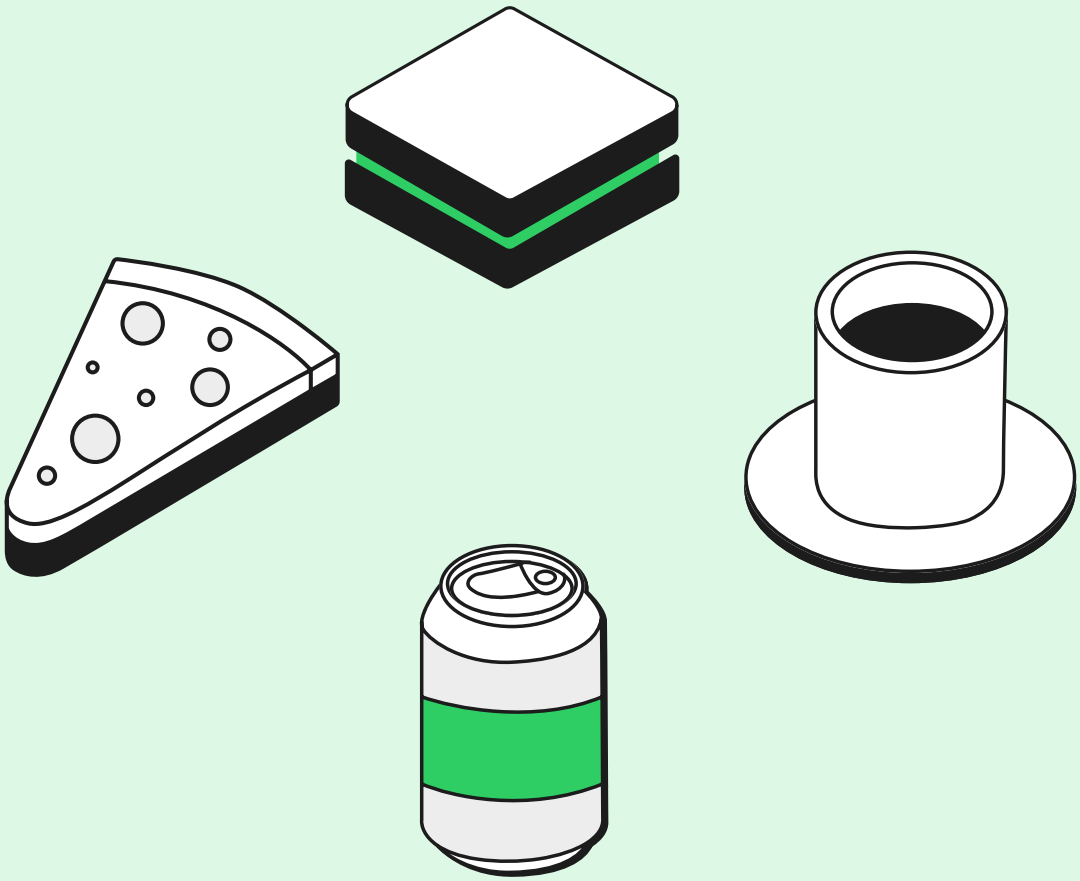
Guide

greenly

Greenly for Food

Greenly's Contribution to the transition of the Food & Beverage industry



Introduction

Food, beverages, and agrifood activities are crucial to the global economy and human health, aiming to ensure healthy nutrition and tackle global challenges like malnutrition and obesity, aligning with UN Sustainable Development Goals 2 and 3 (SDGS, 2025). The food sector is also a major economic driver, valued at approximately USD 8.2 trillion in 2024, representing 8.7% of global GDP and employing over 300 million people worldwide (WBC, 2024). When expanding the scope to agrifood systems, this figure rises to nearly one-third of the global workforce (Davis et al., 2023).

The food sector is a significant contributor to global GHG emissions, accounting for approximately one-quarter to one-third of the total. Emissions stem from land-use change, livestock production, processing, transport, packaging, food waste, and end-of-life, with agricultural land conversion being a major contributor. These emissive practices create climate effects that directly threaten the stability of the global food system, as seen in rising food prices due to climate-fueled heatwaves (Savage and Smith, 2025).

This white paper addresses a critical question: How can the food and beverage sector transform itself to align with the Paris Agreement goals and decarbonize while preserving its vital role in food security and livelihoods? Moreover, can this decarbonization strategy protect the sector against the impacts of climate variability?

Greenly is dedicated to supporting the food and beverage industry in its transition towards greater sustainability and lower emissions. Our comprehensive carbon management and reduction strategies are tailored to address the unique challenges of the sector. Through automated data collection, granular emissions tracking, and industry-specific tools, Greenly empowers companies to accurately measure their carbon footprint, identify hotspots across their complex supply chains, and streamline reporting processes. We go beyond compliance, helping businesses develop ambitious reduction action plans and communicate their environmental impact effectively, fostering trust and driving market advantage in a world increasingly demanding sustainable practices.

01

The Food & Beverage Industry’s Environmental Impact and Decarbonization efforts

Emissions of the sector

The global food system generates 23 to 42% of global GHG emissions (≈17 Gt CO_2eq/year) (IPCC, 2022). Key gases include N_2O (soils, fertilizers), CH_4 (livestock, rice), CO_2 (fossil fuels, land-use change), and refrigerants (storage/transport) (Garnett, 2011).

Figure 1 from Our World in Data highlights what emits GHG at each stage of the food chain (H. Ritchie, 2019)

31%

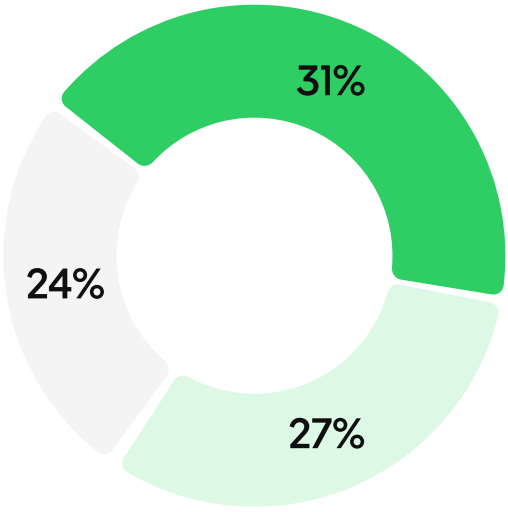
Livestock & fisheries:
mainly ruminant methane

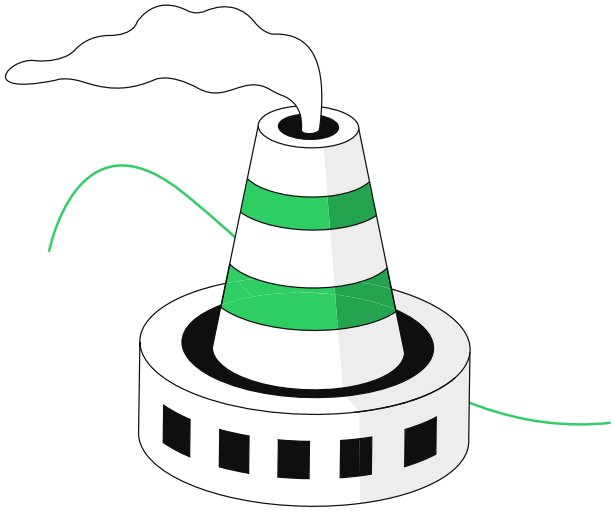
27%

Crop production:
largely N_2O from fertilizers and CH_4 from rice

24%

Land use:
from deforestation, savanna burning, soil degradation





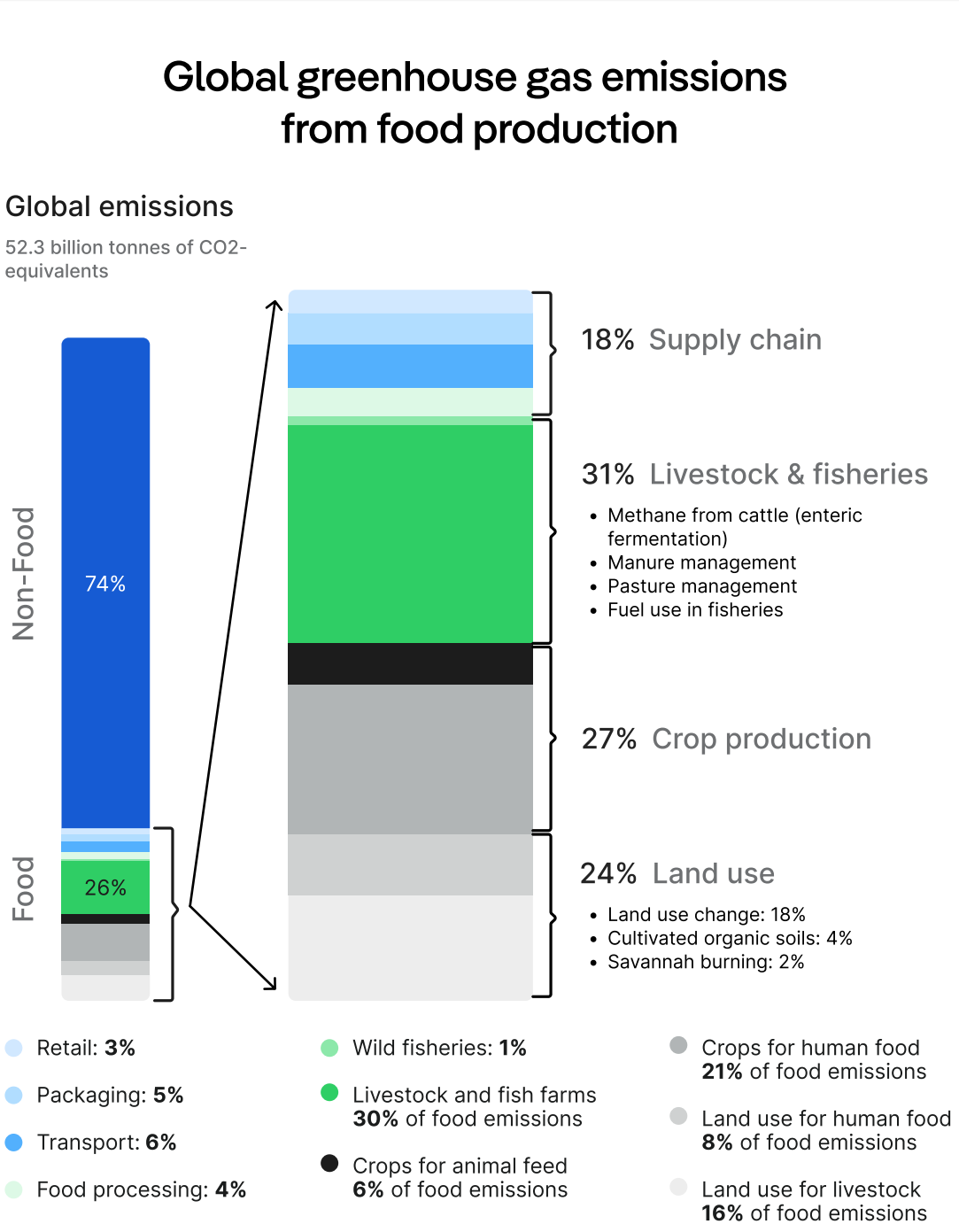


Figure 1: Distribution of food industry emissions along the supply chain [Hannah Ritchie, Our World in Data]

The proportion of emissions in the global food and beverage sector highlights the critical role of Scope 3 emissions for companies. The sustainability of their supply chains largely determines their overall GHG footprint.

Let's dive into which food is the most emissive.

Beef

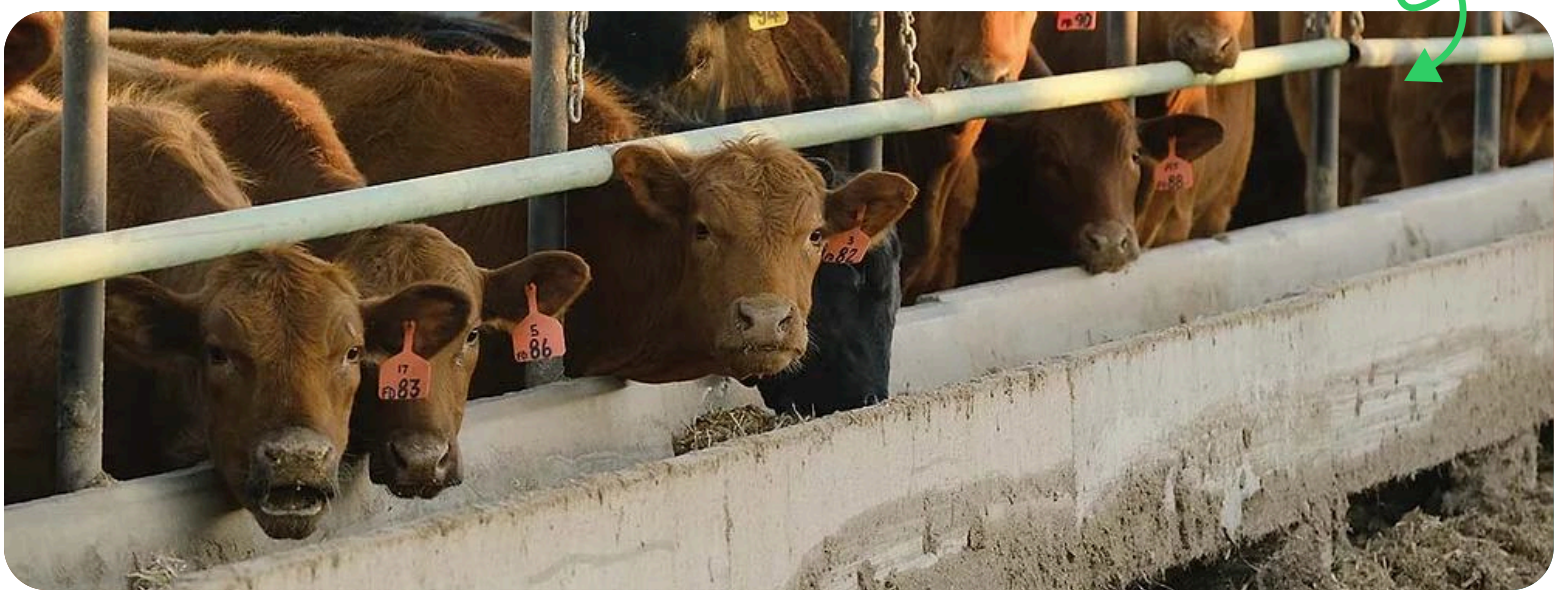
has the highest emission factor of all foods: 99 kg CO_2eq/kg. In 2022, it made up 19% of global meat production (FAO, 2024). Most emissions occur on farms (56.23 kg CO_2eq/kg), mainly from enteric fermentation, a digestive process that produces methane, 95% released through burping (Glasson et al., 2022). Cattle ranching is also the leading driver of tropical deforestation, causing 41% of global forest loss (~2.1 Mha/year). In Brazil, ranching drives 72% of deforestation. Contrary to public debate, soy plays a minor role in beef's footprint, as most soy (57.2%) feeds poultry and pigs, not cattle. The main issue is the expansion of pastureland (Ritchie, 2024).

Rice

emits only 4 kg CO_2eq/kg, but due to massive volumes (800 Mt, 8% of primary crops in 2022), it is the second largest contributor to food-related emissions. Flooded fields foster methanogenic bacteria that release methane (Mahmood et al., 2023). Studies show rice's footprint exceeds sustainable thresholds. Mitigation options include alternate wetting and drying (AWD) irrigation, improved fertilizer use, and short-duration, high-yield varieties (Mahmood et al., 2023).

Dark chocolate

has the second-highest emission factor after beef (47 kg CO_2eq/kg) as illustrated in Figure 2 for Our World In Data (Ritchie et al., 2022). Emissions stem mainly from deforestation for cocoa farming: 2.3 Mha of forest lost between 2001-2015, especially in West Africa, Southeast Asia, and Latin America (WRI, 2022). Cocoa expansion often occurs in biodiversity hotspots, driven by insecure land tenure, weak governance, and soil decline. While volumes are smaller than beef or rice, chocolate's per-kg footprint and deforestation link make it a critical food for sustainability efforts (Kroeger et al., 2017).



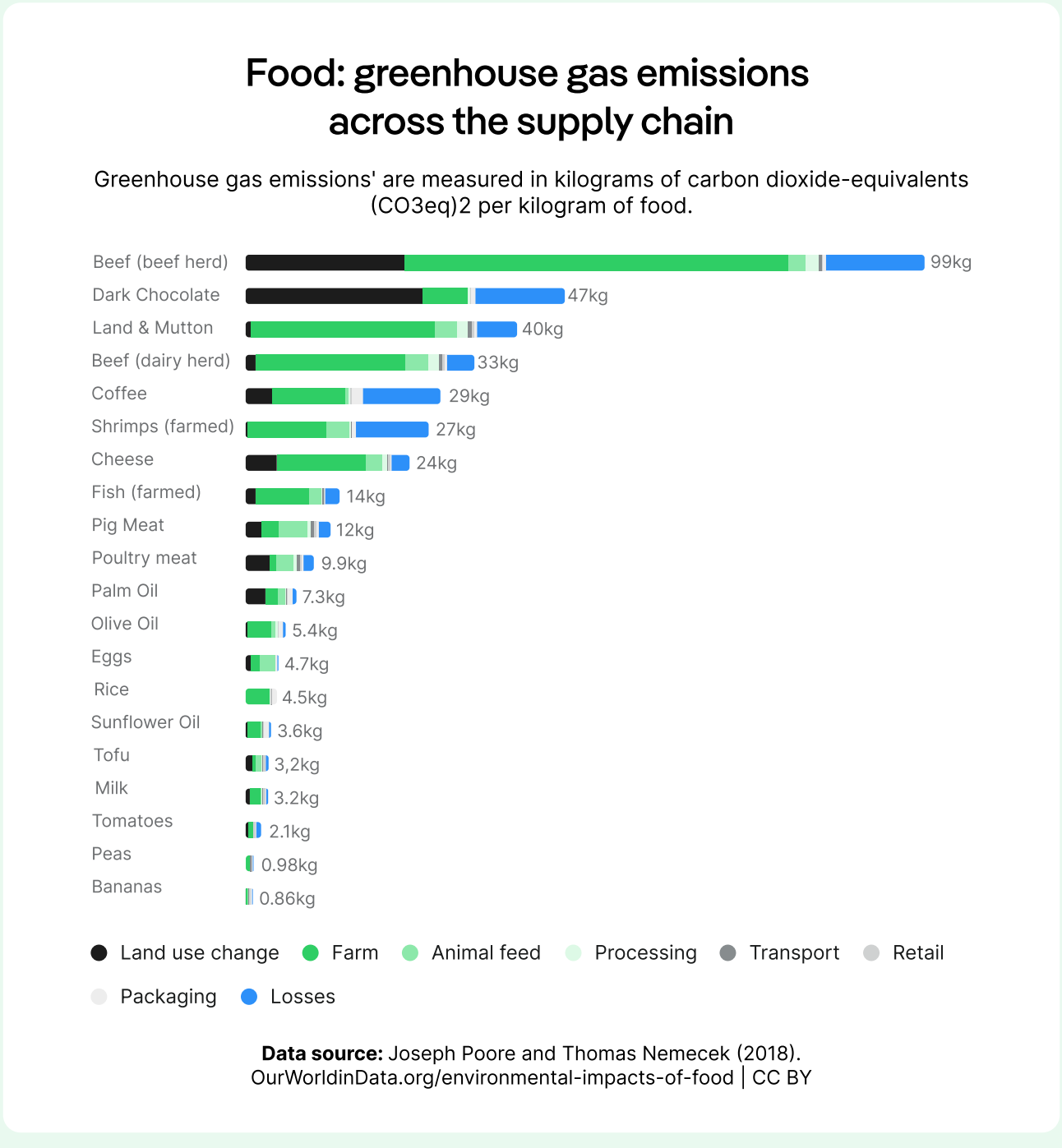


Figure 2: Emissions per food item by stage of the supply chain [Our World in Data, 2023]

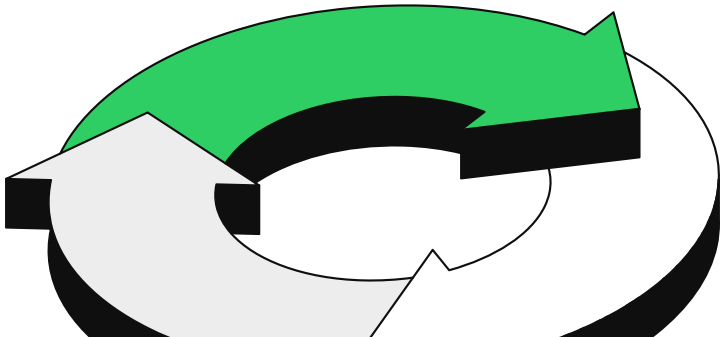
Enlightening though it could be, it is important to understand that simply avoiding these food items is not enough to achieve global net-zero emissions. Achieving this goal requires broader systemic changes across the entire food system. Indeed, food alone could emit 1,356 Gt CO_2eq by 2100, exceeding the 1.5°C budget by 2 to 3 times and nearly exhausting the 2°C budget (H. Ritchie, 2021). Cutting food-related emissions is therefore essential to Paris Agreement goals.

Further, climate change already reduces yields through heat, drought, ozone, pests, and ocean acidification.

Extreme events increase production losses and food prices (IPCC, 2022). Farmers have thus had to adapt via crop/livestock changes, diversification, agroecology, but still face financial/institutional limits. Moreover, a rising population (9.7-10.8B by 2050) will raise food demand by 40-54% (UN, 2025).

These risks are even more concerning in the context of global hunger and nutrition issues. Today, 815 million people remain chronically undernourished, lacking access to sufficient and nutritious food (FAO, UNICEF, WFP, and WHO, 2020). Simultaneously, low-quality diets and unbalanced nutrition contribute to rising rates of obesity and diet-related non-communicable diseases. Over 2 billion adults are overweight or obese, reflecting both unhealthy dietary patterns and the unequal distribution of food resources on a global scale (Duro et al., 2020; FAO, UNICEF, WFP, and WHO, 2020).

Beyond GHGs, the sector drives concerning environmental impacts such as eutrophication, water depletion, acidification. For instance, nuts use 230,000 L of water/kg vs. 662 L for bananas (Poore & Nemecek, 2018). In addition, social impacts of the sector include child/forced labor, low wages, unsafe work, corruption, and Indigenous rights violations. Consequently, both environmental and social impacts must be considered to set effective mitigation targets.



Decarbonization Efforts

Major food companies have announced net-zero targets for 2040-2050, but only a few have been validated by the SBTi, which ensures these targets are grounded in science: in 2024, 613 food companies were working on targets (Cover Crop Strategies, 2024). Walmart, for example, claims to reach net-zero by 2040 but recently withdrew from the SBTi, raising concerns over credibility (SBTi dashboard, August 2025) (Zero emissions White Paper, Walmart Sustainability).

A reason for that often comes from the belief that mitigation in the food sector is going to threaten food availability. Evidence shows it need not. The system already produces 4 billion tonnes of food annually (FAOSTAT, 2022), enough to feed 10 billion people (FAO, UNICEF, WFP, and WHO, 2020).

Key mitigation strategies have thus been underlined by the most recent IPCC report:

Agricultural stage:

carbon sequestration, nutrient efficiency, improved yields, manure/composting, renewable energy. Example: the "4 per 1000" initiative seeks a 0.4% annual increase in soil carbon, improving fertility and resilience while offsetting emissions.

Post-farm gate:

energy efficiency, renewables, packaging reduction, and food waste prevention. One-third of food (1.3B tonnes) is wasted, contributing 8-10% of GHGs. Initiatives like SDG 12.3, Too Good To Go, and France's Anti-Waste Law are reducing losses.

Consumption patterns:

plant-based diets cut emissions and free land; beef and lamb require 50-100x more land per protein unit than tofu or peas. Shifts toward plant proteins could reduce land use by up to 75% (Hannah Ritchie, 2021). These mitigation efforts necessarily involve corporate engagement as companies are crucial in promoting dietary changes through awareness campaigns or carbon labelling and through the diversification of their offer towards more plant-based products.

Emerging technologies:

cultured meat, plant-based alternatives, and cellular fermentation lower land and water footprints but face energy, cost, and acceptance barriers.

In addition, recent studies show that investing in sustainability drives measurable ROI. For instance, sustainable transformation could yield $10T annually in benefits (Watts, 2024) and investments of $205B/year (2025-2030) could deliver 9 Gt CO_2eq reductions by 2030, with $190B returns and $30B savings (Nilsson, Food and Land Use Coalition, 2024).

Moreover, sustainability will prevent the worst. Without action, future generations could face costs of $535T for large-scale removals (Dyke, 2017) and climate damages could reach $38T/year by 2049 (Hart, Forbes, 2024), while the EU food sector already loses €28.3B annually to extreme weather (Abnett, Reuters, 2025). A way to seize the extent of these economic opportunities is through the use of True Cost Accounting (TCA) initiatives that are helping policymakers value hidden impacts like biodiversity loss and public health.

Finally, the sector is governed by a range of regulations and frameworks which hold significant potential to drive emissions mitigation. A few examples include carbon labeling, Extended Producer Responsibility (EPR) for packaging, food waste reduction mandates and Environmental Product Declaration (EPD).

To learn more on the impact of the food industry and its decarbonization efforts, refer to our White Paper "A Holistic Overview of the Food & Beverage Industry's Carbon Footprint".

02

Why Greenly for the Food & Beverage Sector?

The transition of the food and beverage industry toward greater sustainability and lower emissions necessitates the adoption of comprehensive carbon management and reduction strategies. This is where Greenly can help your company achieve its full potential.

The Sustainability Suite: Automated, Accurate Carbon Management

Greenly's platform delivers comprehensive carbon tracking specifically tailored for food and beverage companies.

Automated data collection

and emissions tracking are particularly relevant for agri-food companies, which often operate multiple factories in different regions, each with decentralized and heterogeneous data systems. For such firms, manual consolidation of energy use, logistics, and supplier information is both time-consuming and error-prone. Greenly's API and ETL integrations can streamline this process by directly linking to ERP systems, ensuring that emissions data from disparate sites is automatically updated and harmonized.

Granular emissions tracking

is also critical in the agri-food sector, where a large share of climate impact lies in upstream supply chains. Companies typically have limited visibility or control over the provenance of raw materials, such as agricultural inputs or packaging. By offering detailed dashboards across Scopes 1, 2, and especially Scope 3, Greenly enables businesses to identify high-impact hotspots, such as transport, fertilizer use, or end-of-life packaging, despite these uncertainties.

Time efficiency

is a decisive factor in an industry characterized by low margins and short production and delivery timelines. With up to 80% time savings on emissions reporting, Greenly's platform allows sustainability teams to move beyond administrative burdens and focus instead on actionable strategies, whether that means engaging suppliers, optimizing logistics, or rethinking packaging, without slowing down core operations.

In addition, the full client journey with Greenly is verticalized: industry specialist, commercial team, delivery, and product help you navigate through the platform.

The platform brings together a set of specialized toolboxes designed to address the unique sustainability challenges of the food and beverage industry. Its **Packaging Impact Assessment** module helps companies analyze and reduce emissions linked to packaging, while **Agricultural Supply Chain Expertise** provides tailored strategies for mitigating farm-to-table impacts. Through its integration with the **EDP International platform**, the tool also leverages a global database of product-specific Environmental Product Declarations (EPDs), including those relevant to food and beverages. Complementary functionalities include

Water Usage Analytics for benchmarking efficiency in beverage production and **Food Waste Measurement** tools for restaurants and retailers to monitor and cut waste-related emissions.

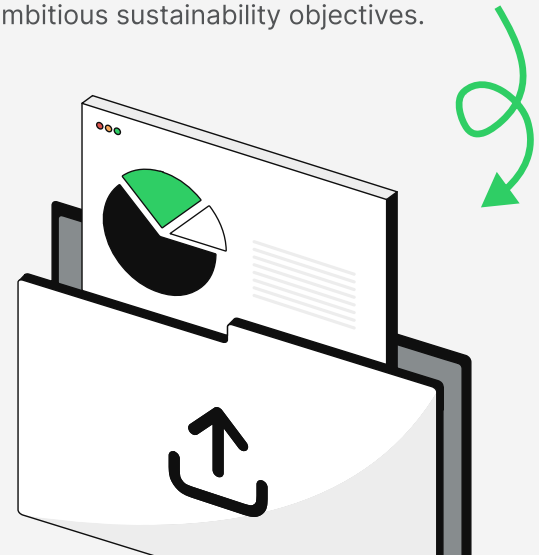
The platform further supports **Transport Optimization** to manage the logistics challenges of perishable goods, and **Supplier Engagement** modules enable companies to collect data directly from suppliers and collaborate on reduction initiatives across the value chain.

Moreover, our emission factors database counts more than 300,000 of them.

We use AGRIBALYSE®, CarbonCloud, Global Feed LCA Institute (GFLI) and INRAE database, reference databases for indicators related to the environmental impact of products and foods. Further, we use other databases for different precise usages: CyclEco for end of life, GLEC for transport, region-specific databases linked to regulations: ADEME, GOV.UK, Eurostat, EPA, etc. Our Research and Methodology experts also create specific emissions factors when needed.

Finally, Greenly helps food companies communicate their environmental impact on their packaging, menus and applications, fostering meaningful transition towards low carbon diets.

The typical rollout process spans between 1 and 3 months, significantly outpacing traditional in-house approaches. The "Climate Action Ready" package allows businesses to establish emissions tracking, complete data collection, and generate a compliant GHG report within three months. More advanced offerings, such as the "Net Zero Contributor" package, expand this scope to include trajectory modeling, tailored action plans, and strategies for achieving long-term carbon reduction, catering to organizations with ambitious sustainability objectives.

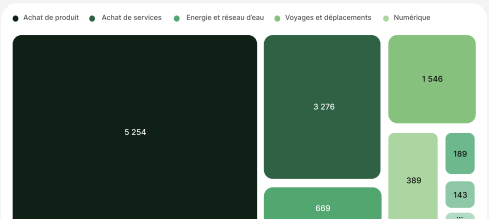


Support for Regulatory Compliance

Greenly ensures food and beverage companies stay ahead of increasingly complex global regulations:

Customisable dashboards:

Businesses can export data in tailored formats to meet specific compliance needs. Dashboards provide flexible data views at multiple levels and contain scope-specific insights, presenting a holistic view of a company's carbon footprints. Real-time features also enhance monitoring against reduction targets and facilitate compliance with regulatory deadlines.



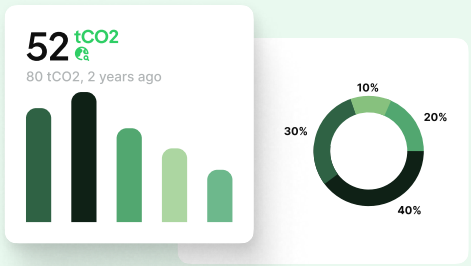
Alignment with Global Frameworks:

Greenly ensures adherence to frameworks such as the Corporate Sustainability Reporting Directive (CSRD), the Science-Based Targets initiative (SBTi), the Carbon Disclosure Project (CDP), and the Carbon Border Adjustment Mechanism (CBAM).

- Sustainable Procurement
- Decarbonization Strategy
- GHG Assessment
- **SBTi Compliance**
- Life Cycle Analysis
- CSRD Compliance

Automated Comprehensive Reporting:

Businesses can generate audit-ready, transparent GHG reports that follow GHG Protocol and other regulatory requirements, including the SBTi and International Organization for Standardization (ISO) certifications. This streamlines the often complex and time-consuming reporting process.



Industry-Specific Compliance

- Food labeling regulations for carbon footprint disclosure
- Supply chain transparency requirements
- Regional packaging and waste directives
- Agricultural emissions reporting standards

Facilitating Climate Commitments

Beyond compliance, Greenly empowers food and beverage companies to make meaningful progress on sustainability goals.

Trajectory Modelling:

The platform's sophisticated trajectory simulation tool helps businesses explore different carbon reduction pathways adapted to the food industry and develop long-term strategies for decarbonization. By generating multiple scenarios, companies can evaluate the impacts of different emission reduction strategies, balancing operational constraints with sustainability objectives.

Reduction Action Plans:

Greenly possesses an extensive library of reduction strategies, from replacing standard palm oil by RSPO-certified palm oil to reducing purchased food volumes. With the addition of prioritisation tools, Greenly can help businesses focus on high-impact actions that align with operational and resource constraints.

Continuous Tracking and Reporting:

Additional to complying with regulations and standards, Greenly's continuously updating dashboard enables clear communication of progress to stakeholders, fostering trust and credibility. Greenly empowers food companies to turn ambitious climate commitments into measurable achievements.

Greenly's Customer Reach

In the end, over 200 food & beverage businesses have already trusted Greenly's platform to calculate their carbon emissions, helping them win clients with comprehensive, easy-to-understand reports that take just a few weeks to produce.

For instance, Maison Denis has trusted Greenly for the GHG assessment of 13 of its entities, interested in the simplicity in apprehending and calculating Scope 3 emissions. The company found that transportation contributed less to its overall emissions profile than expected. Despite operating internationally and distributing products across multiple countries, the impact of transport was moderated by the use of long shelf-life items, such as canned and sterilized pouches, mainly shipped by sea. This underscored the importance of evaluating emissions across the entire product lifecycle. Packaging, however, emerged as a major contributor to the company's emissions. Although anticipated, this emphasized the ongoing need to optimize packaging. The company is committed to reducing packaging weight, improving recyclability, and increasing the proportion of recycled materials, all while ensuring the highest standards of food safety and preservation.

03

Case Study of a Food & Beverage Company's Success with Greenly

greenly × KFC

Initial Sustainability Goals

KFC France embarked on their carbon assessment journey as part of their broader sustainability transformation aimed at becoming a leader in the French "fast good" sector. The company had made an international commitment to achieve net zero emissions by 2050, requiring them to actively work with stakeholders to limit the carbon impact across their entire value chain. A key component of this strategy was understanding the environmental impact of their product offerings, particularly comparing traditional meat options with vegetarian alternatives. KFC France needed detailed insights into their carbon footprint to make informed decisions about product development, supply chain optimization, and to effectively communicate their sustainability progress to stakeholders and consumers.

How Greenly's Platform Facilitated Carbon Tracking and Reduction

Greenly provided KFC France with a comprehensive Life Cycle Assessment (LCA) methodology that enabled them to analyze the complete environmental impact of their products from raw materials to post-consumer waste. The platform allowed for detailed tracking of emissions across multiple stages of the product lifecycle, including ingredients sourcing, transportation, production in restaurants, and waste management. Greenly's approach was particularly valuable in handling KFC's complex supply chain data, creating clear comparative analyses between different burger options (Colonel Original chicken burger, Colonel Veggie burger, and beef burger), and identifying the main emission sources throughout the value chain. The user-friendly visual dashboards enabled KFC to clearly understand where their carbon hotspots were located, focusing particularly on the protein components which showed significant variation in environmental impact. By providing precise emission factors for different ingredients (beef: 34.1 kgCO2e/kg, chicken: 5.47 kgCO2e/kg, veggie patty: 1.37 kgCO2e/kg), Greenly helped KFC quantify the benefits of their menu diversification strategy.

34.1 kgCO2e/kg
beef

5.47 kgCO2e/kg
chicken

1.37 kgCO2e/kg
veggie patty

Key Results Achieved

The partnership between KFC France and Greenly yielded several significant results. The LCA revealed that a beef burger (3,854 gCO_2e) was 74% more emission-intensive than the Colonel Original Chicken Burger (1,004 gCO_2e) and 82% more emission-intensive than the Colonel Veggie Burger (657 gCO_2e).These findings provided KFC with scientific backing for their vegetarian menu offerings. The assessment also provided KFC with optimization opportunities throughout their value chain, helping them identify potential areas for further emission reductions. The results were successfully communicated through various French media outlets, enhancing KFC's brand reputation for transparency and environmental commitment. The collaboration was described by KFC as highly positive, with the company using the insights to communicate effectively with stakeholders and raise consumer awareness about the environmental benefits of their vegetarian offerings. The partnership ultimately supported KFC's progress toward their international net-zero commitment while providing tangible data to support their positioning as a more responsible fast food option.

3,854 gCO_2e
beef burger

1,004 gCO_2e
Colonel Original chicken burger

657 gCO_2e
Colonel Veggie burger

Conclusion

The journey toward a sustainable food and beverage industry is not merely an environmental imperative but a crucial pathway to global well-being and economic resilience. As this white paper has outlined, the sector's significant contribution to global greenhouse gas emissions, coupled with its vulnerability to climate change impacts, necessitates urgent and transformative action. Decarbonization efforts, ranging from agricultural innovations and waste reduction to shifts in consumption patterns and the adoption of emerging technologies, are vital for aligning with global climate goals while safeguarding food security and livelihoods.

Greenly serves as a vital partner in this transition, offering comprehensive support that addresses the core challenges faced by food and beverage companies. By providing automated, accurate, and granular carbon management tools, Greenly enables businesses to navigate complex supply chains, identify emission hotspots, and achieve significant time efficiencies in reporting. This empowers companies to meet stringent regulatory requirements such as CSRD and SBTi, ensuring compliance and enhancing transparency.

Furthermore, Greenly helps companies go beyond mere compliance by facilitating ambitious climate commitments through trajectory modeling and customized reduction action plans. This empowers the industry to effectively reduce its environmental footprint, from optimizing agricultural practices to innovating in packaging and waste management. Crucially, by providing clear communication tools for environmental impact, Greenly also enables companies to align with the growing consumer demand for sustainable products, fostering trust and driving market advantage.

Decarbonizing the food and beverage industry is vital to ensure the industry can sustainably continue its vital role in nourishing a growing global population.

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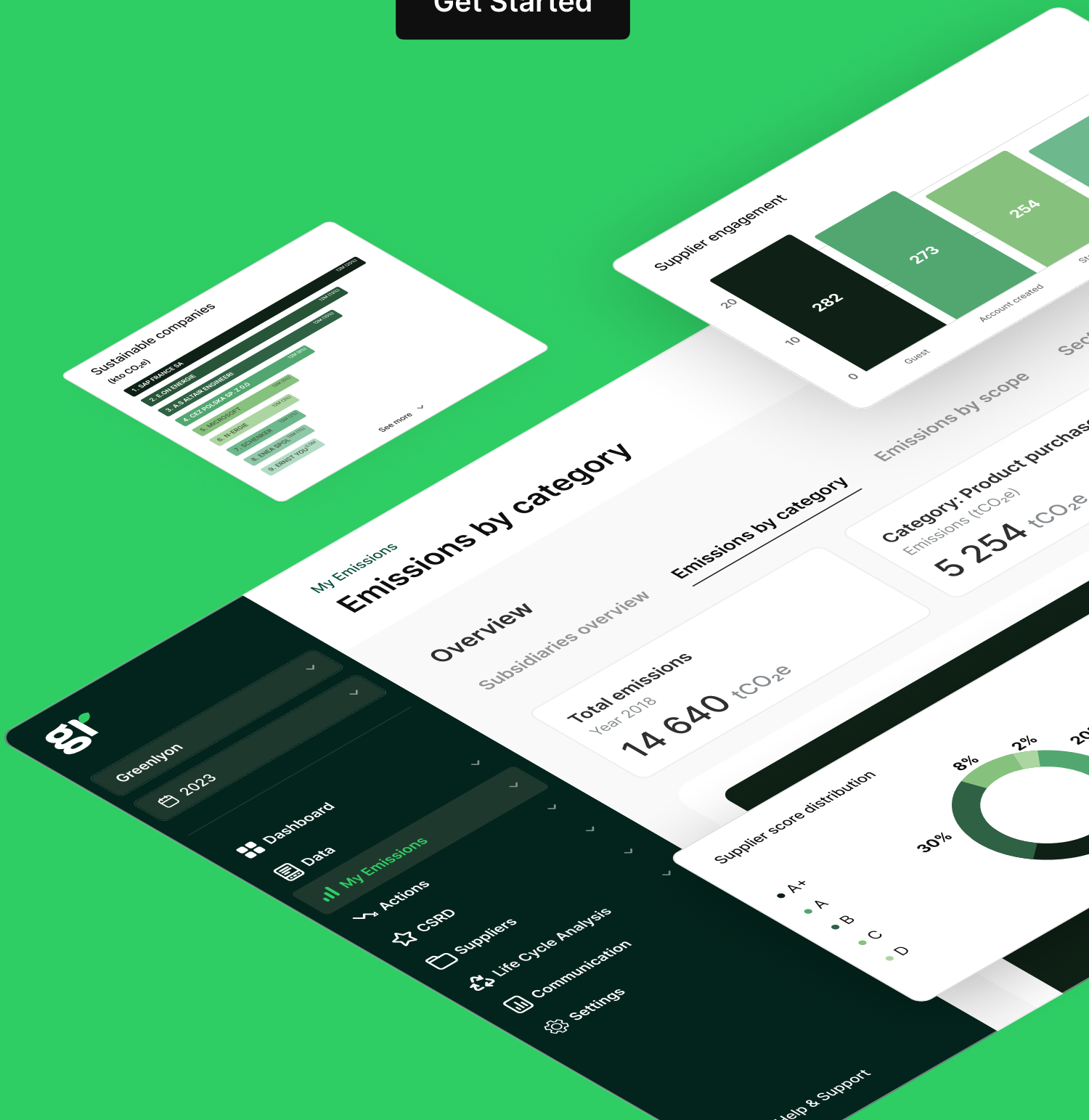
Your climate journey starts here

Get Started



Just like 3500 companies, they have entrusted Greenly with their Carbon Footprint

To find out more or to meet a Greenly expert

Website: www.greenly.earth
Contact: contact@greenly.earth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