

May 2023

PREMIUM
REPORT

Food Loss & Waste Reduction

Premium Report Featuring 10 Exemplary Startups



Foodbytes
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Food Loss and Waste Reduction

Foodbytes aims to make connections within the F&A industry to drive meaningful improvement in the food value chain. To inspire and cultivate valuable collaborations, we are exploring 10 critical themes throughout the year that we believe are positioned to drive sustainable impact.

In May, our team explored **Food Loss and Waste Reduction**. We examined how companies are combatting pressing challenges like the **rising cost of transporting surplus food, disrupted supply chains due to global conflict and changes in labor availability**.

We scouted and reviewed more than 120 aligned startups, directing our focus on key trends driving growth. On the ground at the ReFED 2023 Food Waste Solutions Summit in St. Louis, MO, the Foodbytes team discussed directly with several industry leaders, funders, policymakers and emerging innovators shaping **food loss and waste (FLW)** solutions. In addition, we convened a targeted group of global Rabobank consumer foods and supply chain specialists, who lent their expertise in selecting 10 leading startups innovating in the space.



Featured Rabobank Experts



Maria Castroviejo
RaboResearch Senior Analyst
Consumer Foods



Michelle Huang
RaboResearch Analyst
Consumer Foods



Sudip Sinha
RaboResearch Senior Analyst
Beverages



Lieke Verhofstad
Business Development Manager
Food Transition



Margit van den Berg
Project Lead
Food Transition

Back to basics: The critical characteristics for food loss and waste (FLW) innovators

1

Creating full value chain solutions

FLW is created or supported by each point in the food supply chain, and it will require organized efforts between those points to have the most impact on reduction.

Emerging platforms are using data to coordinate behaviors between producers, manufacturers, retailers and consumers.

See: The Data Cartographers (pg 6)

2

Setting up for Scale

The business of food is marked by a high level of unpredictability. From input price volatility and labor availability to consumer expectation and more, innovators looking to reduce food waste must build technologies and products that can utilize a wide range of inputs across quality and volume.

See: The Circular Manufacturers (pg 10)

3

Bridging the Climate conversation

In addition to food insecurity and burdened waste management systems, FLW contributes to “the global problems of climate change, biodiversity loss and pollution,” according to the World Economic Forum. As investment into climate technologies grows, food waste innovators need to demonstrate their climate commitments by quantifying their impact across a range of ESG metrics, including water and energy savings.

See: The Resilient Producers (pg 8)

4

Integrating with existing behavior

Reducing the friction of switching to lower food waste practices is essential for both businesses and consumers looking for new solutions. For businesses, modular operational systems that can layer on top of their existing platforms will find an easier path to scale. For consumers, innovators are striving to develop products or services that can work as a 1:1 replacement for steps in their current routines.

See: The Data Cartographers (pg 6)

5

Creating accessible products

Part of creating a food system with less waste is encouraging more consumer mindfulness around the topic. Companies that are pioneering upcycled brands give the consumer an ability to see their impact firsthand, while often creating demand for underutilized ingredients.

See: The Scrappy Productizers (pg 12)

One leading grocery retailer's estimated food waste value equals close to 9% of adjusted operating profit.

\$18^{BN}
NEEDED
TO REDUCE FLW BY 50%

\$500^M
**CURRENTLY
INVESTED**
TO REDUCE FLW BY 50%

Food Loss and Waste is a Climate and Business Imperative

Several of the world's largest retailers and suppliers have committed to FLW initiatives in recent years, driven by the United Nations' Sustainable Development Goal Target 12.3. This aims to halve per capita global food waste at the retail and consumer levels and to reduce food losses along the supply chain by 2030. Beyond ESG targets, **"reducing food waste should become a business priority,"** according to a [report from RaboResearch](#) **Consumer Foods analysts Michelle Huang and Sudip Sinha.** "Our in-depth analysis of leading grocery retailers reveals that **the hidden costs of food waste are enormous**, even at the best-performing chains," the team noted. They measured one such retailer's estimated food waste value to equal close to 9% of adjusted operating profit.

To achieve the required reduction in FLW, a massive amount of investment is still required. As Foodbytes partner ReFED notes, \$18B of investment is needed to reach the SDG 12.3 FLW reduction goals in the U.S. alone. In contrast, only about \$500M has been invested year to date. **"While food waste accounts for 8% of GHG emissions in the food sector, funding into the space is nowhere near equivalent"** as a share of climate tech investment, mentioned Alex Corai, **VP of Capital, Innovation and Engagement at ReFED during their Food Waste Solutions Summit.** Read on to explore the exemplary startups innovating in areas we believe are ripe for investment and collaboration.

10 Exemplary Startups Reducing Food Loss and Waste

How are startups addressing key drivers in unique ways? What type of traction are they seeing? How can you learn more and collaborate with them? We're glad you asked! **Click on their names in the next pages to view their Foodbytes profiles in the hub.** Once you're there, you can add them to your watchlist, read about their milestones and current goals, and get in touch to discuss collaboration.



The Data Cartographers

If there's one "wish list" item among organizations and companies fighting food loss and waste, it's data availability and consistency. The first step in addressing the root causes of the FLW issue is having a clear picture of where losses originate and where waste is distributed – Many supply chains are now set up to deliver that picture more clearly than before. The second step is interoperability: having that data talk to each other, learn from each other and tie back to real life decisions made along the way. **Winning data solutions can contextualize new data and information in terms of interrelated behaviors on farms, in processing facilities, at retail stores and in the home.**

From an analysis of the Foodbytes hub, we have gathered that the top focus of startups - across all sectors – is decision support software and big data aggregation and analytics. This points to a food industry reality - **one of the biggest challenges is the incredible amount of variability in the food system.**

Because of this, "startups that are value chain based, with a solution that is relevant to the whole supply chain, are very interesting to us," notes **Lieke Verhofstad from the Rabobank Food Transition team** during the Foodbytes review session.

Additionally, while many foodservice, retail and other consumer-facing businesses must deliver on their ESG targets, many upstream suppliers struggle to maintain FLW as an urgent priority while battling inflation, cost and margin. In response to these stressors, **emerging data solutions can quantify their impacts in terms of profitability for suppliers, while delivering sustainability messaging downstream.**

"Talking about profitability instead of sustainability is what resonates most with customers," shared Matt Schwartz, CEO and Co-founder of [Afresh](#), at the ReFED conference.





Photo: Orbisk

The Data Cartographers



- **Orbisk:** Outfitting waste bins in professional kitchens with a scale and a smart camera, allowing for identification and optimization of inefficiencies in the process.



- **Rebound Technologies:** Developing a 2-in-1 solution for frozen food processors and cold chain logistics companies, consisting of a freeze point suppression cycle that combines agile freezing and unprecedented humidity control.



- **Wiagro:** Developing a digital post-harvest platform, based on IoT devices and Blockchain, that is committed to quality control and conservation, establishing a worldwide standard for traceability and food care.

The Resilient Producers

Several major retailers – including Tesco, Carrefour and Walmart – have committed to reducing food loss and waste in their operations, in coordination with SDG 12.3. To achieve this goal, they have also committed to working with their leading suppliers to achieve this goal. In fact, **Consumer Foods Analyst Michelle Huang’s RaboResearch report notes that these retailers have joined an initiative called 10x20x30**, “which brings together 10 of the world’s largest food retailers and providers to engage with 20 of their priority suppliers and aims to halve rates of food loss and waste by 2030.”

This collaboration can help address structural challenges, such as the “overproduction of crops due to producer-retailer contracts building in surpluses to anticipate shrinkage,” notes Rabobank’s Food Transition Project Lead, Margit van den Berg. Additionally, we believe support from downstream retailers will help de-risk farm pilots aiming to incorporate more sustainable practices that circumvent overproduction and the food loss that follows.

“The true impact of food waste on the supply chain is underestimated – beyond carbon emissions, it turns into even more harmful methane in the land fill,” notes **Lieke Verhofstad**, heading business development in Rabobank’s Food Transition Team. “The highest value of all FLW initiatives is prevention,” notes her colleague **Margit van den Berg**, Food Transition project lead.



Collaboration is also helpful in measuring the impact of existing upstream innovations in the context of food loss and waste.

An analysis of startups in the Foodbytes hub shows an **overlap with FLW goals across numerous innovations within the agricultural inputs and supply chain logistics sectors** – even when the startups themselves aren’t positioning themselves in the food waste sphere. Many of these solutions – like **plant health and crop protection technologies** – **deliver direct results on food loss prevention**, but are marketed in terms of yield optimization and resource efficiency.

Collaboration between producers and retailers can tie these technologies to FLW outcomes further down the supply chain and provide a fuller picture of the resulting sustainability impact.

In fact, startups and other solution providers are looking towards developing carbon markets to make the business of food loss and waste mitigation more lucrative. While initially focused on food rescue, non-profit Verra – which sets and verifies carbon credit standards – is leading the charge with a new methodology for food waste carbon credits. The hope is that these credits will offer more financial stability for “capital-intensive food rescue operations – many of which require expensive assets such as trucks, warehouses and cold storage facilities to move food around and preserve it,” according to an **article** by GreenBiz.



The Resilient Producers



- **Cultiva LLC:** Providing safe, natural and innovative plant health solutions that enhance the fruit and leaf cuticle and give growers season-long protection against environmental stressors to help maximize their marketable yields.



- **Pebble Labs Inc.:** Developing a biological platform using precision engineered microbes to effectively provide systemic, continuous RNA-based protection – from inside the plant – against diseases and pests.

The Circular Manufacturers

Recently, Rabobank [interviewed](#) a family-run vegetable processing company and client that has taken strides towards their own FLW reduction through a circular approach – creating an entire new business line for upcycled carrot fiber. “Because we have a good overview of which farmers grow what and for whom, we can see at any time which product is suitable for a particular market and purpose,” explains **Van Veldhuizen, Director at Van Rijsingen Beheer BV**. “And if a particular crop does not meet the specifications to be sold as fresh produce, the grower no longer needs to throw it away. We can process it into a food ingredient instead. Granted, the grower will receive less money for that crop, but it’s better than nothing at all. **In that way, focusing on adding value ensures more stable chains.**”

By tapping into new applications and market opportunities for upcycled ingredients, innovative companies can **deliver the highest and best use for surplus food**, which is seen as a collective mission in the upcycling space. It is worth noting, however, that not all food surpluses or byproducts are set up to scale as food ingredients. According to **RaboResearch Consumer Foods Analyst Michelle Huang**, “**the key question for upcycling propositions is whether it can be a sizeable business**. Low volumes and high costs make this type of business difficult to commercialize.” On the other hand, feed upcycling – although lower on the food pyramid – “can still offer a valid proposition from a sizeable business perspective,” notes Huang. For example, poultry feed prices remain high and offer an attractive market for alternatives.



“

The key question for upcycling propositions is whether it can be a sizeable business.

Michelle Huang - RaboResearch Consumer Foods Analyst

The Circular Manufacturers



- **Bright Feeds:** Converting unwanted food into a high-quality, nutrient-rich animal feed replacement for soy and corn, using cutting-edge AI and drying technology in an energy-efficient and carbon-negative process.



- **AgriFiber Solutions:** Manufacturing upcycled, GRAS (Generally Recognized as Safe) approved dietary fibers – both soluble and insoluble arabinoxylan prebiotic fibers – in liquid and dry form for uses ranging from bakery and beverage to meats and ice cream.

The Scrappy Productizers

During our search for FLW innovators in the Foodbytes hub, **the largest category of startups was within branded upcycled products.** While the number of innovators in the space is exciting and demonstrates growing consumer interest in upcycled foods, it can also create difficulty in differentiating the products based on branding and marketing alone.

For corporates looking to adopt or buy upcycled products – **“the key question is on alternative costs,”** notes **Consumer Foods Analyst Maria Castroviejo.**

For example, a buyer of upcycled carrot fiber would also be replacing an existing product. To accurately reflect their impact from an ESG and business perspective, **innovators need to be aware of the 1) costs, 2) environmental impact, 3) reliability of source, and 4) supply chain volatility of the inputs they are replacing.** For consumers, brands that balance a familiarity of taste and design, ease of use and habitual use – combined with educational data transparency to gamify impact – can **motivate consumers to embrace change.**





Photo: Kazoo Snacks

The Scrappy Productizers

KAZOO

- **Kazoo Snacks:** Upcycling corn germ to create a sustainable baked corn CPG platform, with the world's first science-backed water footprint savings claims on-package.

MATRIARK

- **Matriark Foods:** Creating upcycled, carbon-neutral food products sold across foodservice, retail, foodbanks and private label, to produce value for farmers, processors, private enterprise and the public sector.

THE SPARE FOOD CO.

- **The Spare Food Co:** Tapping into the 40%+ of overlooked and unused ingredients across the supply chain – like surplus produce and historically co- and by-products of manufacturing processes – to create impactful consumer goods, the first of which is a sparkling tonic powered by whey.

A window into the future of Food Loss and Waste Reduction

Beyond the current challenges and opportunities for food companies – prioritizing resource efficiency and sustainability, building consumer awareness and focusing on more resilient supply chains – we see **two major innovation whitespaces for the future of food loss and waste reduction:**

1 Public-Private Partnerships

A spokesperson from innovator Too Good To Go noted at the ReFED Food Waste Solutions Conference, “there are hundreds of startup solutions in the market, and there are numerous sustainability teams at big corporates, **but it’s not coordinated enough yet to go beyond the pilot phase.**” Collaboration between governments and private enterprise can help align policies, private sector actions, farmer practices, and consumer behavior towards FLW reduction. Additionally, **public-private partnerships have a powerful potential to support far-reaching overhauls in infrastructure that involve cross-industry goals, such as the transformation of food waste into energy.** Sustainability conversations need to be had in the same rooms where business decisions are made.

2 Aggregator-Trader Models

With a fragmented food system, localized efforts to minimize food loss and waste can struggle to find reliable input streams and volumes to offset the costs of their businesses. RaboResearch Consumer Foods Analyst Sudip Sinha notes that **“to bring the supply chain together and achieve workable volumes, potentially at global level, we need to develop aggregator-trader models to pool information and resources.”** Dedicated aggregator-traders in food waste – from byproduct procurement platforms to upcycled e-grocery – will reduce barriers to behavioral change, as well as help standardize impact measurement across the chain.

Through the Rabo Food & Agri Innovation Fund, Rabobank invested in one such solution, Foodbytes alum [Full Harvest](#). The startup is a business-to-business marketplace specializing in surplus and imperfect produce, solving the produce distribution efficiency problem and reducing on-farm waste.



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