FOOD SURPLUS IN U.S. DISTRIBUTION

Results and Analysis of Surplus Rates by Cause and Destination

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Georgina Morris
Georgina.morris@lidd.com

LIDD on behalf of ReFED

1. Introduction

In this report, we discuss the surplus occurring in U.S. food distribution, including its most common causes and management pathways (destinations), and the best practices distributors put in place to prevent surplus. Food distribution is a stage of the supply chain that has not previously been studied by ReFED and remains understudied in the existing literature more broadly. These estimates are therefore the first of their kind in the context of ReFED's surplus food modeling.

Food distributors function as wholesale intermediaries, purchasing products in large quantities from manufacturers or growers, and selling to foodservice providers (e.g. restaurants, hotels, public institutions) or retailers. Distributors aggregate products from several sources into a single warehouse or distribution center, often with different temperature zones, and assume the financial risk associated with storage, spoilage or fluctuating demand.

We analyze qualitative and quantitative insights from six semi-structured interviews with distributors across the United States, conducted in 2025.

2. Methodology

We collected primary quantitative and qualitative data **through 6 semi-structured interviews** with U.S. distributors. We asked participants structured questions about their surplus rates through different stages of operations, as well as the percentages attributable to different causes and destinations. We supplemented these questions with unstructured questions where necessary to gain a deeper understanding of different causes, destinations, and ways in which distributors prevent or divert surplus through different solutions and best practices.

The stages of operations at which we asked distributors to estimate their surplus rate are listed and defined in **Table 1:**

Stage of Operation	**Definition**
Inbound Goods	The reception of inbound orders.
Warehouse & Shipping	The storage of goods and assembling orders for shipping
Returns	Orders returned to the distributor by the customer.

We employed a convenience sampling approach which leveraged LIDD's pre-existing industry contacts. LIDD compiled a list of American food distributors from their former and current client base which formed the basis of our target population.

Our sample includes distributors of varying sizes and specialties. "Broad-liner" distributors carry a full range of products across all temperature zones: ambient, fresh, and frozen, whereas other distributors specialize on certain product categories such as proteins or frozen foods. Distributors can also vary by size, with larger distributors operating multiple distribution centers across several states, and smaller distributors serving a more limited geographic area. Some distributors supply both foodservice institutions and retailers, while others concentrate on one segment. Overall, our sample reflects a mix of broadline and specialty, small and large distributors, as well as those serving foodservice, retail, or both.

We analyzed quantitative data by calculating average (mean) surplus rates across all distributors, including a breakdown by cause and destination. Surplus is reported as a percentage of total food ingredients[1]. Since interviews were conducted in 2025, the data most closely reflect 2024, as interviewees generally relied on information from the prior year.[2]

We transcribed interviews and conducted a discourse analysis of qualitative data to draw out the key themes and better understand best practices in the industry to prevent or divert food loss.

3. Overall Surplus Rate

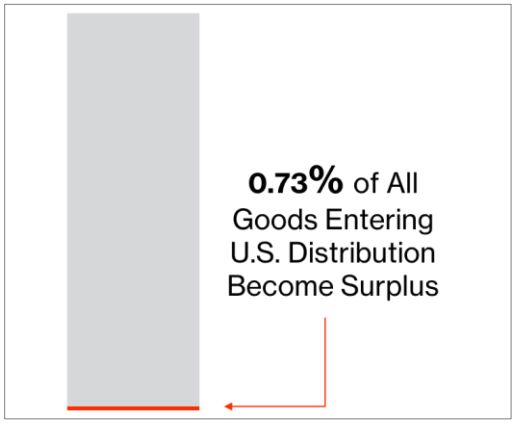


***Figure 1**: Total Food Surplus Rate in U.S. Distribution.*

On average, 0.73% of all food entering U.S. distribution becomes surplus. This is much lower compared to ReFED's estimates of food surplus in other stages of the supply chain.

The following factors contribute to low surplus rates in distribution:

1. **No Food Processing Occurs at the Distribution Stage.** Distributors receive finished goods and do not perform any transformation in their facilities, unlike other supply chain stages, such as manufacturing, foodservice, or the home.
2. **A Streamlined Operational Role.** The role of distributors in the supply chain is straightforward and highly optimized. They order, hold, and ship products through the sophisticated management of logistics and warehousing, to maximize profit margins.

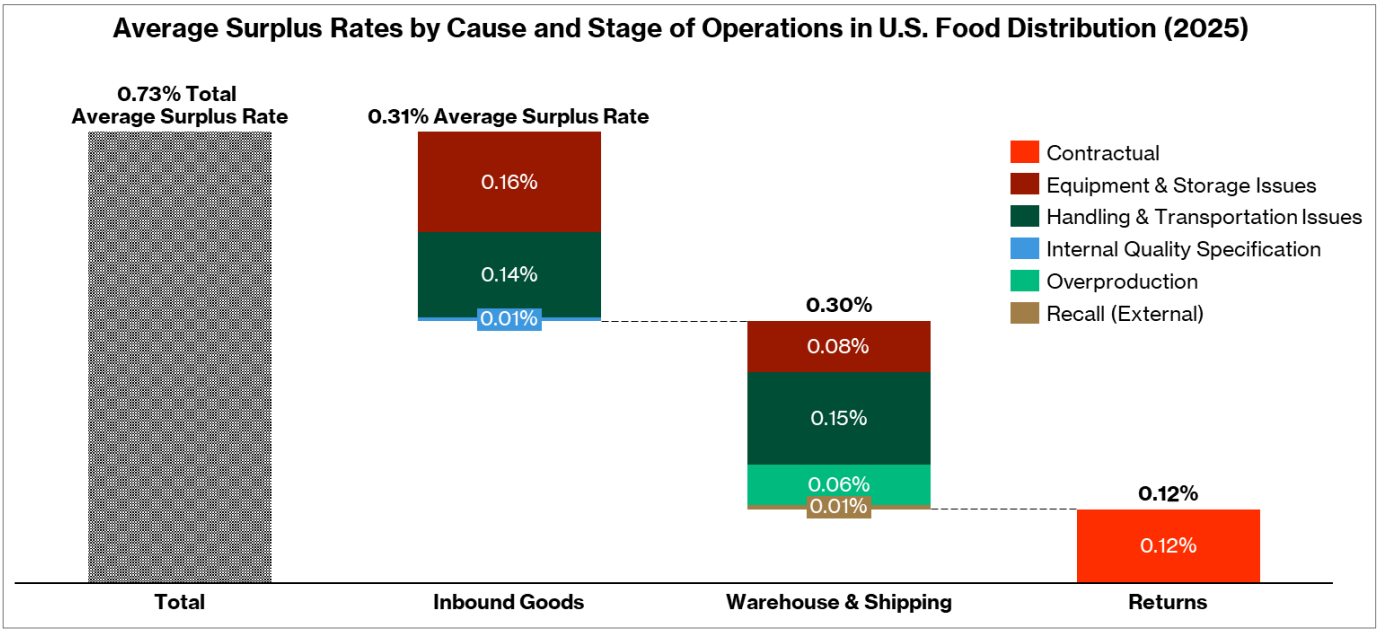
[1] We do not estimate food surplus in distribution by volume as we have done in our study on U.S. food manufacturing. This is because we do not have baseline estimates for volumes of food entering distribution, as we did for manufacturing. Estimating the total volume of food entering distribution would be highly complex due to the absence of mandatory reporting, dynamic market conditions, and the combination of imported and domestically produced volumes.
[2] Rather than 2023, which was used for manufacturing surplus estimates due to the availability of baseline data for that year.

3. **High Inventory Turnover Minimizes Outdated Products.** Their inventory turnover is high (though it varies by temperature zone) which reduces the likelihood of products becoming outdated while in storage.

4. **Scale Drives Efficiency.** Distributors typically function by leveraging economies of scale, operating large centers that serve wide regions. This scale supports advanced infrastructure and technology, more sophisticated forecasting and inventory systems, stronger supplier relationships, while also enabling access to waste-reduction solutions and initiatives that are often unavailable to smaller supply-chain actors.

Although the surplus rate in distribution is very low, the large quantities of food moving through this stage mean that recoverable volumes could still be significant. Furthermore, surplus at the distribution stage often has strong potential for diversion to human consumption, as it is typically already packaged and in an edible format, a point we explore in the following sections.

4. Surplus Causes



According to interviews, surplus in distribution is attributed to just 6 causes overall, with 4 among these accounting for the majority. In Figure 2, causes are shown across the three stages of operations in distribution, with Inbound Goods representing the receiving stage, Warehouse & Shipping representing the storage and preparation of orders, and the Returns representing returned orders (as defined in Table 1).

The range of total causes is smaller than other stages of the supply chain, reflecting the streamlined role of distributors and the absence of any transformation processes. The dominant causes were mentioned by three or more distributors while minor causes were mentioned by two or less.

Dominant Causes

1. Handling & Transportation Issues
2. Equipment & Storage Issues
3. Overproduction
4. Contractual

Minor Causes

1. Internal Quality Specification
2. Recall (External)

Most surplus occurs at the **Inbound Goods stage (average surplus rate of 0.31%)** or the **Warehouse & Shipping stage (0.3%)** due to two factors: **Equipment & Storage and Handling & Transportation Issues**. These two factors account for 73% of total surplus in Distribution, according to our interviews.

At the **Inbound Goods stage**, interviewees described how testing upon receipt can lead to rare but high-volume surplus events (Equipment & Storage Issues). For instance, occasionally entire truckloads are rejected either due to food safety concerns (such as pest or mold) or temperature issues (especially for meat and seafood).

Load shifting during transit can also cause damage and lead to pallets or cases being thrown out (Handling & Transportation Issues). Several interviews described rail as particularly prone to damage due to load shifting. Improper stacking of pallets can also cause them to fall over in trucks or can lead to crushed corners and damage. Other interviewees described nails sticking out of pallets leading to totes or cases being punctured.

At the **Warehouse & Shipping stage**, forklift damage accounts for low volume but regular instances of surplus mentioned by all distributors and contributing to the 0.15% surplus occurring due to Handling & Transportation. Goods that are punctured by forklifts cannot be redirected because they are considered contaminated. Similarly, interviewees described how lift driver errors, such as hitting racks or dropping pallets or cases can lead to damaged products.

Several poor inventory management practices can lead to surplus occurring in the warehouse. As discussed by interviewees and arising in LIDD's work with distributors, inventory management issues leading to surplus include:

- **Poor date coding or rotation** leading to expiry. One distributor described how confusion over multiple date labels (e.g. "best by", "use by", "manufactured on") complicates inventory decisions among their employees.
- **Poor picking practices** such as not practicing a FIFO (First In, First Out) or FEFO (First Expired, First Out) system. One interviewee explained that pickers occasionally picked from the reserve stock rather than the pick slot, to save time, leading to newer items being shipped before older ones.

Other inventory challenges arise due to supply and demand fluctuations leading to excess inventory. One distributor described demand for yogurt fluctuating with school term dates, for example, leading to excess that became outdated before they could sell it ("overproduction"[3]).

[3] Although "over-ordering" may be a more precise term in this context, we use "overproduction" to remain consistent with the causes matrix adopted from the manufacturing study.

Best practice solutions to inventory management and other handling and storage practices are discussed in section 6.

The **Returns** stage accounts for the smallest share of overall surplus (16.4%). All surplus in the returns stage is attributable to Contractual Issues, arising from contractual discrepancies over orders between distributors and their customers. These often occurred due to human errors either when picking the order or due to order errors on the customer side (often leading to the wrong item or quantity). Occasionally driver errors could also mean that the order was delivered to the wrong location, or items were left on the truck. In most cases, according to interviewees, returns can be resold. According to one interviewee, 99% of returns could be re-stocked and resold if the truck was on a roundtrip. For another, this figure was 90%. The remaining 1–10% of surplus is lost for health and safety reasons, for example when the integrity of the cold chain could not be verified.

5. Surplus Destinations

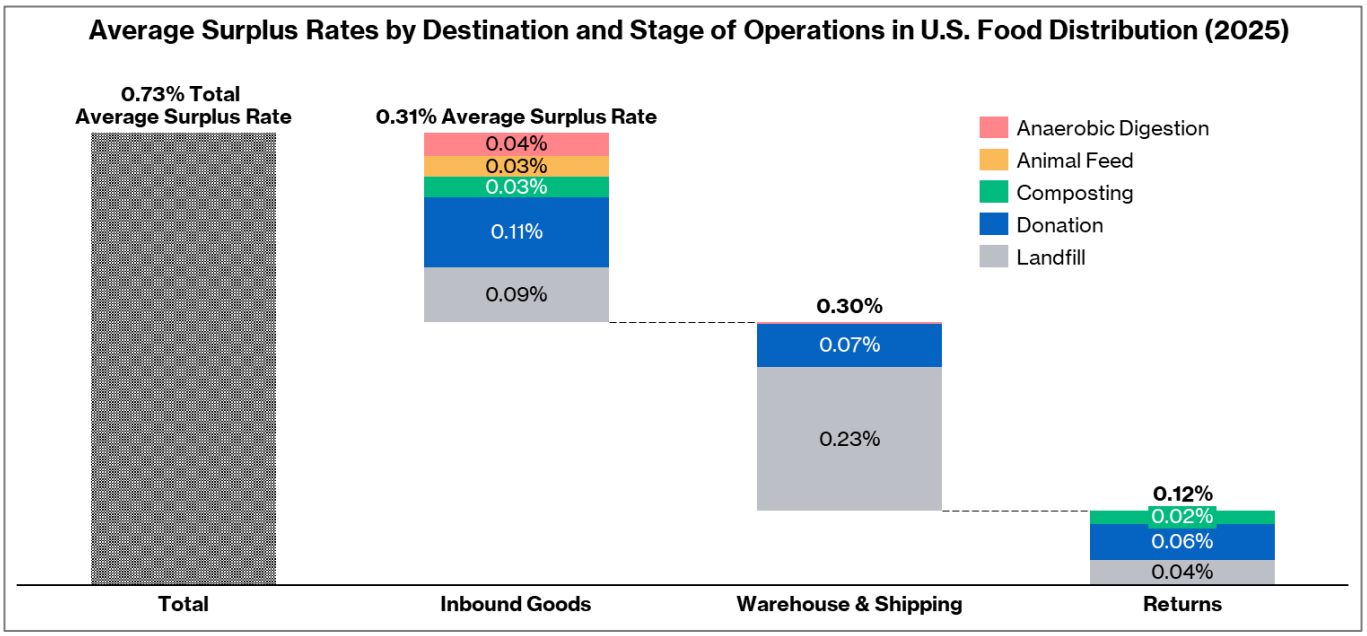


Figure 2: *Average surplus rates by cause and stage of operations in U.S. food distribution (2025).*

Interviewees cited 5 destinations – or management pathways – for their surplus. Principal among these are **landfill (accounting for 49% of total surplus) and donations (33%)**. Composting, animal feed, and anaerobic digestion account for the remaining 18%.

The Inbound Goods stage sends surplus to a wider range of destinations than other stages. This is likely because surplus at this point often consists of large volumes of a single product, resulting from infrequent but high-volume rejections. Such homogeneity makes it easier to coordinate alternative management pathways, which may explain why options like anaerobic digestion and animal feed are more common here than elsewhere. Large, single-product loads are also easier to de-pack, a process used by some anaerobic digestion and composting facilities. In contrast, surplus generated within warehousing typically involves small quantities across many product types, making it more difficult to identify a single, efficient end-use solution.

Two companies mentioned sending Inbound Goods surplus to animal feed via the same local partner, who have a de-packaging facility and turn damaged product into animal feed. Others also had partnerships with composting facilities with de-packaging capabilities.

In contrast to manufacturing, distribution channels direct less surplus to animal feed and a greater share to donation. Distributors are one step further removed from producers and therefore less likely to have the close relationships needed to broker returns of surplus to farms. In addition, distribution surplus is more often human-edible and packaged in consumer-ready formats, compared to manufacturing surplus, making it better suited to donation or discount channels and more complex to process into animal feed. For this reason, too, donation is more present in distribution than in manufacturing, representing the second largest destination in distribution.

However, as highlighted by several interviewees, donation programs rely on good partnerships with local food banks. They often depend on being located near a large, well-resourced food bank or donation partner with the ability to receive, transport, and store substantial volumes of surplus. These organizations must have the capacity to handle donations that may be very large and may require extensive refrigerated or frozen storage. Furthermore, donation decisions tend to be client-driven and depend on packaging and brand policies, with some distributors explaining that certain brands preferred not to donate surplus products.

Landfilling was the most common destination, accounting for 49% of total surplus, with most of this occurring in the Warehouse and Shipping stage. The Warehouse and Shipping stage is more likely to generate surplus through numerous small-scale handling errors. As a result, the surplus often consists of a mixed assortment of products that are damaged or contaminated to the point that they cannot be donated, making landfilling the most suitable outlet. Distributors described landfilling as usually reserved for contaminated or damaged products, or as a last resort where other pathways were not available.

6. Solutions and Best Practices

The solutions cited by distributors were overwhelmingly aligned with best practices in warehousing, inventory management, and forecasting, that prevent surplus.

Notably (though not exclusively), distributors discussed implementing the following:

1. **Strong inventory management**

   Distributors consistently emphasized daily or frequent inventory checks, cycle counting and ERP/WMS integration, shelf-life monitoring systems and automated date alerts.

2. **Forecasting tools**

   Distributors described using demand-driven purchasing (near-term algorithms and AI-based forecasting, for example) to prevent expiry-based losses.

3. **Temperature and cold chain integrity**

   Distributors sought to maintain product quality through rigorous refrigeration and equipment maintenance, trailer inspections, and sealed loading bays.

4. **Handling best practices**

Distributors discussed a broad range of practices to minimize damage in the warehouse, including managing their warehouse layout (pallet orientation and weight placement), daily equipment inspections, and aisle arrangements to minimize collisions.

5. **Alternative markets and discount channels**

   These were leveraged by distributors for short-coded or over-purchased products via overstock deals and promotional pricing, helping to prevent food loss while recovering some economic value.

6. **Staff training, retention and incentives**

   Many distributors emphasized training employees in safe handling, temperature control, and procedures for sorting food for donation. Efforts to retain staff through fair pay and favorable work conditions foster greater staff retention, allowing staff to build expertise and limiting errors that lead to waste. One distributor described an incentive program that rewards staff with bonuses for minimizing handling errors in the warehouse.

Donation programs were also a common solution raised by distributors, along with several other diversion activities, as discussed in section 5, although surplus *prevention* through optimizing operational efficiencies was always preferred.