-frontend.vizzuality1.now.sh/
The *Roadmap to 2030* will condense key takeaways from the Insights Engine to articulate an action plan with seven priority action areas for key food system stakeholders.

1. Optimize The Harvest
2. Enhance Product Distribution
3. Refine Product Management
4. Maximize Product Utilization
5. Reshape Consumer Environments
6. Strengthen Food Rescue
7. Recycle Anything Remaining
Informing the Future: Roadmap to 2030

**PREVENTION**

1. **Optimize The Harvest**
   - Avoiding overproduction, then harvesting as much as possible. For wild-caught products, sourcing only what is needed.

2. **Enhance Supply Chains**
   - Leveraging technology to create smart systems that help efficiently move products to maximize freshness and selling time.

3. **Refine Product Management**
   - Aligning purchases with sales as closely as possible, and finding secondary outlets for surplus. Building out systems and processes for optimal on-site handling.

4. **Maximize Product Utilization**
   - Designing facilities, operations and menus to make use of as much of each product as possible. Upcycling byproducts into food products.

5. **Reshape Consumer Environments**
   - Driving consumers towards better food management and less waste by creating shopping, cooking, and eating environments that promote those behaviors. Shifting culture to place more value on food.

**RESCUE**

6. **Strengthen Food Rescue**
   - Furthering the rescue of high-quality, nutritious food by increasing capacity, addressing bottlenecks and improving communication flow.

7. **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.
Preliminary results show that Optimize the Harvest solutions have low net financial benefit, but high potential for tons to be captured with new solutions.

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<th>Metric</th>
<th>Value</th>
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<tr>
<td>Net Financial Benefit</td>
<td>LOW</td>
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<tr>
<td>Tons of Surplus</td>
<td>HIGH</td>
</tr>
<tr>
<td>Climate Mitigation</td>
<td>MEDIUM</td>
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Preliminary Draft - Not Final
## Optimize the Harvest Solutions (Specialty Crop Focus)

<table>
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<tr>
<th>Best Practices</th>
<th>Modeled Solutions</th>
<th>Unmodeled</th>
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<tbody>
<tr>
<td>Sanitation Practices</td>
<td>Buyer Spec Expansion</td>
<td>Field Cooling Units</td>
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<tr>
<td>In-field Sanitation Monitoring</td>
<td>Partial Order Acceptance</td>
<td>Labor Matching Software</td>
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<td>Optimized Harvesting Schedules</td>
<td>Gleaning</td>
<td>Innovative Grower Contracts</td>
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<td>Imperfect Product Lines</td>
<td>Improved Communication for Planting Schedules</td>
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<td>Risk-Based Quality Procedures</td>
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<td>Smaller Harvest Lot</td>
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Landfill Bans

[Map showing states and municipalities with organic waste bans and waste recycling laws]
State Tax Incentives

STATES OFFERING ADDITIONAL TAX INCENTIVES FOR FOOD DONATION

Federal policy provides businesses with a tax incentive for food donations. States shaded above offer additional tax incentives for food donations.
A Word on Data
Thank you

For questions and more information please contact:

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What interests us about food waste is that it is a very solvable problem. ReFED has made food waste understandable

Jesse Fink
Founder, ReFED
ReFED Insights Engine: U.S. Food Waste Monitor

Combines 50+ public and proprietary datasets to quantify the amount and cost of surplus food in the U.S. with breakdowns by sector, food type, and state.

Sample Use Cases:

- **Food Businesses** can identify hot spots to prioritize programs
- **Entrepreneurs** can identify opportunities areas for innovation
- **Food Recovery Organizations** can prioritize their sourcing strategy for specific food types, sectors, and geographies
- **Researchers** can identify data gaps to guide future research.
Food Waste Monitor: Destination Breakdown

5.72M Tons of Food Surplus were generated in Retail across all states in 2019.

- Landfilled: 1.7M Tons (29.66%)
- Donated: 1.09M Tons (15.11%)
- Animal feed: 1.06M Tons (18.52%)
- Composted: 1.03M Tons (17.04%)
- Anaerobically digested: 275k Tons (4.81%)
- Biomaterial processing: 264k Tons (4.62%)
- Composted: 239k Tons (4.17%)
- Land application: 66.8k Tons (1.17%)

ABOUT THE DATA
Data quality: 1 Low - 5 High
Methodology
Glossary
Food Waste Monitor: Food Type Breakdown

5.72M Tons Food Surplus were generated in Retail across all states in 2019.

**Food departments**

- Produce: 3.0M Tons - 52.81%
- Dry goods: 1.04M Tons - 18.26%
- Breads & bakery: 58.0K Tons - 10.15%
- Candy: 419K Tons - 7.32%
- Dairy & eggs: 198K Tons - 3.47%
- Prepared foods: 188K Tons - 3.29%
- Fresh meat & seafood: 160K Tons - 2.80%
- Frozen: 70.2K Tons - 1.23%
- Ready-to-drink beverages: 50K Tons - 0.87%

**Destinations**

**Causes**

Data quality: Low to High

About the data:

Methodology

Glossary

DATA IS ILLUSTRATIVE
Food Waste Monitor: Cause Breakdown

5.72M Tons of Food Surplus were generated in Retail across all states in 2019.

Data is illustrative.

- **Date Labels**: 4.7M Tons (70.00%)
- **Spoilage**: 972k Tons (17.00%)
- **Residuals**: 572k Tons (10.00%)
- **Kitchen Trim**: 172k Tons (3.00%)

**Total**: 5.72M Tons

**About the Data**

- **Data Quality**:
  - Low
  - High

**Methodology**

**Glossary**
Prioritizes solutions by stakeholder to understand the environmental and social impact potential of each.

Sample Use Cases:

- **Climate Funders** can determine the highest impact GHG solutions for specific regions.
- **State Agencies** can see what solutions will divert the greatest amount of food from landfills in their state.
- **Grocery Retailers** can estimate the profit potential of food waste solutions for their business and for their customers.
Dives deeper into each solution, including market size, ROI, diversion and impact potential, challenges and stakeholder actions needed.

Sample Use Cases:

- **Sustainability Managers** can use to better understand options, then to pitch a pilot to their leadership.

- **Solution Providers** can share with potential clients and investors.

- **Consultants** can quickly find the numbers needed to run a business case on a particular solution for a client.
Allows filtered search through directory of food waste solution providers by solution type, service area, size, status, and performance metrics.

Sample Use Cases:

- **Food Businesses** can find food waste solution providers that operate in their area.
- **Investors** can find solution providers that match their investment thesis.
- **Solution Providers** can communicate their environmental and social impact to potential clients and investors.
Enables users to convert tons of food waste diverted to environmental and social impacts in a standardized method and format.

Sample Use Cases:

- **Food Banks** can quantify the impact of their organization for their annual report, including metrics such as GHG reduction, meals recovered, health impacts, etc.
- **Food Businesses** can quantify the impact of a specific food waste reduction program to share results with associates.
- **Food Waste Solution Providers** can communicate their impact to potential funders in a credible, standardized way.
Tracks food waste-related policies at the federal and state levels and sends notifications when new policies are proposed.

Sample Use Cases:

- **State Policy Makers** can find examples of policies passed in other states.
- **Food Businesses, Solution Providers,** and **Advocates** can receive notifications when new food waste-related policies are proposed.

ReFED Insights Engine: U.S. Food Waste Policy Tracker (2021)
Quantifies the annual philanthropic, private, and public investment in food waste solutions by funding area, state, recipient, investor, and capital type.

**Sample Use Cases:**

- **State Agencies** can understand what solutions are underfunded within their state.
- **Funders & Investors** can identify areas of white space, as well as the top recipients of funding for a given solution area.
- **Solution Providers** can see total funding in their solution area.