Daly, H. (2026). Slaying the Goliath of Food Scarcity: AI and the Circular Food Economy Revolution. *Journal for Global Business and Community*, *17*(1).
https://doi.org/10.56020/001c.162429

Essays

Slaying the Goliath of Food Scarcity: AI and the Circular Food Economy Revolution

Hylah Daly[1]

[1] Accounting, Georgia State University

https://doi.org/10.56020/001c.162429

Journal for Global Business and Community

Vol. 17, Issue 1, 2026

Food scarcity and food waste are paradoxically two major problems confronting the global economy. Agrifood systems carry massive hidden costs, amounting to a $10 trillion global problem, according to the Food and Agriculture Organization. The largest share of these hidden costs stems from overconsumption in high- and upper-middle-income countries. Meanwhile, developing nations carry the heaviest burden, facing higher levels of poverty and undernourishment while contributing the least to the waste that harms the planet. AI systems offer a potential solution to this problem by helping producers transform the supply side of the food chain.

The Global Food System's Hidden Crisis

"Finish your plate, there are children starving in Africa," my mom ordered as I stared down a hefty serving of mysterious greens. Like many families, we were vaguely aware that wasting food was "bad," without fully grasping what food waste actually means. Ironically, the same mom urging me to clean my plate would go out for brunch the next day, where entire portions went uneaten.

Global food scarcity and food waste exist on opposite sides of the same coin, a ruinous yin-and-yang relationship, revealing a deep structural disconnect in how the world produces and consumes food.

Agrifood systems carry massive hidden costs, amounting to a $10 trillion global problem, according to the Food and Agriculture Organization. The largest share of these hidden costs stems from overconsumption in high- and upper-middle-income countries. Meanwhile, developing nations carry the heaviest burden, facing higher levels of poverty and undernourishment while contributing the least to the waste that harms the planet.

The irony is disturbing; over 1 billion meals are wasted every single day, yet 783 million people are food insecure, according to the UN Environment Program. Households account for 60% of this waste, followed by food service (28%) and retail (12%).

Food waste is not only a humanitarian failure, but concurrently a humanitarian one. Agriculture consumes 70% of global freshwater, and when food is thrown out, every gallon used to grow it disappears too. As discarded food decomposes, it releases methane, a greenhouse gas significantly more potent than CO_2. Preventing waste remains one of the fastest, most measurable climate solutions available.

However, most businesses still lack the tools to forecast, prevent, and redirect waste effectively. Agentic AI opens several new doors; the ability to redesign food production and consumption systems, reduce structural inefficiencies, and redistribute resources with precision. It offers a novel, actionable journey toward addressing global food scarcity.

Companies Are Part of the Problem and the Solution

Every night at 9:00pm in the Krispy Kreme on Cumberland Boulevard, tray after tray of perfectly fine donuts were tossed into the trash. This had not differed from my other wasteful retail experiences, like tossing good dough out at the end of each shift at my local pizza joint or clearing out hundreds of "expired" items each quarter at CVS. No matter how repetitive or normalized the process is in business, someone, somewhere, could have used that food.

The more food delivery apps expand, and menu variety and promotion of convenience explodes, this problem multiplies. Companies, understandably, optimize profit, not precision. But what if they could know exactly what people plan to eat? What if they had an additional bottom line, one that represented accountability for social environmental harm and waste?

Businesses need better food-waste accounting. They need tools to quantify, and reduce, the economic, environmental, and social costs of overproduction. This is where AI becomes a multi-faceted asset, capable of transformative global change.

AI for Food Production Efficiency

Agentic AI, systems able not just to analyze data but also to act on it, can transform the supply side of the food chain.

Before food ever reaches a plate, 1.2 billion tons are lost. In the U.S., up to 40% of food supply goes uneaten, totaling 133 billion pounds annually. Meanwhile, the 2025 Global Report on Food Crises notes that 1.4 million people face catastrophic levels of food insecurity in six territories, especially in the Gaza Strip and Sudan. Funding cuts have

forced assistance programs to reduce their reach by nearly a quarter, from 100 million people served to 76 million.

A major catalyst of this imbalance is simple; producers have no real-time, accurate way to predict demand.

Agentic AI closes this gap through monitoring supply chains continuously, in real time. Crop yields can be forecasted in the most precise way possible. Over time, AI trains producers to use just-right levels of water, energy, and land, reducing overprotection at its root. This can lead to powerful tools - predictive modeling of crop yields, recognizing patterns for spoilage, weather cycles, and demand trends, and automated recommendations for optimal production volumes.

One powerful example of a company already taking advantage of AI and agricultural innovation is Twiga Foods in Kenya, where a demand-forecasting AI analyzes years of market data to show exactly what crops suppliers should grow. This system cut food waste from 30% to under 5% and strengthened local independent and family farmers' economic autonomy.

In Australia, the Digiscape platform uses advanced climate and agronomy models to help farmers and shipping handlers plan crop choices, manage stocking, and make irrigation decisions with precision. Using an extensive database library of all sorts of data useful for farmers to make critical agricultural decisions, data collection and analyses coupled with AI are already being used in ways to revolutionize agriculture and support a more sustainable harvest.

If Kenya and Australia can do this at scale, the U.S., with its vast and unparalleled technological capacity, certainly can. With widespread adoption and collaborative use of this technology, AI can empower major grocery chains, farms, and suppliers to know precisely what will be bought in a week, month, or season. Data aggregation of market trends coupled with AI can be a catalyst for less overproduction, lower costs, and higher efficiency - and most importantly, they can dramatically decrease food waste.

AI for Food Service & Consumer Behavior

On the consumer side, waste often stems from oversized portions and poor ordering habits. American culture romanticizes a "good portion," essentially, a lot of food for a good price, even when that amount surpasses what people are able to eat. What if AI could recalibrate this dynamic? Imagine if it was embedded in food service to further analyze consumer eating habits, and more accurately guide companies to what is actually wanted by customers, instead of assuming beforehand, and subsequently leading to waste?

Restaurants could use AI to track plate waste, revealing which dishes consistently leave extra spoonfuls behind. Delivery platforms and ordering apps could analyze individual consumption patterns and suggest more realistic portion sizes. AI could pair this guidance with actual cost savings estimates, further encouraging customers to order with the most cost-effective and sustainable fashion, reducing both unnecessary spending and waste hand-in-hand.

The EU's FRUGAL Project (Project FRUGAL) demonstrates how powerful this can be. By using 3D cameras and AI to analyze waste in kitchens and dining areas, restaurants can identify exactly which dishes produce the most waste and why. Cameras in the kitchen detect overproduction, and cameras in the dining room detect underconsumption. Scaling this across U.S. restaurants and delivery platforms could transform consumer behavior and significantly reduce waste.

Circular Food Ecosystem

When both producers and consumers share AI-generated data, businesses gain a holistic view of the food ecosystem. This creates a circular food economy, one where AI identifies excess before the waste even occurs.

By predicting surpluses and deficits in real-time from all participants in the food distribution chain, AI can create a centralized system to redistribute resources optimally. It can guide companies on how to repurpose or process, donate, or sell surplus at discounts. This includes sustainability in the discussion board of profitability, instead of making it a sacrificial or opportunity cost.

Companies like Carrefour are already ahead, using AI to identify high-risk perishable items and sell them at a discount before they spoil.

Circular economies operate on the simple philosophy of keeping resources in use as long as possible. AI strengthens this system by forecasting seasonal patterns (like pumpkins at Halloween, and eggs at Easter) and allowing farms to plan for how to repurpose leftovers as fertilizer, animal feed, or raw materials. This is where AI becomes infrastructure, as it quietly and continuously can strengthen and augment everything in the background.

AI as a Tool for Equity and Redistribution

Circular economies are powerful not just within nations, but between them. And they must be, because the burdens of food production are not equally shared globally. Over American history, the U.S. agricultural system transformed from millions of small farms to a smaller number of vast, industrialized operations. With that transformation came the ushering in of many environmentally catastrophic symptoms, including overuse of chemicals, waste and contamination of water, displacement of labor, all to blame for an overall environmental decline. Developing nations often bear the downstream effects; exporting crops, water, and resources to feed wealthy nations while facing food insecurity themselves.

Agentic AI can help realign this imbalance and support a fairer global model by monitoring crop yields, water usage, and soil health in real time. It can flag excess supply in one region, and deficits in another. It can also protect local ecosystems before the damage becomes irreversible.

AI gives us the first global "dashboard" capable of showing where food is produced, where it is needed, and how to move it efficiently. Water saved on crops can support local wells or be reused for other purposes. Surplus crops can be redirected to nations most in need. Developing countries can build their own industries, strengthening their lo-

cal economic systems around processing and repurposing food previously categorized only as "waste."

Business Impact

The partnerships that this extensive data aggregation could lead to are endless, because the nature of circular economies is that they are very resourceful. Businesses stand to gain enormously from AI-enabled circular food systems. Through heightened efficiency, companies can obtain lower operational and spoilage costs, and higher profit due to new markets for repurposed goods. Additionally, they could even partner with governments, who also could benefit from the AI-enabled technology.

Local governments in cities and states can improve public-school lunch planning using surplus food. They can bring together local farms and educational institutions, promoting sustainability. They can partner with local farms, plan how to use excess supply, and support food banks, food shelters, and food drives using real-time accurate information. AI supplies can provide the transparency needed to create partnerships between private and public sectors that flourish and create a win-win situation for companies, people, and the environment.

A Fairer Food Future

Most people don't think about the hidden costs behind the food on their plates. Whether we're picky eaters or proud members of the Clean Plate Club, our smallest habits that contribute to global problems, can now be studied and be transformed into solutions. Thanks to AI enabled technologies, those habits are not just visible but represent powerful insights.

AI equips businesses with tools to track waste, prevent it, and redesign food systems from the ground up. Farms, restaurants, retailers, and governments can finally quantify what was once unmeasurable. Food that used to rot in trash bags like I saw night after night at Krispy Kreme, can now be predicted, redirected, reused, or prevented from being wasted at all. By accounting for hidden costs and enabling circular economies, AI transforms food waste from a crisis into a coordinated solution for food scarcity.

We often say the world produces enough food to feed everyone; it's our systems that fail to distribute it. With AI, the very waste that once weighed down our food chains can become the lifeline someone else desperately needs, proof that one economy's "trash" can truly become another community's treasure. It's time to face the long-standing Goliath of global food scarcity with a new kind of slingshot: one powered by intelligence, accountability, and the courage to use technology in small but mighty ways.

Submitted: March 27, 2026 EDT. Accepted: April 03, 2026 EDT. Published: May 29, 2026 EDT.