



Mission Multiplier: The Cross-Cutting Case for Food Waste Reduction

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Biodiversity

Biodiversity—the variety of species and ecosystems found across land and aquatic environments—sustains the natural processes that make food production possible, from fertile soils and pollination to balanced food chains and water filtration. Yet agriculture is simultaneously one of the greatest beneficiaries of biodiversity and one of its leading threats. Land conversion, livestock production, intensive farming, and agricultural runoff degrade habitats, reduce species diversity, and disrupt aquatic environments, chipping away at the very natural systems that food production depends on.

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About the Series

Whether your mission is centered on economic resilience, public health, climate, biodiversity, or other areas, progress often depends on addressing challenges that cut across systems—especially those shaped by the global food system. As that system has grown more complex to feed a growing population, it has placed mounting pressure on natural resources and supply chains, with cascading effects on people, animals, the planet, and the economy.

One of the most overlooked ways to ease that pressure—and to accelerate progress across multiple goals at once—is addressing the roughly one-third of all food produced but never sold or eaten. Wasted food also means wasted land, water, labor, dollars, energy, and nutrients, with ripple effects across affordability, animal welfare, biodiversity, public health, regenerative agriculture, and super-pollutant mitigation. Yet food systems receive [under 3%](#) of public climate finance—and less than 6% of that targets loss and waste. For philanthropic funders and mission-driven investors, that gap is a powerful, underutilized opportunity to advance core priorities faster while relieving pressure on the broader food system.

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Introduction

On land

A substantial share of the land cleared and the ecosystems disrupted to produce food is expended on food that is never eaten. Globally, food that ends up wasted occupies **almost a third** of the world's agricultural area—an area equivalent to a country larger than China. In the U.S. alone, uneaten food occupies the equivalent land area of New York and California combined, with conversion pressure concentrated in the **Northern Great Plains grasslands**. If business-as-usual continues, agricultural activity devoted to food waste could contribute a fifth of additional terrestrial **biodiversity loss by 2050**. Reducing food waste is therefore not only an efficiency gain, it is a direct intervention to relieve the pressure food production places on the natural systems biodiversity depends on.

The consequences of food overproduction on land are felt most acutely in the Global South, where some of the world's most biodiverse ecosystems—the Amazon, the Congo Basin, Southeast Asian rainforests—sit alongside rapidly expanding agricultural frontiers. Land conversion for food **destroys wildlife habitat**, releases carbon stored in soil, and reduces the land's capacity to hold water.



For funders focused on biodiversity and conservation, this presents a compelling and underutilized opportunity. Food waste reduction offers a pathway to relieve pressure on land conversion and reduce degradation of aquatic ecosystems, complementing direct habitat protection and species conservation funding by addressing a major systems-level contributor to biodiversity loss.

In the water

Biodiversity in aquatic environments, especially oceans, is affected by food system activity on both land and water. Coral reef habitats are damaged as greenhouse gas emissions from landfills warm the ocean; agricultural runoff chemicals bioaccumulate in sealife; and the dumping of sludge and food scraps—by cruise ships, for example—contributes to toxic algal blooms. But perhaps most concerning are the impacts of overexploitation of fish stocks and the collateral damage of industrial fishing and aquaculture practices.

The Food and Agriculture Organization estimates that over **one-third of fish** caught for human consumption is lost or wasted due to non-selective fishing methods, bycatch, and spoilage across the supply chain. Combined with consumer food waste, harvest methods and consumer habits account for **two-thirds** of waste in aquatic food supply chains. In fisheries (wild-caught fish, crustaceans, and shellfish), non-selective methods like bottom trawling and long-lining damage ocean floors and reefs that serve as critical carbon sinks. Aquaculture (farmed fish, crustaceans, and shellfish), projected to become the dominant source of aquatic food in the future, carries its own risks: habitat loss from pond-farm conversion, sea-cage pollution, and the spread of aquatic disease. Record-low salmon catches in Scottish rivers, for example, have been **partially attributed** to the transmission of sea lice from nearby salmon farms.

Tracing and addressing these losses is further complicated by the highly international nature of seafood trade. The **most wasted** aquatic foods consumed in the U.S.—shrimp, salmon, tuna, catfish, and tilapia—are predominantly imported, making supply chain visibility and accountability difficult to establish. Greater transparency in seafood supply chains is a necessary precondition for meaningful action.





How Food Waste Reduction Enables Impact

Food waste reduction creates two distinct sets of enabling conditions for biodiversity outcomes: one operating through land-based food systems, the other through aquatic food systems.

Relieving land conversion pressure through reduced overproduction

The most direct pathway from food waste reduction to support land-based biodiversity outcomes runs through production volume. When food is wasted, the land, water, and inputs used to produce it are wasted along with it, sending a market signal upstream for demand that doesn't actually exist. This drives overproduction, which in turn drives land conversion, harming habitats and biodiversity in the process. [Research](#) suggests that combining food waste reduction with diet shifts toward less resource-intensive foods—such as the [Planetary Health diet](#)—could reduce the biodiversity footprint of food consumption by roughly half, potentially rescuing species currently committed to extinction from unsustainable agricultural land use.

The highest-leverage targets within this pathway include:

■ **High-deforestation commodity supply chains in the Global South.** Post-harvest losses in regions like Southeast Asia, Sub-Saharan Africa, and Latin America—especially for commodities like [palm oil](#)—drive a compounding problem: spoilage creates pressure to produce more, which accelerates land conversion in some of the most biodiverse environments in the world. Reducing these losses keeps more food in the human value chain without requiring additional land.

■ **Animal products in high-income economies.** Beef production directly drives [deforestation](#) and habitat destruction, while feed for chickens and pigs accounts for the majority of global soy production—37% and 20%, respectively—also contributing meaningfully to deforestation. Reducing retail, foodservice, and consumer waste of beef, pork, and chicken in developed economies, where [consumption](#) and waste rates are disproportionately high, lowers the effective demand signal driving land pressure further upstream.

Protecting aquatic ecosystems through reduced overexploitation and improved production practices

To improve outcomes for aquatic biodiversity, food waste reduction operates through a different but equally important set of pathways: reducing the scale and improving the practices of fishing and aquaculture that degrade ocean and freshwater environments.

■ Reducing wasteful and destructive catch practices.

A meaningful share of aquatic food loss stems from the methods used to harvest it. Non-selective catch methods like bottom trawling generate significant bycatch—species caught and discarded, often dead—[averaging up to 55%](#), while also physically damaging ocean floors and reef systems. Interventions that reduce bycatch and shift fishing practices toward more selective methods cut both aquatic food waste and the collateral ecological damage that comes with it; [increasing trammel net mesh size](#), for example, can reduce bycatch of undersized or non-target species by [up to 50%](#).

■ Improving aquaculture efficiency to reduce loss and its environmental footprint.

On-farm mortality in aquaculture represents both a production loss and an environmental one: animals that die prematurely mean wasted feed, water, and

inputs, while high-density operations with poor disease and water quality management generate pollution that damages surrounding aquatic ecosystems. [AI-assisted management tools](#) that improve feed optimization, enable early disease detection, and help maintain water quality can concurrently reduce on-farm loss and lower the ecological footprint of production per unit of food.

■ Shifting demand toward lower-impact and underutilized species.

Concentrated consumer demand for a narrow set of high-value species—many of them carnivorous fish such as salmon, trout, and eel, which [require more than twice their body weight](#) in wild fish biomass as feed input, or tuna, which needs as much as 25 times its biomass in wild-caught fish—drives overfishing and long, loss-prone international supply chains. Redirecting demand toward herbivorous, locally sourced, or underutilized species with healthier population stocks reduces overexploitation pressure while also shortening supply chains in ways that limit spoilage loss. Replacing fishmeal, most often made from wild-caught fish, with more sustainable alternatives can achieve a similar effect, reducing both the waste and the biodiversity impacts tied to its production.



Funding Food Waste Reduction to Support Biodiversity

For funders focused on biodiversity and conservation, food waste reduction offers several distinct capital deployment pathways, organized by the system each primarily targets.

Relieving land conversion pressure

■ **Post-harvest infrastructure in the Global South.** Philanthropic funding and impact capital can support infrastructure that reduces food loss in the commodities and regions where land conversion pressures are highest. Palm oil is a clear example: fresh fruit bunches must be processed within [24-48 hours](#) of harvest to prevent oil quality degradation, a challenge compounded by poor road infrastructure, labor constraints, and limited access to milling capacity for smallholder farmers. Nigerian company [Releaf](#) has developed a proprietary processing machine that improves palm kernel cracking speed and efficiency for smallholder farmers, and then turns the otherwise wasted shells into biochar.

■ **Reduced waste of high-impact animal products in developed economies.** Systematic waste measurement, demand forecasting, dynamic pricing, and inventory optimization tools that reduce retail and foodservice waste of beef, chicken, and pork are well-positioned for impact investment. A number of companies now [enable foodservice waste tracking](#) and generate operational recommendations based on observed waste patterns, helping operators cut losses of these especially high-impact products.



Protecting aquatic ecosystems

■ **Aquaculture management.** A growing number of aquaculture technology companies can help reduce on-farm mortality among fish and shrimp, though it isn't yet clear which approaches are most effective. The [Lever Foundation](#) is launching a program to accelerate these technologies by curating shortlists of top-recommended solutions—spanning water quality systems, AI health monitoring, disease treatments, and vaccines—and engaging directly with producers and trade associations to drive uptake, recognizing that beneficial agricultural technology often diffuses far too slowly without active facilitation.

■ **Shifting demand toward herbivorous, lower-impact, and underutilized species.** This is another meaningful lever for alleviating aquatic biodiversity loss. [Eating with the Ecosystem](#), a New England-based nonprofit, models this approach by fusing marine science, commercial fishing knowledge, and chef partnerships to build consumer appreciation for underutilized and seasonally abundant species.

■ **Replacing wild-caught fishmeal with sustainable alternatives.** This solution addresses biodiversity loss and food waste at the feed level, reducing demand for the forage fish that underpin marine ecosystems. The [Centre for Feed Innovation](#) is advancing this frontier through research into alternative sources—including [single-cell proteins](#) and [algal oils](#)—that can substitute for fishmeal and fish oil in aquaculture feed without relying on wild-fish extraction.



Case Study Dual Impact in Action

S2G Investments is a multi-asset investment firm working across food and agriculture, oceans, and energy, often backing opportunities at the seams between those systems. That cross-sector view shapes its approach to food waste: S2G sees wasted food as a mispriced input that still carries the land, water, and wild biomass spent to produce it. Reducing it lets the system produce more from fewer inputs, making it a capital-efficient way to advance biodiversity, with habitat and species gains arriving as a co-benefit of stronger unit economics rather than a trade-off. That conviction shows up in a portfolio built around the points where wasted food and biodiversity loss intersect, from surplus at retail to losses across aquaculture and fisheries at sea.

Portfolio companies operating at this intersection include:

- **Wildtype**, which produces the first cell-cultivated seafood cleared by the FDA, offering the nutrition of wild-caught fish without the mercury, microplastics, or pressure on wild populations—easing the feed demand that strains marine biodiversity, given that farmed carnivorous fish like salmon can require more than twice their weight in wild fish as feed.

- **ViAqua**, whose orally delivered, RNA-based feed supplement protects farmed shrimp from disease, beginning with White Spot Syndrome Virus. Since disease can kill up to half a crop and cause roughly a quarter of shrimp farms to fail each year, cutting that mortality saves the feed, water, and inputs behind every animal lost.
- **Flashfood**, a digital marketplace connecting shoppers with surplus and near-dated groceries at up to 50% off, now in more than 2,000 stores across the U.S. and Canada, including Meijer and Kroger. It diverted 33 million pounds of fresh meat and produce from going to landfill in 2025.
- **Mill**, whose food recycling system turns household food scraps into nutrient-rich grounds, creating the first recovered-food feed ingredient cleared for commercial distribution in the U.S. With 21 million pounds diverted to date, those grounds return to gardens, backyard chickens, or small farms.



“Three billion people rely on seafood as a major source of protein. Yet our oceans are already under pressure from overfishing. When seafood is wasted, we’re effectively asking the ocean to provide the same meal twice. The solution is simple: keep enough fish in the water to maintain a healthy food chain, and also make the most of the seafood we harvest. That’s how we build a more resilient future for both people and nature.”

Moira McDonald, Environment Program Director, Walton Family Foundation



[The Robertson Foundation](#), a leader in driving transformational change in global food systems through philanthropy, offers a complementary example. Biodiversity has remained central to its work even as its broader focus has shifted toward climate change, spanning efforts from ocean protection to rebuilding wild tiger populations. The foundation initially turned to food waste for its outsized ability to cut methane emissions, but its biodiversity impact further cemented that choice.

“The fact that cutting food waste also protects biodiversity is a critical co-benefit, providing powerful reasons to care about this work.”

Christen Loper, Ph.D., Environment Program Director, Robertson Foundation



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