

REDUCING WASTE, FROM FARM TO PLATE

A multi-stakeholder recipe to reduce food loss and waste



ABOUT NUTRITION CONNECT

Nutrition Connect, an initiative of the Global Alliance for Improved Nutrition (GAIN). It aims to empower public and private sector actors to collaborate so together we can identify innovative solutions, form novel partnerships and share good practices that drive investment and action to improve nutrition.

ABOUT GAIN

The Global Alliance for Improved Nutrition (GAIN) is a Swiss-based foundation launched at the UN in 2002 to tackle the human suffering caused by malnutrition. Working with governments, businesses and civil society, we aim to transform food systems so that they deliver more nutritious food for all people, especially the most vulnerable.

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FOREWORD

Food lies at the heart of our very being – our cultures, economies, and lives. Yet, despite the abundance of food produced worldwide, millions of people still go to bed hungry every night. This stark paradox highlights the urgent need to tackle the issues of food loss and waste.

The International Day of Awareness of Food Loss and Waste 2023, celebrated the world over, each year on the 29th of September, serves as a powerful reminder of our collective responsibility to address one of the most pressing challenges of our time: ensuring that food reaches those who need it and minimising the impact of food loss and waste on our environment.

The figures speak for themselves. While hunger and food insecurity persists, an estimated 13 percent of the world's food is lost in the supply chain from post-harvest before the retail stage¹ and another 17 percent is wasted in households, food services and in retail². This staggering amount of waste not only robs people of the sustenance they need but also has severe environmental and economic consequences.

Since its inception in 2019, Nutrition Connect as a knowledge mobilisation platform housed within the Global Alliance for Improved Nutrition (GAIN), and an advocate has been invested in this priority area for brokering dialogue and investment on mitigating food loss and waste. In our role for promoting collective learning by collaborating with key partners and convening dialogue to influence and coordinate actions among public and private sector actors we have over the years presented content pieces on the myriad challenges and solutions, featuring opinion pieces, case studies and innovations on food loss and waste and other key priority areas of work for food systems transformation.

In keeping with our north star, to connect evidence with action, for better nutrition through public private engagement, this International Day of Awareness of Food Loss and Waste 2023, with great pleasure the Nutrition Connect team introduces this compendium titled - "Reducing the Waste, From Farm to Plate - The Multi-stakeholder Recipe to Reduce Food Loss and Waste".

We hope that this compendium can serve as a valuable resource for many partners invested in this thematic area, to delve deeper into the multi-faceted challenges that surround the issue of food loss and waste, on a global, regional, national and local scale. What it presents is a compilation of keen insights, research, and strategies aimed at enhancing understanding, addressing, and ultimately reducing food loss and waste. It brings together the expertise and experiences of individuals, organisations, and governments from around the world who are committed to addressing malnutrition, food insecurity and environmental sustainability.

Within this compendium you will find insights that will help you delve deeper into the multi-pronged nature of food loss and waste as our common challenge, its varied social, economic, and environmental impacts. There are also global initiatives, regional, national and local efforts underway, policies, and programmes in place and in-the-making, to combat food loss and waste. It also houses private sector perspectives from businesses that are optimising their supply chains to reduce waste and mitigate greenhouse gas emissions. At the other end of the spectrum, there are stories of inspiring individuals championing change at the grassroots level, emphasising the importance of local action in achieving global goals. And some technological advancements enroute for the optimisation of food redistribution,

¹ FAO, 2022

² UNEP, 2021

ensuring that surplus and nutritious food reaches those in need. Possibly, most importantly this compendium allows us a glimpse into the future of food systems, the road that lies ahead as we try and tackle food loss and waste.

In front of us lies a tall ask, as we hurtle towards the zero hour – the year 2030, when we hold ourselves accountable and take stock of progress made on the Sustainable Development Goals (SDG). We are confronted with multiple, complex, cascading challenges and shocks. Global food crisis in many parts, climate shocks in others, disrupting global progress and raising vulnerabilities. Specifically, the UN SDG 12.3 target – calls for halving per capita global food waste at the retailer and consumer levels and reducing food losses along production and supply chains. This will prove to be no mean feat to achieve in the remaining seven years to 2030.

As you explore the pages of this compendium, we encourage you to reflect on the significant role each one of us can play in the fight against food loss and waste. Whether as a policymaker, business leader, private sector organisation, development sector agency, a farmer or a consumer, your actions matter.

Together, we can build a safer haven where food is cherished and not wasted, and where our planet is sustainably nourished, and surely, where no one goes to bed hungry.

The team of Nutrition Connect extends its heartfelt gratitude to all the contributors, agencies, researchers and advocates who have shared their knowledge and experiences in this compendium. Your dedication to this cause is a beacon of hope in our collective journey toward a more equitable, sustainable, and hunger-free world.

And last but not the least, to all our readers, we hope you enjoy this compendium and gain much from it, as have we, in curating it.

- The Nutrition Connect Team

List of Abbreviations

A

AFI: Arla Foods Ingredients

B

BAMX: Red de Bancos de Alimentos de Mexico

B2B: Business to Business

C

COAG: Committee on Agriculture

CoC: Code of Conduct

CCAC: Climate and Clean Air Coalition

CAF: Clean air Fund

CII: Confederation of Indian Industry

D

DMDP: Danida Market Development Partnerships

E

E-PLAN: Ethiopia Post-Harvest Loss Alliance for Nutrition

EU: European Union

F

FLW: Food Loss and Waste

FY: Financial Year

FAO: Food and Agriculture Organization of the United Nations

FBOs: Food and Beverage Organization

FDA: The US Food and Drug Administration

G

GDP: Gross Domestic Product

GAIN: Global Alliance for Improved Nutrition

GFN: The Global Food Banking Network

GRASP 2030: Gotong Royong Atasi Susut & Limbah Pangan di Tahun 2030

GCCA: Global Cold Chain Alliance

GKI: Global Knowledge Initiative

GMA: Global Methane Assessment

GDP: Gross Domestic Product

GHG: Greenhouse Gases

GO4SDGs: Global Opportunities for SDGs

I

I-PLAN: Indonesia Post - Harvest Loss Alliance for Nutrition
IFPRI: International Food Policy Research Institute
IDR: Indonesian Rupiah
IBCSD: Indonesia Business Council for Sustainable Development
IEA: International Energy Agency
IPCC: Intergovernmental Panel on Climate Change (IPCC)
IFSA: Indian Food Sharing Alliance
ISO: International Organization for Standardization

K

Kgs: Kilograms
KALRO: Kenya Agriculture and Livestock Research Organisation
KEBS: Kenya Bureau of Standards
KIRDI: Kenya Industrial Research Institute

L

LMIC: Lower and Middle Income Countries

M

Mt: Million tonnes
MoU: Memorandum of Understanding

N

NBP: Nyangorora Banana Processors
NEMA: National Environment Management Authority
NITI Aayog: National Institution for Transforming India
N-PLAN: Nigeria Post - Harvest Loss Alliance for Nutrition
NENA: Near East and North Africa

P

PKR: Pakistani Rupee
PPE: Public Private Engagement
PHL: Post-Harvest Loss
PLAN: Post-Harvest Loss Alliance for Nutrition
P4G: Partnering for Green Growth and the Global Goals 2030
PPP: Public-Private Partnership
PCC: Pacific Coast Collaborative
PCFWC: Pacific Coast Food Waste Commitment

R

R&D: Research and Development

S

SBN: Sun Business Network

SBN: Scaling up Nutrition Business Network

SDG: Sustainable Development Goals

SHARP Model: Sustainable, Healthy, Affordable, Reliable, Preferable Model

SUN: Scaling Up Nutrition

SEI: Stockholm Environmental Institute

U

USAID: United States Agency for International Development

UN SDG 12.3 target: United Nations Sustainable Development 12.3 target

UNFSS: UN Food Systems Summit

UNEP: United Nations Environmental Programme

UNFCCC: United Nations Framework Convention for Climate

US: United States

UN: United Nations

UFS: Unilever Food Solutions

W

WRAP: Waste and Resources Action Programme

WEF: World Economic Forum

WWF: World Wide Fund

Introduction

The global food system is in crisis, marked by the triple burden of malnutrition; undernutrition (stunting and wasting), overnutrition (overweight and obesity) and micronutrient deficiencies (hidden hunger). Concurrently, more than a third of food produced for human consumption, food we often deem to be medicine, ends up in landfills or is incinerated further fuelling our current climate crisis. To achieve a balanced co-existence of human and planetary health, we must transform our food systems, through collaborations, policy reforms and evidence-based solutions.

The United Nations Sustainable Development Goal 12.3 target—calls for halving per-capita global food waste at the retailer and consumer levels and reducing food losses along production and supply chains. Global efforts are needed to defeat hunger, food insecurity and malnutrition to raise levels of nutrition and reduce food loss and food waste, considering sustainable production and consumption practices. Its a benchmark with “Target, Measure, Act” principle as a reliable framework for governments and businesses to accelerate reduction of discarded food as individually and also part of a collective.

Individual organisations and multi-stakeholder initiatives tackling food loss and waste embrace the Target Measure Act principle and enable implementation within stakeholders across the food system.

The Sum is Greater than its Parts

The agencies of public and private sector actors share a chief responsibility towards addressing food loss and waste. While the public sector can bridge institutional gaps and provide space for incentivising the reduction of food loss and waste, the private sector can support the much-needed innovations and enhance investments to reduce food loss and waste.

Thus, Nutrition Connect, an initiative of the Global Alliance for Improved Nutrition (GAIN) is dedicated to addressing food system challenges including food loss and waste through a public-private engagement lens. As part of its mandate, Nutrition Connect is showcasing organisations and multi-stakeholder initiatives that are actively working to solve this wicked problem.

What this Compendium Offers

- Sobering data points to keep us in check as well as impact numbers to appreciate ongoing efforts from policymakers and the business community
- Evidence-based approaches, using data and insights to inform where hotspots occur throughout the value chain and what impactful interventions are required. While acknowledging the influence of our food environments shaped our societal norms and market influences. Our diverse socio-cultural, economic and geographic contexts present both challenges and opportunities for addressing food loss and waste
- Initiatives from across the globe with the aim of gaining a nuanced understanding of their work and organisational goals, at different points of the food supply chain
- Examples of business models and innovative solutions that embraces indigenous knowledge, behaviour changes and high-tech machinery that are leading to marked food loss and waste reduction

- Partnerships and Coalitions co-creating solutions and harnessing resources like data, finance and networks to ensure that safe and nutritious foods are reaching those who need it the most
- Policy frameworks and voluntary codes to guide food system actors in their operations and multi-stakeholder engagements. Collaboration with stakeholders across the food system enables 'farm to fork' consideration of impact and action, overcoming common barriers and fosters innovation which scales impact and multiple benefits

International Day for Awareness on Food Loss and Waste provides an opportunity for food system actors to pause, reflect and strive to balance satiating world hunger, nourishing people especially the most vulnerable without being detrimental to the planet.

Final Thoughts

The case studies within this compendium serve as actionable examples with insights from similar contexts. The urgency to address food and nutrition security rooted in science and societal norms. Collaborative, innovation and data-driven action are key to transforming our food systems and reducing food loss and waste, ensuring a sustainable future for all.

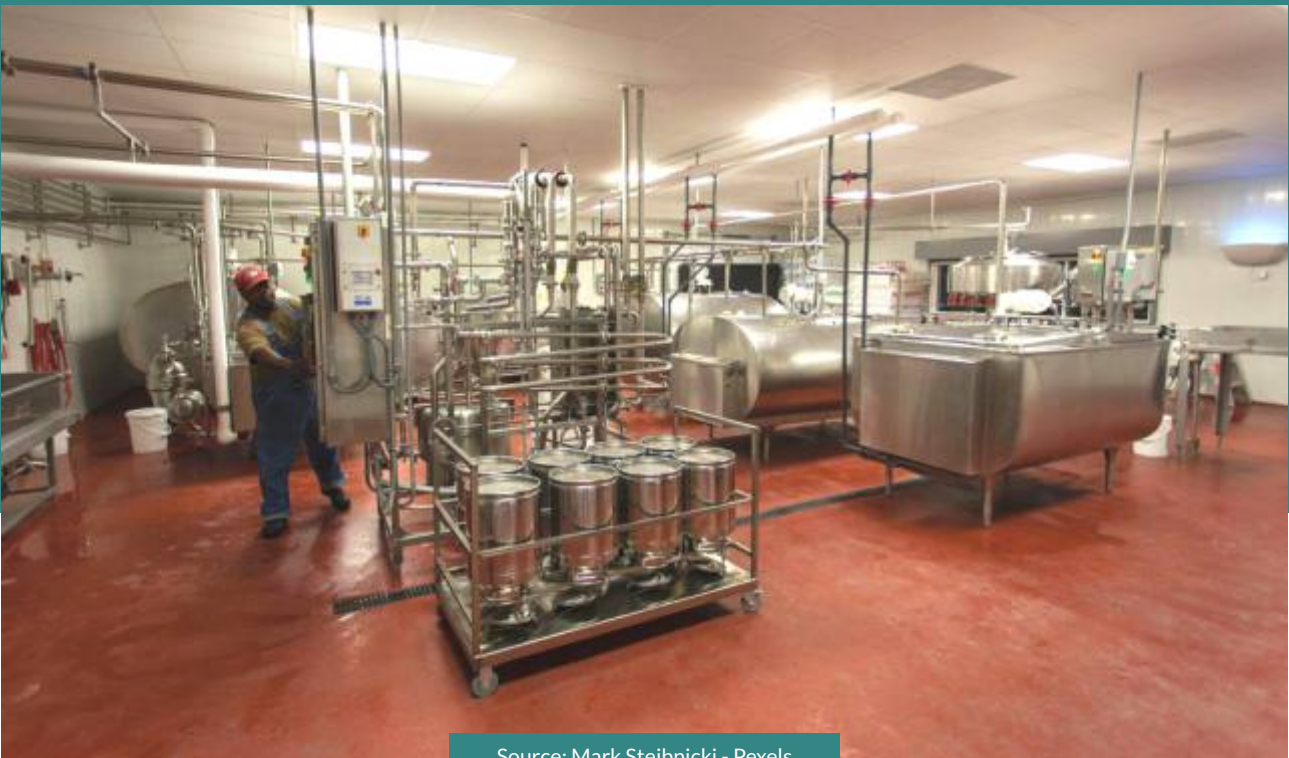


Case Studies

CIRCULAR BUSINESS MODELS

Collaborative Models for Affordable Nutrition with Whey

The GAIN Access to Better Dairy (GA2BD) project in Pakistan, turning food waste to nutrition



Source: Mark Steibnicki - Pexels

In 2022, the Global Alliance for Improved Nutrition (GAIN) along with ARLA Food Ingredients and the SUN Business Network in Pakistan rolled-out the GAIN Access to Better (A2B) Dairy Project, of a market-based approach to repurpose a near-waste of a milk by-product, 'Whey' into a nutritious and affordable drink.

Key messages

- Pakistan's dairy industry accounts for 12% of its agricultural GDP, yet the agrifood system suffers from food loss and waste with 40% food wasted each year.
- Innovative 'waste-to-food' interventions devised as public-private sector collaborative initiatives, are stemming and reversing food loss and waste in Pakistan.
- A whey-based, protein-rich and affordable drink, a great source of nutrition was developed as a palatable product, adding to the socio-economic-environmental win-win. As per GAIN's draft report "Whey water and its impact on environment" information generated through interviews and literature available, cheese manufacturing industry in

Pakistan is wasting nearly 43.7 million liters whey, disposed of in sewerage water every year. The financial analysis as per proposed recipe formulation indicates that repurposing this near-waste whey into a nutritious product could yield 437 million servings of 200 ml each. This initiative is financially viable, leading to profitability for benefits for dairy business partners and the broader dairy value chain.

- The Supply Chain Analysis for Nutrition (SCAN) tool developed by the GAIN was used for analysing specific supply chain weaknesses or bottlenecks and suggesting potential mechanisms to improve nutrition along the supply chain.
- The GAIN Access to Better Dairy – Greening and Scaling partnership, brought together private companies, government agencies, civil society organizations, and academia to co-create solutions to fulfill multiple objectives of: affordable, good taste, high nutritional value, food safety, environmental protection, and business sustainability.
- The 'SHARP approach' (Sustainable (S), Healthy (H), Affordable (A), Reliable (R), Preferable (P)) was used to find the “sweet spot” for optimizing competencies of multi-sectoral partners to find a good food solution, with the whey-based drink.

In 2022, two sets of sustainability conundrums plagued Pakistan. While severe floods wreaked havoc on the country's food basket and economy, pushing 14 million into seeking emergency food assistance, its large dairy industry however continued to generate massive amounts of whey, a milky-white liquid, rich in protein, left after the production of cheese, which was being discarded as waste water. Whey – a rich source of proteins, vitamins, and minerals for the human body – when disposed of as waste water, was disrupting local ecosystems. At that point, a product that repurposed the whey – from waste product to nutrient-rich food – seemed like it stood to solve multiple problems of generating yet another source of income, providing a nutrient-rich drink and being conducive to environmental effects.

Partners in the private and public sector are increasingly interested in collaborating for improved health and nutrition goals and reaching a more effective Food Systems Transformation. But while momentum for public-private engagement is building, there is less clarity on how to go about it effectively. This case study draws focus on four key factors needed for enterprises with a better health focus, to reach scale: An enabling policy environment, adequate funding, business and technical skills support, and market linkages.

Pakistan reports over 40% of its food is wasted each year.¹ This includes food loss during the supply chain (production, post-harvest handling, agro-processing, distribution and consumption) that occurs every year. Achieving food security and nutrition is a high priority for Pakistan.

A number of important policy initiatives in fact have been taken in this direction, including the concept development of the National Zero Hunger Program, the food security assessment survey, commitment of the Government for Sustainable Development Goals particularly SDG 1 and 2 for Poverty and Zero Hunger Challenges, and devising future strategies through a National Food Security Policy.

¹ Report by the Ministry of National Food Security & Research

Overcoming the better food and nutrition challenges of Pakistan

Pakistan has a population of 240 million², with nearly 22%³ living below the national poverty line and 43% of its population⁴ being food insecure. While conflict and insecurity, economic and climatic shocks have had a role in deepening the crisis, a contributing factor has been the postharvest food losses that Pakistan faces, of up to 40-50% due to supply chain and other technical issues related to storage and transportation of food. Perishables (fruits, vegetables and dairy), one of the most nutritious of foods, suffer the most. Around 15 percent of total milk produced in Pakistan (Estimated at PKR 1 trillion gets wasted due to improper storage and handling) whereas in a country like Holland, only one percent of milk produced is wasted.⁵

High quality proteins are critical during growth, health recovery and maintenance throughout life. Whey, a milk byproduct is in fact proven to cause reduction of diarrhea in infants and could combat moderate acute malnutrition in children. Pakistan is the fourth-largest dairy producer in the world, producing nearly 62 billion litres a year.

Pakistan's dairy industry is a vital component of its agriculture sector, accounting for over 12% of the country's agricultural GDP.⁶ It contributes significantly to the economy and provides livelihoods for millions while being a key source of income, especially for small-scale farmers and rural communities. Yet, most of Pakistan's poor struggle to afford milk and milk products – an important source of nutrition – despite the country being the fourth-largest dairy producer in the world, with an annual milk production of 62 million litres.⁷ While protein also happens to be the primary macronutrient causing malnutrition among children and women, Whey, a rich source of protein, remains underexplored in Pakistan. High quality proteins are critical during growth, health recovery and maintenance throughout life. Whey, a milk byproduct is in fact proven to cause reduction of diarrhea in infants and could in fact combat moderate acute malnutrition in children.

For every 1 kilogram of cheese the dairy industry produces, it generates 9 liters of Whey. The high levels of organic matter in Whey make it an environmental hazard for ecosystems, requiring complex and expensive sewage treatments.

A similar set of problems had been addressed in Ethiopia, in 2017, under the GAIN Access to Better Dairy Project, as a market-based approach to convert near waste of Whey water into a nutritious and affordable, whey-based drink. The four-year project funded by Danida Market Development Partnerships (DMDP), Ministry of Foreign Affairs of Denmark extended for two more years in Ethiopia now, was also extended to Tanzania and Pakistan.

Public-Private solution for stemming food loss & waste in the dairy sector

Its 2021 iteration in Pakistan – a collaboration between local dairy processors in Pakistan, Arla Foods Ingredients (AFI, Denmark), Global Alliance for Improved Nutrition (GAIN, Switzerland), and the SUN Business Network in Pakistan – has been aimed at showcasing an innovative business model with emphasis on circular economy principles. The whey-based drink being produced as a part of the pilot project in Pakistan, enables the low income population to consume a dairy byproduct-drink enriched with protein, vitamins, minerals, contributing to fighting malnutrition.

² UNFPA World Population Dashboard - Pakistan

³ ADB Poverty Data - Pakistan (2018)

⁴ ISSI Acute Food Insecurity Brief 2022- Pakistan

⁵ The Pakistan Business Council - Modernising the Dairy Sector March 2022

⁶ PCFWC. 'Institutionalizing a Waste Reduction Culture in Food Manufacturing,' *Pacific Coast Food Waste Commitment*, Fall 2022, pp. 1-16.

⁷ Government of Pakistan Statistics 2021

The “Waste to Value” approach adopted by the GAIN-SBN-ARLA partnership model used a three-pronged approach to demonstrate benefits of post-harvest loss reduction. The two key objectives of the project were to increase acceptability and availability of an affordable, safe and nutritious milk-based products for children and women to improve nutrition status; and to catalyze market development of the dairy value chain, to increase profitability for small holder farmers, local processors and other value chain actors creating more regular supply of milk for low-income consumers. The SHARP model was aptly able to capture the 'sweetspot' of this unique partnership.

The “Waste to Value” approach has a three-pronged approach in which it demonstrates the benefits of post-harvest loss reduction through: i) increased focus on hygiene practices for milk-handling to reduce spoilage ii) extending shelf-life and value addition by fermentation using best-in-class cultures to product byproducts, and iii) using by-products from cheese production, which often are wasted, by turning it into a healthy dairy-based drink.

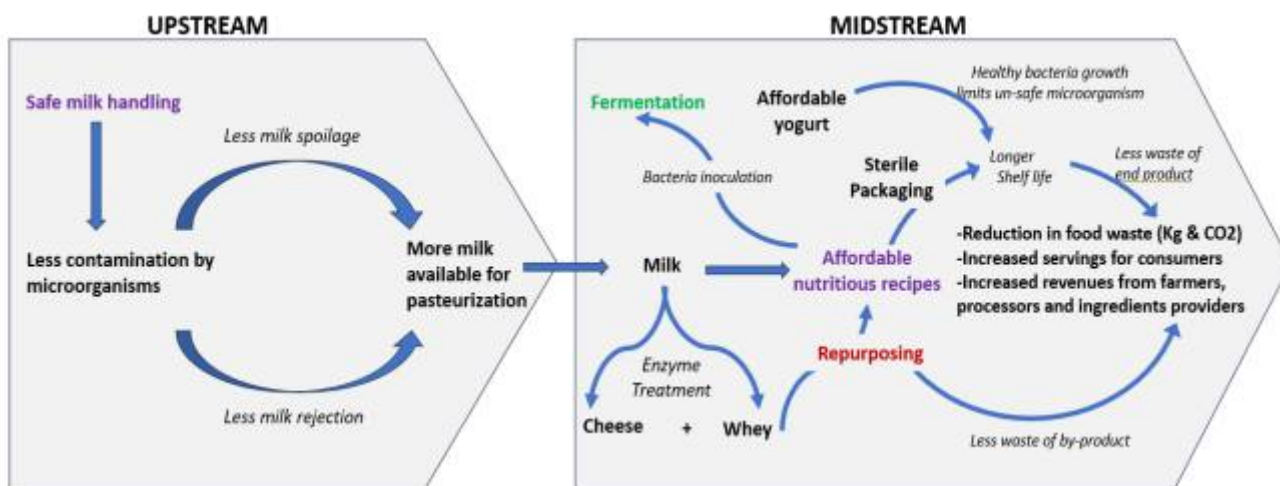
Charlotte Sørensen outlines the benefits of partnership for better nutrition in dairy in a most inspiring way, saying “The DNA of Arla Food Ingredients is all about sharing knowledge to become better together. We have been working on collaborative projects to bring technology into optimizing food and nutrition. The GAIN-Nordic partnership stands to benefit the dairy industry, with partnership projects moving from Ethiopia through Zambia and now in Pakistan and Tanzania. Working with varied partners has brought forth a multitude of best experiences and resources, ensuring that one plus one equals three!”

By using several tonnes of otherwise waste Whey, which also has a longer 3-month shelf life, it will also address the environmental impact of the dairy industry. Lastly, by re-channeling dairies into producing another by-product, using existing infrastructure, it also will work towards boosting economic growth, and promoting livelihoods and job opportunities of the local dairies.



The cheese extraction process from milk underway at a local dairy

Initiated by GAIN, the project is facilitated through the SUN Business Network, in consultation with the SUN Secretariat in Pakistan and the Ministry of Planning, Development and Special Initiatives (Government of Pakistan) under the overall stewardship of SUN focal point. This format of Public Private Engagement (PPE) for better nutrition, has AFI providing technical expertise for recipe development, product design and development of key ingredients (dairy for the initial pilot phase). The project value chain also involves various dairy processors like Fauji Foods Limited and Ajmair Food Pvt Ltd/ Cakes and Bakes, who make cheese, pre-mix suppliers, ingredient suppliers, different marketing and distribution channels, all of whom collaborate through the SBN coordination platform.

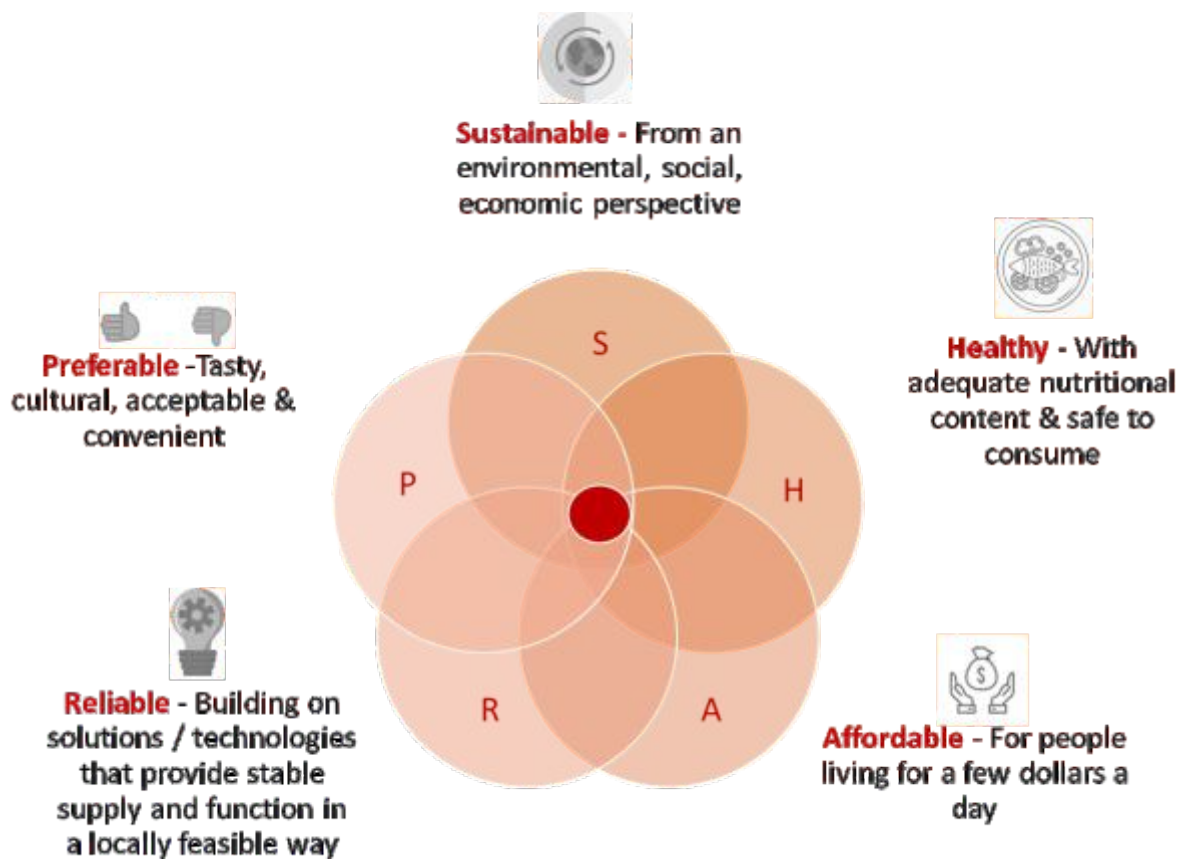


The Waste-to-Value approach of the GAIN Access to Better Dairy (GA2BD) model : Demonstrates post-harvest loss reduction through increased focus on hygiene practices for safe milk handling and extending shelf life and value addition by fermentation using best-in-class cultures to produce yoghurt, as well as re-purpose by-products (Whey) from cheese production

The partnership for furthering better diets for all, brings together multisectoral partners to co-develop solutions with a focus on the health and socio-economic conditions of the low-income populations.

The consortium of partners has been selected using the unique SHARP Approach,⁸ specifically developed for ensuring the success of this public private engagement model for countering food loss and waste. The SHARP approach aims to find the “sweetspot” for nutritious products serving as the foundation for scale up. This uses the convergence point of all competencies of diverse partners that is essential to find solutions to honor constraints for scaling up. The GAIN Nordic partnership model is a case in point as illustrated in the next page:

⁸ Interview of Charlotte Pedersen, GAIN at Nutrition Connect (Food Loss and Waste Series 2022)



The SHARP Model devised from the GAIN-Nordic-country partnerships, forming the basis for public private sector engagements and scale-up for preventing food loss and waste

The initial phase of the project in Pakistan thus involved a mapping of industries and assessment of their capacities, discussions around recipe formulation, composition and production of Whey and cost estimation for the final product of the whey-based drink to determine profit margins that would be agreeable to businesses, affordable for consumers and yet conducive to scaling-up.

A triple win for People, Planet, Prosperity - The challenges, lessons & successes

When it was initially started, the idea of a whey-based nutritious drink was completely new in Pakistan. Positioning the unique concept, then mobilizing and convincing the dairy industry has been challenging for various reasons. Firstly, the dairies were less confident of the profit potential of such a product. This was more complicated, given the context of a series of economic recession and natural disasters occurring in Pakistan, because of which all dairies diverted their research and development (R&D) investment funds towards other more proven products emanating from the use of milk, and were initially reluctant to focus on a new product development. The second issue has been Customs clearance and trade barriers (for importing some of the secondary ingredients required for whey-based drink production) causing certain delays and bottlenecks in ensuring a smooth supply chain.

At each step of the way, convincing and building trust within a multitude of partners, be it the private sector, public sector, development sector partners or even local business community, has been the most rewarding aspect of this partnership model for stemming post-harvest losses and ensuring smooth supply chains.



SBN Pakistan team at the launch of the Access To Better Dairy Project in 2022

There have been factors that have worked in favor of the initiative and helped to smooth out these issues. Paramount, has been growing government interest in the project, aligning as it has, with the objectives of the Ministry of Planning, whose goal is scaling up multi-sectoral nutrition. “It is our Ministry's job to facilitate and encourage businesses and initiatives that want to work on tackling issues like malnutrition, childhood stunting, and micronutrient deficiencies,” says Badar Uzman, Program Policy Officer, National SUN Secretariat, Ministry of Planning. “The government decided to support this initiative since we believe it is a cost-effective intervention that can help in scaling up nutrition,” he adds. The ministry has played a role for facilitation by connecting the project with other key stakeholders within the food industry, and other regulatory agencies within government. “When governments lead initiatives like this, it is always encouraging for businesses, due to the long list of bottlenecks that they otherwise may have to face,” he says.

In addition to this, the response of the private sector to the initiative has also been encouraging, especially after they have been made aware of its profit potential and more importantly, for the environment. “Most dairies in Pakistan are aware of the environmental impact of dairy waste and emissions in general. Most dairies are also helpful and vigilant for addressing malnutrition so they are willing to take steps to address these issues,” says Tanazza Sadaf, Portfolio Lead – GAIN Pakistan.

The product is currently in the final stages of development. The pilot phase has seen the dairy company distributing samples of the Whey-based drink among 300 school students in Pakistan, all of whom have responded favorably for the taste and acceptability of the drink.

The initiative marks a key success in PPEs for eliminating food loss and waste emanating from the synergistic planning, development and roll-out of this intervention, between industry, business and the public sector. Whilst aligning with Pakistan's national developmental objectives such as the Pakistan Vision 2025⁹ and Pakistan Multi-sectoral National Nutritional Strategy,¹⁰ Pakistan National Climate Change Policy¹¹ and Pakistan Dairy Development Plan¹² – this initiative also allows businesses to generate revenue,

⁹ UNFPA World Population Dashboard - Pakistan

¹⁰ ADB Poverty Data - Pakistan (2018)

¹¹ ISSI Acute Food Insecurity Brief 2022- Pakistan

¹² The Pakistan Business Council - Modernising the Dairy Sector

spelling a win-win for People, Planet and Prosperity. “The product is testament to the high potential of collaborative efforts succeeding in fighting multiple challenges,” adds Ms. Sadaf.

The driving idea behind the project is in thinking 'circular' and trying to optimize the value of anything perceived as food waste, and finding ways of repurposing it back to the food value chain. The first step is to see if it can be used as fertilizer or bio-gas for fields, the next step is to see if it can be used as animal feed. The last step is to see if it can be made fit for human consumption. This also involves behavior change, and a change in thinking patterns.

“Thinking how precious something is a key part of making this possible,” said Charlotte Pedersen, GAIN.

The way forward: Collaborating for a food systems change with 'No Food Loss and Waste'

To fight the challenge of food loss and waste in Pakistan, a set of challenges specific to this project, and the solutions-context surrounding it, needs to usher change. The post-harvest food loss especially of perishables need to be minimized. At a policy level, there is a need to engage provincial governments towards making new policies and regulatory framework to tackle food loss and waste across the food value chain. Alongside, behavior change campaigns targeted at both consumer and industry, are needed.

Already having worked in Pakistan and in a previous intervention in Ethiopia and Tanzania, the project is a promising model for scaling-up in many other countries and provincial contexts. The partners including GAIN, SBN and ARLA Food Ingredients are now also starting to explore Latin America as a next possible area of intervention to step-up focus on tackling food loss and waste with this special whey-based drink. Given its high-volume of cheese production and burgeoning challenges for malnutrition, this could augur well for the Latin American continent.

Set to have a food systems transformative change, at the level of environment, nutrition, business and livelihoods, the project is a promising triple-win in the PPE space.

Banana Waste Reimagined

Nyangorora Banana Processors Unlocks Its Potential



Banana crisps Source: Nyangorora Banana Processors (NBP)

This case study highlights Askah Nyakwara, a food waste champion and the company's founder Nyangorora Banana Processors (NBP) in Kisii, Western Kenya. The banana industry is characterised by high food loss from roots, stems, bark, leaves, flowers, rejected or overripe fruits, and their peels. Through their innovative efforts, NBP has reduced post-harvest losses from 40% to 15% in their operations over 10 years.

Key messages

- Worldwide, about 114.08 million metric tons of banana waste-loss (equivalent to 22 million passenger vehicles) are produced, leading to environmental problems such as the excessive emission of greenhouse gases.
- Bananas are the second most-produced fruit after citrus and the fourth most important food crop after rice, wheat and corn.
- Through processing and value addition, bananas can be upcycled into crisps and flour with nourishing qualities, while the waste by-product can be used as natural fibres.
- Increasingly, budding Small and Medium Enterprises like Nyangorora Banana Processors in sub-Saharan Africa are repurposing indigenous foods to boost incomes, nourish communities, and cultivate sustainable livelihoods.

Bananas are the fourth-most important food crop after rice, wheat and corn¹ and provide essential micronutrients for human growth and development. Banana farming in central and western Kenya is a source of livelihood for small-scale farmers and an essential component of the country's food security and agricultural sector.²

The banana processing industry is characterised by high food loss and waste loss from roots, stems, bark, leaves, flowers, rejected or overripe fruits, and their peels. A single banana plant produces waste of up to 80% of its total plant mass.³

In 2006, a youth group providing extension training for the local community on modern farming methods in the western part of Kenya, in Kisii, was launched. Almost two decades later, the project morphed into Nyangorora Banana Processors (NBP), a company that Askah Nyakwara founded. NBP unlocks the potential of banana waste, such as stems, peels and leaves often discarded during banana processing. Through their innovative efforts, since 2013, NBP has reduced post-harvest losses from 40% to 15% (currently) in their operations.

Milestones of NBP

- Nyangorora Banana Processors was established in 2013 and is currently incubated at the Kenya Industrial Research Institute (KIRDI) in Kisii, Kenya.
- In 2016, Askah Nyakwara was recognised as the 'Smart Entrepreneur Of The Year' in Kenya, during an entrepreneurship summit organised by CPF Financial Services.
- NBP received equipment for banana crisps production from USAID worth 10,000 USD
- NBP has an estimated sales turnover of \$10,000 every month with a production volume of 3,000 kilogrammes of banana crisps.
- Through GAIN and the SBN Kenya they have established market linkages and benefited from benchmarking opportunities with other companies for foods that are nutritious and suitable for consumption by children.
- Through the support of Switch Africa Green, they were able to acquire solar dryers that has increased their processing productivity.
- In 2023 NBP also became ISO certified. The company is also certified by KEBS (Under Ministry of Industrialization, Trade & Enterprise Development in Kenya that develops food standards, and rules on quality assurance and testing) and NEMA (Under Ministry of Environment & Forestry in Kenya that oversees environmental safety issues and conducts environmental impact assessments).

¹ CropTrust, 'Banana / plantain', Crop Trust - Securing our food, forever, 2023. [\(Link\)](#) (accessed 27 October 2023).

² IICA, 'Bananas: A key crop for food security that is under threat', Inter-American institute for cooperation on agriculture, [\(Link\)](#) (accessed 27 October 2023).

³ M. Castillo, M. de Guzman, and J. Aberilla Mikhail, 'Environmental sustainability assessment of banana waste utilization into food packaging and liquid fertilizer', Sustainable Production and Consumption, Vol. 37, 2023, pp. 356–368. [\(Link\)](#)



Photo: Askah Nyakwara being awarded the entrepreneur award in 2016 by CPF Financial Services

Askah Nyakwara, the food waste champion from Kisii

Meet Askah Nyakwara, a 40-year-old food waste champion who lives in Nyangorora village in Kisii, Kenya, with her husband and three children. Askah's journey as an entrepreneur in exploring value-adding opportunities to extend the shelf life of bananas and reduce FLW began three decades ago when she was just a little girl. Growing up, Askah assisted her mother in selling bananas and witnessed how most small-scale farmers like her mother hardly made a profit after waiting for a year for an entire banana bunch to mature.

“It was always the middlemen making a profit and not my mother who had toiled on the farm as it takes 9 to 12 months for a banana bunch to mature. The irony was that after all that hard work and wait, a full banana bunch weighing about 7-12 kilos was being sold for less than 2 USD. This was not enough money to pay for my school fees and other needs in the family,” said Askah Nyakwara.

“We started by making the banana crisps in my mother's kitchen.⁴ Later, we moved to KIRDI to expand our operations. To streamline our processes and minimise banana waste, we repurposed the leftovers into flour and launched a new product line of doughnuts and porridge flour, now a popular healthier breakfast alternative for babies and school-going children,” says Askah Nyakwara, Founder of Nyangorora Banana Processors.

According to Lamec Mogire, KIRDI Center manager, “It has been a win-win situation for NBP and the community as the SME we currently house at KIRDI has created employment and is helping to improve the community's nutrition through the fortified banana flour high in banana flour high in potassium, vitamin C and phytonutrients.”

NBP purchases bananas from over 40 collection centres located in Kisii and Nyamira, in Western Kenya, representing over 5,000 small-scale banana farmers. The extension farming training that she received from KARLO between 2004-2008 enabled her to identify the best crop variety for various products, the Ngombe Grade One banana variety

⁴ AN, 'Kenyan entrepreneur turns profit in banana snack business', Africanews, 2016. [Link](#) (accessed 27 October 2023).

for the banana crisps, Giant Cavendish, William and Grand Nine variety for the wine and juice production and Uganda Green for making the porridge flour. Nyakwara added, “In my community, bananas are readily available and cheap, so mothers who are underprivileged in certain ways prefer to feed their children mashed bananas as it is very filling. Here I found many mothers were eager to and looking for options to diversify their children's diets, but could ill afford it.” says Aksah.



Processing of raw bananas into next stage product variants

As a response to her community's nutritional challenges, Nyakwara launched a unique banana porridge mix. The porridge mix from NPB is nutritious and gluten-free and is increasingly preferred by mothers as it includes sorghum, pumpkin seed and finger millet blend, and is much-liked by children as well.

Running a Circular Business Model

A banana stems only fruits once in the year, and is often left to rot in the field or burned . Banana stems, leaves and overripe bananas left to rot on farms after harvesting create breeding grounds for pests, diseases and emit methaneous odours. Askah felt that it was time for her community to maximise the potential of the banana tree, which was locally grown in her community. She has since been able to implement a circular business model in her operations at NBP.

LOSS SCENARIOS			
	FARM -GATE LOSS	DISTRIBUTION LOSS	PROCESSING & STORAGE LOSS
BANANA PARTS	Banana stems, leaves, the bark, overripe bananas	Damaged fruits during loading and offloading	Banana peels waste flour during milling of dried bananas
UPCYCLING METHOD	<ul style="list-style-type: none"> • Fibre extracted from banana stems • Liquid extracted from banana stems • Overripe bananas processed to vinegar 	Dried in the solar dryer and then ground	Banana peels and leaves are dried in the solar dryer, the powder generated is used to make dough that is then put in briquette moulds and dried in the solar heater
UPCYCLING PRODUCTS	<ul style="list-style-type: none"> • Banana fibre used to weave baskets and mats • Foliar plant spray used as liquid fertiliser and pesticide • Vinegar used to clean greasy stove tops 	Animal feed	Briquettes used as fuel to fry doughnuts and banana crisps

This table depicts the 'Circular Business Model' employed at Nyangorora Banana Processors

Technology transfer and partnerships

In 2008, she participated in a one-month training residency at Texfad in Kampala, Uganda. Texad offers non-formal skills training programme to women and youth on how to convert banana stems to high quality sustainable textile products.⁵ Through her apprenticeship with Kimani Muturi the founder of Texfad, Nyakwara learnt how to extract fibre from banana stems and how to upscale banana fibre extraction for premium textile making.⁶

“Waste is money. A banana stem that would have been burned down or left rotting in the field is now generating about \$50 in return after we extract the fibre and weave it into a mat or rug,” said Askah.

NBP has been able to create a difference in the community. The ISO-certified company currently employs 16 young people. Ms. Nyakwara has also created awareness in her community on the importance of reducing banana waste and has trained women and youth to create banana fibre from the banana stems. As a result, hundreds of women and youth have been equipped with the skills on how to transform readily-available banana stems to fibre.

“We buy the fibre and finished products from our trainees and as a result the guaranteed sales of their products motivates them to continue upscaling the waste stems readily available in their farms. This has contributed to a cleaner environment and also created employment opportunities for the many women and youth in our network.”

Over 50 students from Kisii National Polytechnic have completed their apprenticeship at NBP since 2013, the students have gained skills on reducing food waste by extending the shelf life of fruits such as mangoes, tomatoes and traditional vegetables through drying and packaging.

With support from the Scaling up Nutrition Business Network (SBN) Kenya, NBP has been able to access peer-to-peer learning opportunities to benchmark its products such as the baby porridge. Co-convened by GAIN and World Food Programme, SBN promotes a multi-sectoral and multi-stakeholder approach to tackling malnutrition by providing technical support and facilitating peer-to-peer learning through regional and country chapters.

Briquettes made from waste banana peels and leaves

Through the support of Switch Africa Green, a programme developed and funded by the European Union and implemented by the United Nations Environment Programme (UNEP) NBP installed solar dryers in their factory. The dryers are not only used for drying bananas but also used by other entrepreneurs to dry fruits and vegetables so as to reduce the post harvest losses of horticulture in the area. They also gained skills on how to be more resource efficient and how to embrace environmentally friendly practices. According to the Global Forest Watch, In 2010, Kisii had 46.6 kha of natural forest, extending over 38% of its land area. In 2022, it lost 33 ha of natural forest, equivalent to 24.0 kt of CO₂ emissions.⁷

Nyakwara drew attention to the ongoing deforestation in her community, “Charcoal burning and the use of firewood in the Kisii area has resulted in massive deforestation. We have replaced the use of charcoal and firewood in our banana crisps and doughnut fryers and instead use our energy efficient briquettes made from banana peels and leaves, as a result

⁵ F. Ssenjala, 'Services we offer', TexFad, 2023. ([Link](#)) (accessed 27 October 2023).

⁶ S. Acevedo et al., 'Recovery of banana waste-loss from production and processing: A contribution to a circular economy', *Molecules*, Vol. 26, no. 17, 2021, p. 5282. ([Link](#))

⁷ GFW, 'Kisii, Kenya deforestation rates & statistics: GFW', Global Forest Watch, 2023. ([Link](#)) (accessed 27 October 2023).

we have been able to make lots of savings on energy costs.” The Briquettes are typically drier than firewood which helps them burn more cleanly and efficiently, they are more energy dense and are able to maintain consistent temperature for a long time burning slower than firewood and charcoal.

Market access and challenges in distribution

Processing banana waste on farms can be challenging due to various factors.⁸ Banana fibres had traditionally been extracted from the banana stem using manual processes involving scrapping the banana sheath until the fibres were unearthed. This banana waste upcycling process is labour-intensive and not viable for commercial production. The special equipment required to process the banana stem is expensive, pushing up the production costs for banana fibre.

NBP has also faced a challenge in distributing its products. In the past, distributors have made away with their products and sales proceeds, resulting in major losses. Also, major retail stores and supermarkets offer unfavourable payment terms (30-90-day), negatively impacting their cash flow.

To guarantee profitable sales, Askah distributes her finished textile products to high end markets locally and internationally, where she sells her products to customers who prefer crafted, eco-friendly rugs, mats and baskets. A shopping basket made from banana fibre retails at 50-70 USD.

The company has embraced e-commerce, they use WhatsApp and Facebook to advertise, local delivery Apps to deliver their product to their customers across Kenya and mobile money applications to receive and track payments.

Looking ahead

NBP has expansion plans. Due to the rise of more conscious consumers pushing the demand for eco-friendly products such as mats, NBP aspires to raise additional capital to expand its operations. “We recognise that it is time for us to be more independent and transition from our current incubation hub, KIRDI, to our facility. There is still a big gap in mentoring entrepreneurs, and we would like to extend the same support offered to us at KIRDI and help other budding entrepreneurs grow,” added Askah.

In the near future, NBP plans to launch a training institute and incubation hub that will train women and youth in Kisii county on banana value addition and how to reduce FLW in the banana value chain.

In conclusion, Nyangorora Banana Processors (NBP) is a game-changing initiative that has unlocked the potential of reducing banana waste in Kisii, Kenya. Their approach is not only environmentally friendly but also economically viable. As such, it serves as a model for other entrepreneurs working in high-waste-producing food businesses to follow.

⁸ A. Ibrahim, ‘Banana waste upcycling boosts Uganda’s circular economy’, World Economic Forum, May 2023. ([Link](#)) (accessed 27 October 2023).

Strengthening Local Foods System

How PLAN forged partnerships to curb loss of nutritious foods in Nigeria, Ethiopia, and Indonesia



Nigerian Market ©GAIN

In 2015-2019, the Global Alliance for Improved Nutrition (GAIN) convened public and private sector players through the Post-Harvest Loss Alliance for Nutrition (PLAN) to reduce loss of nutritious foods along supply chains in three countries.

Key messages

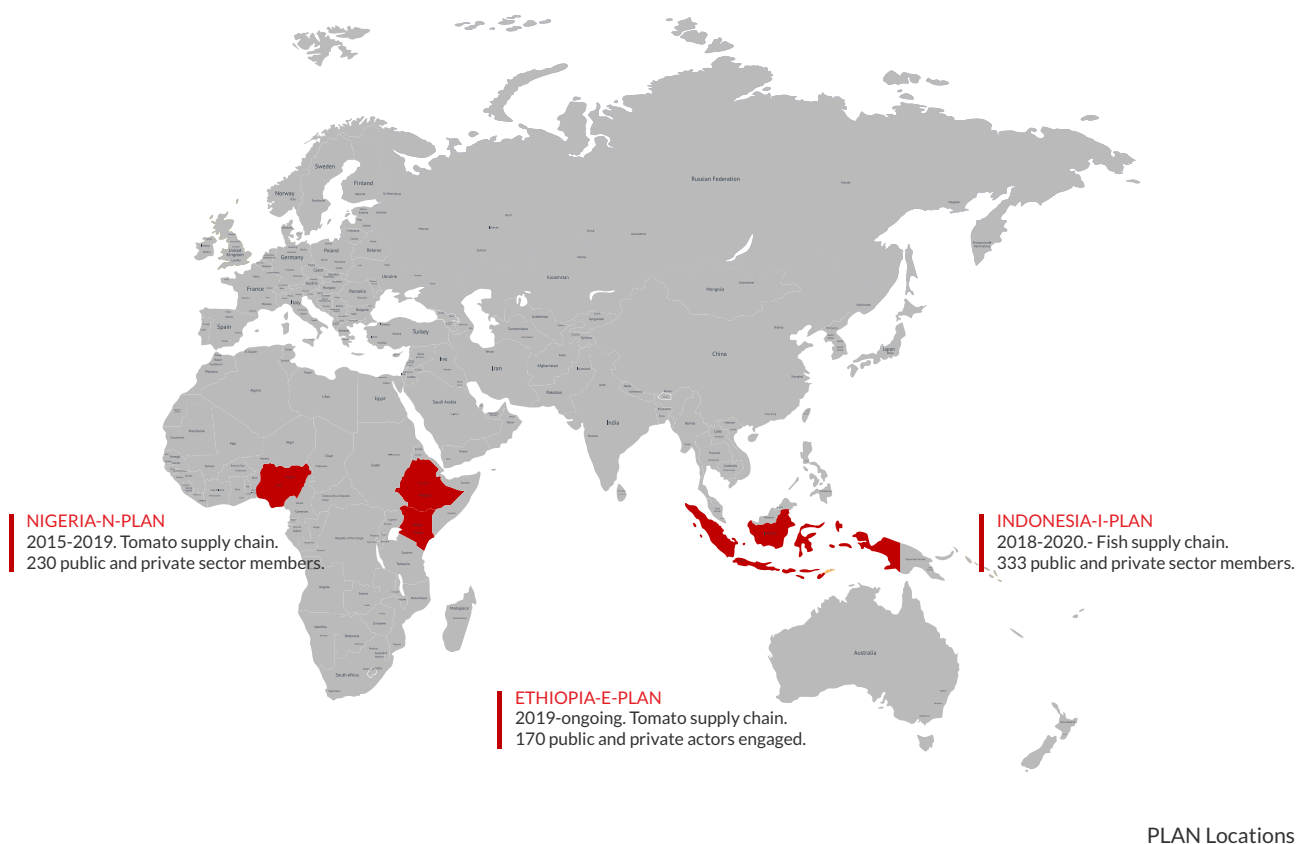
- Currently, vegetable consumption is below recommended levels in 88% of countries and contributes to malnutrition
- In lower-middle-income countries (LMICs), a considerable amount of food loss occurs after harvest before it reaches retailers contributing to a reduced supply of these foods in the market
- One way to increase the availability and accessibility of nutritious foods is to focus on reducing Post-Harvest Loss (PHL) of locally-produced fruits and vegetables
- 230 supply chain actors joined PLAN Nigeria (N-PLAN) to explore cold chain options to reduce the loss of the country's vitamin A-rich tomatoes

- PLAN Indonesia brought together stakeholders along the fish value chain to co-develop innovative solutions and share insights to reduce postharvest loss and make nutritious, fresh fish more available and affordable
- PLAN Ethiopia worked with the local agricultural university to create a specialized PHL training curriculum, which was then used to conduct training on improved postharvest technologies and business management for 165 supply chain businesses and 26 respective government employees

Poor diets are a leading contributor to the non-communicable disease burden worldwide. Currently, vegetable intake is below recommended levels in 88% of countries, and national vegetable production needs to be increased to meet demand in 61% of countries globally.¹

In lower-middle-income countries (LMICs), a considerable amount of food loss occurs after harvest and before it reaches retailers. In Nigeria, 40–50% of fresh fruits and vegetables are lost during crating, transportation, storage, and processing.²

Against this backdrop, the Global Alliance for Improved Nutrition (GAIN), with assistance from USAID, launched the Post-harvest Loss Alliance for Nutrition (PLAN) in 2015. Over five years (2015-2019), the project worked with key stakeholders, particularly small and medium enterprises (SMEs), around a specific nutritious food in Nigeria (tomatoes), Indonesia (fish) and Ethiopia (tomatoes) to address the systemic challenges that contributed to high levels of PHL.



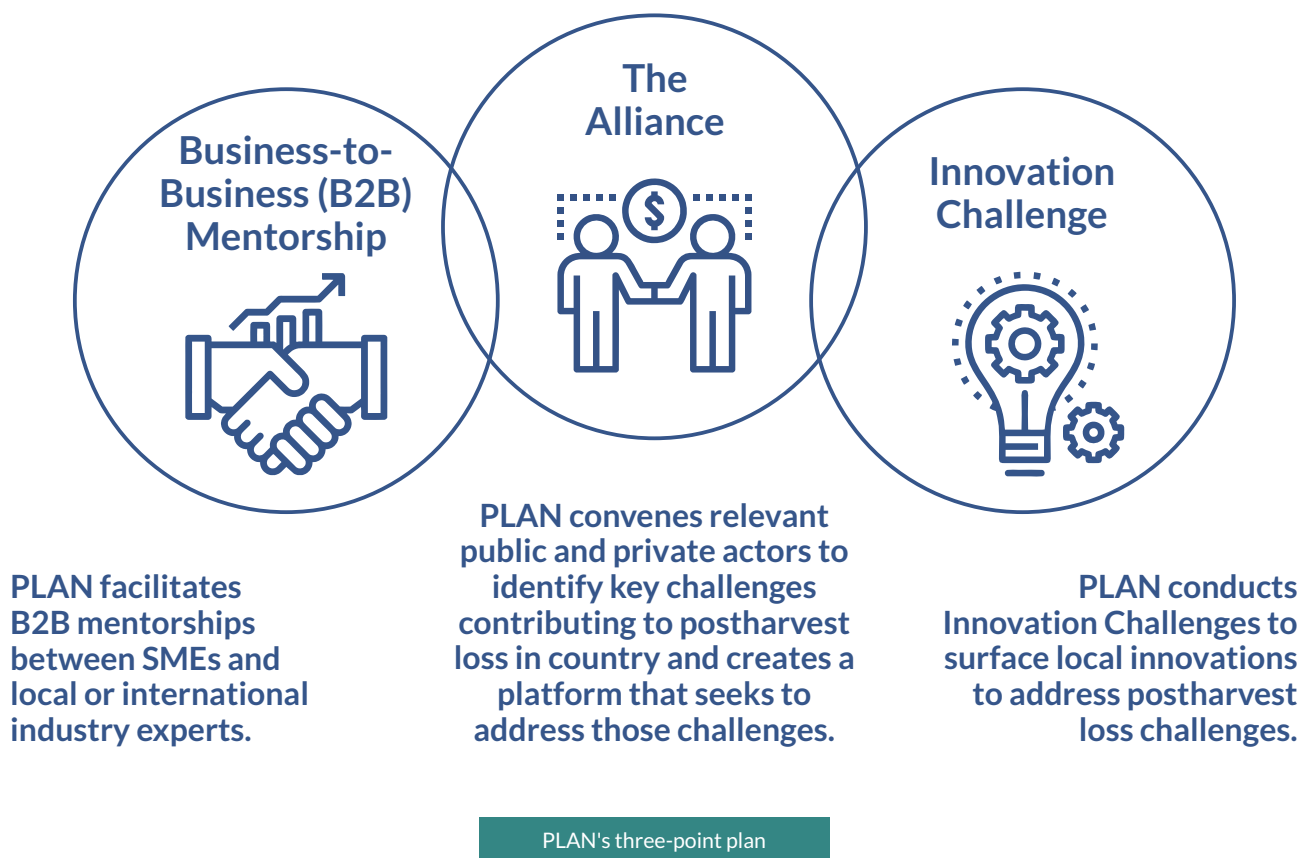
¹ A., Kalmourtzidou, A., Eilander, and E., Talsma, 'Global vegetable intake and supply compared to recommendations: A systematic review,' *Nutrients*, vol. 12, no. 6, 2020, p. 1558.

² GAIN, 'Strengthening the business links in Nigeria's cold chain,' Global Alliance for Improved Nutrition, 2023.

Convening public and private sector actors to reduce food loss

PLAN linked public and private sector actors to reduce the loss of nutritious foods, boosting suppliers' livelihoods while increasing the availability and affordability of nutritious and safe foods for consumers.

The three-point PLAN model prioritised Business-to-Business mentorships between SMEs, convening relevant public and private actors to identify key challenges through The Alliance and conducting Innovation Challenges to address postharvest loss.³



PLAN linked different actors from across a given supply chain to jointly identify and address the causes of PHL, focusing on the availability of highly nutritious foods. "These SMEs saw a business opportunity to work together, to make improvements to their businesses, and do something good for their country," said Teale Yalch, EatSafe Project Manager, Operations and Partnerships, at GAIN.

³ T., Yalch, J., Lofthouse, and S., Nordhagen, 'Creating alliances and fostering innovations to reduce post-harvest loss of nutritious food,' Global Alliance for Improved Nutrition, No. 9, August 2020, pp. 1-20.

A PLAN for Nigeria

Tomatoes are an excellent source of essential nutrients, such as Vitamins A and C. Nigeria, Africa's most populous country, is the largest producer of tomatoes in Africa, with an annual yield of nearly 2 million metric tonnes.

N-PLAN confirmed that most SMEs were responsible for tomato production and distribution. The long transportation journey from northern Nigeria, where tomatoes are grown, to the large urban markets in the south resulted in a 40-60% loss of their produce. These SMEs needed more opportunity and capacity to adopt new technologies, such as cold chains, to help preserve tomatoes along the supply chain.

To address this challenge, N-PLAN convened small businesses to discuss and co-develop innovative cold chain solutions. Over 200 supply chain actors joined N-PLAN's cold chain alliance to explore refrigeration options and reduce losses of tomatoes.

A key outcome of the N-PLAN was the creation of The Organization for Technology Advancement of Cold Chain in West Africa (OTACCWA), a privately led and funded business association focused on developing the cold chain in West Africa.⁴ OTACCWA has close to 200 private members and became an affiliate partner of GCCA in 2020.



Refrigerated trucks in Nigeria © GAIN

⁴ GAIN, 'Impact Story 20: Reducing Postharvest Losses in Fresh Fruits and Vegetables in Nigeria,' Global Alliance for Improved Nutrition, October 2022.



Fish Market in Indonesia © GAIN

Reclaiming Indonesia's fish for improved nutrition

After Nigeria, PLAN expanded to Indonesia in 2017. In Indonesia, aquatic foods account for at least half of the nation's animal protein consumption⁵. Indonesia has one of the highest fish supplies in the world at 6 million tons annually, yet 35% of fish in Indonesia is lost or wasted between harvest and markets due to poor transport and storage infrastructure and practices⁶.

Indonesia loses approximately 13 million tonnes of fish annually, equivalent to 300 kg per person each year⁷. I-PLAN became the bridge between the Ministry of Health and the Ministry of Fisheries to find solutions for fish loss and increase access to fish consumption.

Of PLAN's three-tier approach, the Innovation Challenge was first launched in Indonesia, attracting over 500 entries. The first prize was accorded to an innovation for an ice substitute called Maslaha Cold Bank. Within six months, Maslaha received over USD 500,000 from a private investor and sold over 14,400 cold banks to fish supply chain actors. Commenting on the Innovation Challenge, Teale Yalch said, "During the second competition in 2019, we really wanted to bridge the gap between supply and demand of fish products, so we called for innovations that helped repurpose fish that would otherwise have been lost or wasted to create desirable fish products for Indonesian consumers." With this objective as key to its innovation, I-Fit Fish Cereal, producing nutritious fish-based cereal, won the 2019 competition. With I-PLAN's support, I-Fit Fish cereal's sales grew quickly, increasing by 8,350 boxes from January to July 2020 and generating revenue of IDR 170,600,000. Additionally, when the COVID pandemic hit, the Indonesian Government purchased a large amount of these nutritious breakfast cereals from I-Fit to distribute to low-middle income families with challenges in accessing nutritious foods.

⁵ FAO, 'The state of world fisheries and aquaculture,' *Food and Agriculture Organization*, 2022, pp. 1-266.

⁶ R., Arnold, 'Towards zero food waste in Indonesia's fishing communities,' *IFAD*, September 2020.

⁷ GAIN, 'Driving Innovation and collective action in Indonesia's fish value chain,' *Global Alliance for Improved Nutrition*, 2023, pp. 1-4.

I-PLAN's notable achievements included signing up more than 500 organisations, training over 300 individuals on improved post-harvest loss practices and technologies, helping over 100 businesses apply improved post-harvest loss practices and technologies in their businesses and identifying over 500 post-harvest loss innovations.

After its initial development phase, the I-PLAN Alliance in Indonesia was re-named as JP2GI, and now runs independently, comprising more than 600 fish supply chain members across Indonesia. The Ministry of Health and Maritime Affairs in Indonesia signed an agreement in 2019, independent of GAIN and I-PLAN to promote excellence in Indonesian human capital through increased fish consumption.

Reusable plastic crates to curb the loss of tomatoes in Ethiopia

In 2018, PLAN expanded to Ethiopia with a focus on tomatoes. In Ethiopia, small-scale farmers were transporting tomatoes over long distances using wooden crates that were often of varying sizes, stacked on top of one another, over long distances and bumpy roads. As a result, many tomatoes were destroyed during transportation.

PLAN identified reusable plastic crates (RPCs) as a potential solution to help prevent damage to the tomatoes during the journey from the farm to the market. Unlike wooden crates, RPCs reduce PHL by eliminating overloading with better stackability and stability, and because they can be cleaned, RPCs can help reduce food safety risks as well. An FAO analysis estimated that using these crates in Ethiopia could eliminate 5-10 percentage points of loss compared to wooden crates currently being used [1].

PLAN Ethiopia provided 19,000 RPCs to alliance member businesses based on a co-funding agreement signed with beneficiaries who procured an additional 19,000 RPCs from their funding sources. PLAN Ethiopia also worked with the local agricultural university to create a specialized PHL training curriculum, which was then used to conduct training on improved postharvest technologies and business management for 165 supply chain businesses and 26 respective government employees.

Ensuring nutritious food reaches consumers is a complex challenge

PLAN faced several challenges in achieving its objectives during the five years in Nigeria, Indonesia and Ethiopia. Firstly, financing PHL-reduction technologies remains challenging for SMEs because banks see innovations as highly risky.

Technology scalability depended on affordability and readiness, necessitating business involvement for successful adoption.

For example, "The tricky thing about reusable plastic crates is you need to find a business model that supports their continual circulation across the supply chain (upstream and downstream both), and you need buy-in from all actors. We could do this in Ethiopia and Nigeria with a few early adopters," said Yalch. Commercializing and scaling PHL technology innovations will continue to require innovative business models that work in low-income settings.

Measuring the project's impact on food loss reduction during implementation also proved challenging. It required funding outside of the project implementation phase, for assessing PHL before and after the interventions.

[1.] Rapusas RS, Rolle RS. Management of reusable plastic crates in fresh produce supply chain [Internet]. Rome: Food and Agriculture Organization of the United Nations; 2009. Available from: <http://www.fao.org/3/i0930e/i0930e00.pdf>

The way forward: Coordination and capacity-building across supply chains

Improvements in cold chain storage and logistics, crating and packaging, are key in increasing the shelf life of nutritious foods like tomatoes and fish perishables.

Since the end of the project, PLAN has continued to highlight its several successes. OTACCWA is the leading champion of cold chain technologies in Nigeria and ECOWAS countries. Notable activities at OTACCWA include hosting workshops and capacity-building training on the cold chain supply of perishable commodities and an annual West Africa Cold Chain Summit and Exhibition (WACCSE), now in its sixth edition.

The I-PLAN Alliance in Indonesia (re-named JP2GI) has been run independently and boasts more than 600 members across Indonesia. Over 200 members have applied improved post-harvest loss technology and practices to their businesses, with over 20,000 cold chain technology products sold and used by 400 fishermen and 56,000 fish-based food products sold in the local market.

In March 2022, I-PLAN, founded by GAIN with the support of the Ministry of Foreign Affairs of the Kingdom of the Netherlands, won the Best Practices Award in Sustaining Urban Food Systems at the Dubai International Award for Best Practices.

The experiences of PLAN in Nigeria, Indonesia and Ethiopia highlight the considerable potential for improving supply chain efficiency with greater coordination, technology adoption and capacity-building across supply chains to reduce the loss of nutritious foods.

How Unilever is Leading the Way in Reducing Food Loss and Waste



Source: Unilever

This case study showcases Unilever's comprehensive approach to food loss and waste spanning its supply chains to consumers, Unilever's commitment to addressing food loss and waste is evident through partnerships, innovative solutions and responsible food consumption-as part of its ambitious zero waste strategy.

Key messages

- A third of global food is wasted, which amounts to 1.3 trillion dollars worth of food. Nearly 924 million people (11.7 percent of the global population) faced food insecurity at severe levels, an increase of 207 million in two years.
- With a close to \$14 billion portfolio of food brands, Unilever is championing a zero waste food loss and waste strategy as part of its broader corporate sustainability goals.
- Unilever has sent zero waste to landfill from its factories since 2014 across more than 600 sites, in 70 countries, including factories, warehouses, distribution centers and offices.
- Unilever brands already use production planning to avoid food waste, ensuring supply meets demand wherever possible rather than exceeding it.
- As part of the Future Food initiative, Unilever has committed to halving food waste by 2025.

Background

A third of global food is wasted, which amounts to 1.3 trillion dollars worth of food.¹ This happens in the form of food loss-food damaged as it moves along the supply chain and food waste discarded by manufacturers, producers and consumers. Reversing this trend would preserve enough food to feed 2 billion people. That's more than twice the amount of food required to feed undernourished people across the globe.²

With a close to \$14 billion portfolio of food brands such as Knorr, Hellmann's, Magnum, The Vegetarian Butcher and Horlicks, Unilever has taken significant steps to lead the way in reducing food loss and waste as part of its broader corporate sustainability efforts. Unilever is one of the world's largest consumer goods companies, reaching over 3 billion people daily in over 190 countries through its products.

The Unilever Compass for sustainable goals aims to improve the planet's health and champions for a waste-free world.³ Unilever's holistic approach to tackling food waste encompasses the entire food value chain from farming, production and consumption. Unilever is tackling food waste in its supply chain by helping consumers reduce the amount of food they throw away. As a member of the 10x20x30 coalition, a sub-set of the Champions 12.3 that brings together the top leading retailers and suppliers aims to bring together at least 20 suppliers each to halve food loss and waste by 2030.^{4,5}

Unilever Food Waste Commitments

- Halve food waste in our direct operations by 2025
- Zero waste to landfill and no good food destroyed
- Enrolling key supply partners to follow our lead and tackle food loss and waste in their operations
- Helping food service customers tackle food waste through prevention and redistribution
- Through our brands, we help consumers waste less food at home

Halving food loss and waste along the production lines

As part of the Unilever Compass and Climate Transition Action plan, Unilever has committed to sending zero food waste to landfills and ensuring that no good food is wasted.⁶ Food production can result in excess and debris that often is discarded, so the company has found creative ways of turning food waste in value. In its ice cream production, it developed a product from the leftover ice cream generated during the primary production process of Magnum. Unilever created a new product line, Cremissimo, by adding chocolate sauce and white chocolate chips to the left-over ice cream.⁷

Plant-based foods can enrich our food choices through upcycled nutrient-rich foods while mitigating greenhouse gas emissions from animal protein production and diverting discarded

¹ WFP, '5 facts about food waste and hunger', UN World Food Programme, June 2020. ([Link](#))

² FAO, 'UN report: Global hunger numbers rose to as many as 828 million in 2021', Food and Agriculture Organization of the United Nations, July 2022. ([Link](#)) (accessed 27 September 2023).

³ Unilever, 'The Unilever compass for sustainable growth', Unilever, 2023, pp. 1-2. ([Link](#))

⁴ Champions, 'SDG target 12.3 on Food Loss and Waste: 2020 Progress Report', Champions 12.3, 2020, pp. 1-12. ([Link](#))

⁵ Champions, '10X20X30', Champions 12.3, 2023. ([Link](#)) (accessed 27 September 2023).

⁶ Unilever, 'Why our fight on food waste is a chain reaction', Unilever PLC, Unilever, February 2021. ([Link](#)), (accessed 27 September 2023).

⁷ Circular, 'Cremissimo proves "waste" makes for delicious taste', CIWM, Circular Online, February 2021. ([Link](#)), (accessed 27 September 2023).

food from landfills and incineration. Unilever has invested €85 million in a Foods Innovation Centre at Wageningen University in the Netherlands. The centre will help formulate the next generation of meat and dairy alternatives to join the plant-based foods comprising around a third of Unilever's food portfolio.⁸

Key facts and figures

- As a consumer goods company with a close to USD 14 billion portfolio of food brands, Unilever is championing a zero food loss and waste strategy as part of its corporate sustainability goals
- Unilever has achieved zero waste to landfill from its factories since 2014 across more than 600 sites, in 70 countries, including factories, warehouses, distribution centers and offices
- Unilever is a member of 10X20X30 coalition, which aims to halve food loss and waste by 2030 by bringing together leading retailers and suppliers
- Unilever has invested EUR million in a Foods Innovation Centre at Wageningen University to develop plant-based alternatives and reduce greenhouse gas emissions
- Hellmann's- a mayonnaise brand is committed to inspiring and enabling 100 million consumers annually by 2025 to be more resourceful with their food at home and waste less
- Unilever has partnered with the app Too Good to Go to connect people with leftover edible products from restaurants, bakeries and supermarkets, saving 16 million meals from being discarded
- Reversing food waste trends could preserve enough food to feed 2 billion people, more than twice the number of undernourished people globally
- Unilever recognises and celebrates food waste warriors within its business systems who contribute to reducing and preventing food loss and waste

Collaborating with chefs and hotels on waste-free food solutions

About 8-10 percent of GHG emissions is a result of food waste. Reducing food waste is not only environmentally responsible but also beneficial for restaurants and food service establishments. Unilever Food Solutions' commitment to educating and empowering chefs and operators in this regard contributes to a more sustainable and waste-conscious future for the culinary industry.

The UFS Academy, a free online culinary portal, offers training to chefs or restaurant operators who may need formal training on various subjects, including a food waste management module. Available via the UFS Academy app and on the UFS Academy website, the training module has been widely distributed and well received. The World Wide Fund For Nature Kitchen "WWF Hotel Kitchen" program, supported by Unilever Food Solutions, represents a commendable effort to address food waste in the Greek hotel sector.

⁸ Unilever, 'Unilever intends to build a global foods innovation centre in Wageningen, the Netherlands', Unilever PLC, Unilever, October 2016. ([Link](#)), (accessed 27 September 2023).

This program has achieved several significant milestones:

- During the pilot phase, the program reduced food waste in three Greek hotels by up to 25%. This reduction demonstrates the effectiveness of the strategies and practices implemented to minimise food waste.
- A toolkit based on the program's success was developed and offered to interested hotels. This toolkit likely includes best practices, guidelines, and strategies for hotels to implement food waste reduction measures effectively.

“The Unilever Compass guides the company in making decisions that balance economic, environmental, and social considerations, contributing to a more sustainable and equitable future.” - Rodman Ochoa, Nutrition Global SC Innovations & Strategic Programs Director

Unilever brands driving consumer FLW behaviour change

Almost half of all food waste happens in people's homes. Hellmann's, Unilever's well-known brand of mayonnaise, has been at the forefront of efforts to drive FLW consumer behaviour change at scale, particularly in promoting sustainable and responsible consumption.

Hellmann's, a mayonnaise brand has committed to inspiring and enabling 100 million consumers every year by 2025 to be more resourceful with their food at home and waste less. Here are some ways in which Hellmann's has undertaken such initiatives:

- Hellmann's also champions household food waste reduction through its “Make Taste Not Waste” mass media campaigns, inspiring people to turn their leftovers into easy, tasty meals.
- Hellmann's Super Bowl campaigns reinforce the message about avoiding food waste. It is consistent with Unilever's sustainability goals and food waste reduction target. 40% of all food in USA goes to waste, and 43% of that happens in households, according to a 2016 NA study, reinforcing the need to drive the programme forward. Hellmann partnered with climate action NGO WRAP to release a new four-market study in the US, UK, Canada and Australia on the latest food waste behaviours. The study indicates that nearly half of respondents throw away as much food or more than they did a year ago, allowing consumers to save more household budgets by reducing home waste.⁹
- Hellmann's created the 'Unidos Pela Comida' (United for Food) initiative in Brazil in 2021 to bring together food industry partners and NGOs and turn 68 tonnes of would-be-wasted food into more than 120,000 tasty meals, which were redistributed to those in need.¹⁰



⁹ I. Palmer, 'Cost conscious consumers are adjusting household behaviours but untapped cost savings lie in food waste', WRAP, September 2022. ([Link](#)), (accessed 27 September 2023).

¹⁰ Unilever, 'Tackling food waste', Unilever PLC, Unilever, September 2023. ([Link](#)), (accessed 27 September 2023).

Innovative solutions for saving food

Since 2020, Unilever has partnered with Too Good To Go. This app connects people to food suppliers selling leftover products that are entirely edible despite creeping closer to their 'best before' date. Consumers in the Netherlands reserve and pick up products that would otherwise be thrown away from nearby restaurants, bakeries or supermarkets.¹¹ As a result, 16 million meals were saved from the bin Using the app. The product boxes currently only contain Unilever products. Still, together Unilever and Too Good To Go are calling on other food companies to join us so we can work to reduce food waste together.

Recognising Food Waste Warriors

Unilever recognises and celebrates the efforts of food waste warriors across its business systems. They help cut food waste from farm to fork through their ideas, passion, and action, like reducing tomato waste through farm integration in Asia or by helping hoteliers manage their food waste footprint. By sharing their stories, Unilever aims to inspire action that reduces and prevents FLW amongst its consumers, suppliers and other businesses.

Unilever aims to halve food waste by 2025

Food waste is responsible for 8-12% of global carbon emissions. As part of its sustainability goals, Unilever is committed to reducing food loss and waste. By the end of 2022, Unilever had reduced food waste per tonne of food handled in its operations by 17% versus 2019.

The company is further exploring solutions with our engineering teams, such as anaerobic digestion, using the biogas generated on-site, composting and using the waste as fertiliser. Unilever has empowered everyone involved in their business to be a food waste warrior and spot any opportunity to save food. The food-saving techniques currently include manufacturing fixes to spot any challenges in packing lines and embracing circular economy approaches.

“Unilever is taking a holistic approach to reducing food loss and waste that covers its entire value chain, from farming and production to consumption”. – Rodman Ochoa Nutrition Global SC Innovations & Strategic Programs Director

Unilever has also committed to communicating its food waste data in its Global Food Waste data report each year.¹² The food waste report will detail food waste in all the global operations from factory to shelf and relates to all Unilever Foods and Refreshment manufacturing and logistic sites across the globe: 128 manufacturing sites and 235 Distribution Centres (DCs).

Over the next few years, Unilever will focus on the following four additional areas of action:

- Maintaining zero waste to landfill and ensuring no good food is destroyed
- Enrolling key supply partners to follow their lead and tackle food loss and waste in their operations
- Helping its food service customers avoid food waste through education, partnerships and services, and finding ways of redistributing surplus food
- Through Unilever brands such as Hellmans and Knorr, help its consumers waste less food at home

¹¹ Unilever, 'Delivering door-to-door to help fight food waste', Unilever PLC, Unilever, December 2022. ([Link](#)), (accessed 27 September 2023).

¹² Unilever, 'Global Unilever Food Waste Report', Unilever PLC, 2021, pp. 1-10. ([Link](#))

The Unilever Compass is set out to guide Unilever to deliver superior performance and drive sustainable and responsible growth while improving the planet's health through taking climate action, protecting and regenerating nature and creating a waste-free world. By embracing sustainable sourcing, supply chain management, consumer education, and joining forces with stakeholders in the food sector, Unilever is setting an example for other companies in the consumer goods industry.



Case Studies

INVESTING IN PARTNERSHIPS

Food Banking for a Better Tomorrow

Global Food Banking Network's Innovative Approach in Tackling Food Waste and Hunger



Source: Lagos Food Bank Initiative

The Global Foodbanking Network (GFN) operates in nearly 50 countries with the mission to eliminate hunger by reducing food loss and waste while promoting sustainability. Local food banks in Israel, Nigeria and Mexico are employing innovative methods to recover surplus food and redirect to those in need. Since 2006, GFN has invested USD 48.7 million in grants and supported 580 food bankers worldwide.

Key messages

- Food banks play a major role in providing food and nutrition security within local communities, addressing climate and have seen a growing role since the COVID-19 pandemic.

- Food banks with their network are adopting innovative approaches such as Leket Israel uses satellite technology to detect harvest and redistribute surplus produce while BAMX in Mexico collects surplus food from hotels and restaurants to provide to those in need.
- Challenges in behaviour change and insufficient investment from public and private sectors hinder food donation efforts. This will require reevaluating our food environments and putting in place key policy levers such as food donation policies.
- GFN collaborates with various organisations including Champions 12.3, the Food is Never Waste Coalition among others to accelerate efforts to reduce food loss and waste in line with the Sustainable Development Goal 12.3.

Diverse contexts, one mission

From the sophisticated satellite-led endeavours of Leket Israel to the highly efficient network, BAMX, across Mexico, and the sustainability-driven work of Lagos Food Bank Initiative in Nigeria, the web of The Global FoodBanking Network (GFN) today is spread across nearly 50 countries – and growing. With a simple premise— a world free of hunger – GFN has shown how food banks globally are innovating to reduce food loss and waste, promoting sustainable food systems, and driving critical climate action.

As locally-led organisations, food banks are in tune with unique community needs. The food banking model is premised on the recovery and redirection of wholesome, edible surplus food to those in need. This makes food banking not only an environmental imperative, but also a cost-effective intervention since most nutritious foods can be procured at minimal cost.

Local food banks leading in food security

The real magic of GFN happens at the community level where GFN connects food system actors that have surplus products to food banks and national networks that can redirect healthy and nutritious food to people facing food insecurity. As a technical partner, GFN helps food banks expand partnerships within their ecosystem.

Most critically, in the era of GFN, the idea of food donation has shifted from the canned foods stereotype to include fresh produce, whole grains and animal protein. “We promote healthy dietary choices through adhering to the highest food safety standards. In 2022, healthy and nutritious foods made up 60% of the food we distributed. Twenty-four food banks reported having a nutritionist on board at their local food bank,” says Ignacio Gavilan, Senior Director, Food Systems and Partnerships

In 2022, 26,500 tonnes of fresh produce in Israel – which would otherwise decompose in landfills were recovered by Leket¹, a food bank. Leket recovers surplus produce from a network of 700 farmers and packhouses, using technology to help detect harvest patterns, and has designed an app which alerts them about crops ready for harvest. Climate change has affected agricultural produce and harvest patterns exacerbating food losses in fields. Therefore, to refine food recovery operations, Leket is developing satellite technology to identify when farms are ripe for harvest, ensuring that food reaches its rightful place: the bellies of hungry people.

¹ Leket Israel Red de Bancos de Alimentos de México. Leket Israel: [\(Link\)](#) (Accessed September 25, 2023)

In Mexico, BAMX's El Rescate² programme, a collaboration with over 12 hotel groups and 50 restaurants across the country, has, since 2014, been collecting surplus foods from hospitality buffet lines and meal services to provide 250,000 wholesome meals to those on the breadline.

Since Lagos grows 3% of the food it needs, urban farming and household gardens are essential to meet the nutritional requirements of communities, especially its women. Thus, Family Farming run by the Lagos Food Bank Initiative³, teaches people to grow locally resilient crops, alongside raising small farm animals like chickens.

At the global level, GFN's collaborators include multilateral partnerships like Champions 12.3, Food is Never Waste Coalition⁴, organisations like World Resources Institute (WRI), WRAP UK to accelerate the pace of reducing food loss and waste toward achieving SDG 12.3. Alongside other industry partners, GFN partners with Harvard Food Law and Policy Clinic in tracking the food donation policy landscape and impact through the Global Food Donation Policy Atlas.⁵

Key impact numbers

Since 2006, GFN has

- Granted approximately USD 48.7 million to food banks
- Trained and Guided more than 580 food bankers at the annual Food Bank Leadership Institute
- Connected Food Banks in more than 50 countries

GFN and food bank member activity from calendar year 2022 shows

- 4x more people served over 5 years, from 8 million people in 2017 to 32 million in 2022
- 51,000 community service organizations strengthened in 2022
- Prevented an average of 1.5 billion kilograms of CO₂e annually since 2021

The role of financing and food environments in boosting redistribution

Several factors that have worked in favour of the growing food donation movement. First, some cultural predispositions towards "having empty plates" has contributed to the sustenance of community-based food banks. Second, global tragedies such as the Second World War, the COVID-19 pandemic and the war in Ukraine, have periodically reminded people the true value of food making food banks indispensable. Third, technology and food labelling innovations have been catalytic in helping food distributors manage their supply chains.

Despite wide recognition that reducing FLW is a critical aspect of our hunger and climate solutions, sufficient investment from both public and private players hasn't materialised. Gavilan cites commitment fatigue among countries resisting the food donation movement. "In the sphere of climate finance, food and agriculture remain massively underfunded

² Red de Bancos de Alimentos de México. Red de Bancos de Alimentos de México. (n.d) ([Link](#)) (Accessed September 25, 2023)

³ Lagos Food Bank Initiative. Lagos Food Bank Initiative. Lagos Food Bank (n.d) ([Link](#)) (Accessed September 25, 2023)

⁴ Food and Agriculture Organization of the United Nations (n.d.). Food is Never Waste Coalition. FAO. (n.d.) ([Link](#)) (Accessed September 25, 2023)

⁵ Harvard Law School Food Law and Policy Clinic and The Global FoodBanking Network. (n.d.). The Global Food Donation Policy Atlas. The Global Food Donation Policy Atlas. ([Link](#)) (Accessed September 25, 2023)

compared to others like energy or transportation.” Despite food waste accounting for a third of greenhouse gas emissions, food systems receive 3% of public finance, according to the Global Alliance for Future of Food.⁶

Out of the nearly 50 countries GFN works with, only 4 have national plans to tackle climate change including food waste. Nonetheless, countries that have embraced food redistribution are reaping significant results. In 2019, three of the largest food bank networks in the world⁷ – GFN, European Food Banks Federation (FEBA) and Feeding America found that – recovered a total of 3.75 million metric tons of food, enough to fill nearly 1,292 Olympic swimming pools. The recovery prevented over 12 billion kilograms of GHG from entering the atmosphere because of food waste. The inclusion of a food systems pavilion at COP27 for the first time signalled changing tailwinds with hopes of a more prominent role of food loss and waste reduction at COP28.

No single organisation can solve global hunger

One of the first steps towards food redistribution is setting clear targets and measurement, that will paint a clear picture of the magnitude of food loss and waste in context, and only then can action follow. They have observed that in high-income countries there are greater efficiencies in the supply chain, but also significant waste due to contractual relations between retailers, manufacturers, and distributors. In the low and middle-income countries, the yield per hectare is less, and there is more efficiency in utilizing food.

Lastly, countries should commit to making food redistribution and climate action a cornerstone in climate strategies in mitigating emissions and supporting vulnerable committees. Systemic problems can best be solved collaboratively.

⁶ Global Alliance for the Future of Food. Untapped Opportunities: Climate Financing for Food Systems Transformation. n.p.: Global Alliance for the Future of Food, 2022. Site: [\(Link\)](#) (Accessed September 25, 2023)

⁷ Global FoodBanking Network (n.d.). Reducing Food Loss and Waste. [\(Link\)](#) (Accessed September 25, 2023)

Investing in Food Loss & Waste Reduction

Harnessing Collaborative Partnerships
for UN SDG 12.3 Success



Photo: Simon Peel via - Unsplash

'Target, Measure, Act' is a proven principle in accelerating food loss and waste reduction to meet UN SDG 12.3 target, requiring wide adoption by governments and businesses around the world. International Climate Action NGO, Waste and Resources Action Programme (WRAP) is applying and enabling this principle to be delivered through public-private partnerships (PPP) across six continents. In 2020, P4G supported the WRAP-led FLAWLESS project (Halving Food Loss And Waste by Leveraging Economic Systems) in Indonesia, South Africa and Mexico to halve food loss and waste through collaborative action and leveraging economic systems to scale impact.

Key messages

- **Our global food system is broken.** It is inequitable - our current food system is failing to stave off hunger for hundreds of millions and fueling obesity elsewhere. It is inefficient - One-third of food produced for human consumption is lost or wasted globally. This amounts to about 1.3 billion tons per year, worth approximately US\$1 trillion.¹ It is unsustainable – as the culprit for around 30% of the planet's greenhouse gas emissions, 70% of biodiversity loss and a major contributor to the environmental challenges we all face.² It requires systematic change and that change requires a collaborative approach.
- **We need to accelerate efforts** if we are to deliver the United Nations Sustainable Development Goal 12.3 target of halving food loss and waste by 2030. The principle of “Target, Measure, Act” is proven to accelerate reduction. It needs to be widely adopted by governments and businesses around the world. Public-private partnerships tackling food loss and waste embrace the Target Measure Act principle and enable implementation within stakeholders across the food system.
- **We need to invest in food loss and waste reduction** in both scaling and replicating impactful interventions around the world. This includes the development and provision of financial mechanisms that incentivise the private sector. The Champions 12.3 ‘Business case for reducing food loss and waste’ indicates that a 14-fold financial return on investment in taking food loss and action, can be realised.
- **Impactful action is delivered through evidence and collaboration.** A public-private partnership (PPP) is about working together to deliver a shared goal. In tackling food loss and waste this means “a collaboratively agreed, self-determined 'pact' or agreement to take action on food waste generated at different stages of the food system.” Food loss and waste public private partnerships adopt an evidence-based approach, using data and insights to inform where hotspots occur throughout the value chain and what impactful interventions are required. Collaboration with stakeholders across the food system enables 'farm to fork' consideration of impact and action, overcoming common barriers and fosters innovation which scales impact and allows benefits (financial, environmental and social) to be realised by all.

A blueprint for scalable and replicable impact

The Waste and Resources Action Programme (WRAP) is an international climate action NGO which has been tackling food loss and waste for two decades. In 2005, it initiated a public-private partnership ‘The Courtauld Commitment’, which has been dubbed “the blueprint for voluntary collaborative action for food loss and waste in the world”, bringing together businesses, governments, and citizens to deliver a shared ambition to reduce food loss and waste in the UK. Through the Courtauld Commitment, WRAP has helped the UK waste 27% less food waste each year (saving 5.3 million tonnes of CO₂e annually) that puts the country on trajectory to deliver the UN SDG 12.3 target.

As an internationally-recognised model for delivering food loss and waste reduction at scale, WRAP has developed food loss and waste public private partnerships across six continents. Each PPP is adapted to local context, aligned to UN SDG target 12.3 and the principles of Target, Measure, Act.

Enabling food loss and waste activity in Indonesia, South Africa and Mexico is critical if global food loss and waste ambitions are to be met.

¹ [World Food Programme 2020](#)

² [WWF Report 2022: Driven to Waste: Global Food Loss on Farms](#)

FLAWLESS

The FLAWLESS project comprised of a global coalition of partners led by WRAP aimed to accelerate reduction of food loss and waste through two parallel approaches in Indonesia, South Africa and Mexico - the establishment of food loss and waste public private partnerships along with mobilising the financial sector to factor in both financial and environmental performance in their lending. The two strands of activity were linked together by connecting financial services that complemented food system stakeholders 'targeting, measuring and acting' on food loss and waste reduction.

The FLAWLESS project engaged with financial service providers operating in each country to understand the current level of provision to incentivise food loss and waste reduction and what is required for the market to increase accessibility and broaden range of products. This was matched by understanding the status, barriers and opportunities of the food industry to invest and utilise financial products as a mechanism to scale food loss and waste reduction.

Through the coalition of FLAWLESS partners and public private partnerships, the project focussed on three financial interventions:

- Enabling sustainability-linked lending
- Developing a carbon methodology for keeping food in the human supply chain to support trading (VERRA)
- Trialling a food waste measurement equipment hire model incentivised by savings made (Leanpath)

This led to a public private partnerships signatory financial survey on sustainability-linked loans and workshops with financial service providers, piloting of the Leanpath model in a major hotel chain in Indonesia and VERRA publishing a carbon standard methodology for reducing food loss and waste.

In regard to the public private partnerships, WRAP partnered with a host organisation in each of the three countries to maximise local delivery and adapt the model to context. WRAP provided capacity building to each host who were integrated and connected with the country's food system, plus technical assistance which continues to this day.

The following organisations act as PPP host:

- Indonesia - IBCSD, an association led by CEOs who have a shared commitment in promoting sustainable development. Public-private partnership 'GRASP 2030' was launched in 2021.
- Mexico - BAMX, a national food banking organisation with a network of 55 food banks across 30 states. Public-private partnership Pacto por la Comida was launched in 2021.
- South Africa - CGCSA, an industry association that represents retail and manufacturing member companies. Public-private partnership 'The South African Food Loss and Waste Initiative' was launched in 2020.

Within each PPP, there are a number of committed influential actors (signatories) from across the food system, representing: Government, food production, retailers, brands, manufacturers, hospitality and food service, food donation, academia, trade associations, research and development. This breadth of involvement enables food loss and waste to be tackled at policy, industry and citizen levels.

A key strength of the PPP model is that it can be adapted to suit a context specific to a

country or region and deliver through challenges or times of change. The PPPs of Indonesia, Mexico and South Africa were established during the pandemic. As a vehicle for long term change, it can adapt to political (Mexico), social and natural (South Africa) challenges whilst being part of the solution i.e. increasing the amount of food donated to feed those vulnerable.

“WRAP works with in-country partners across the world to deliver effective public-private partnerships that respond to the local challenges of addressing food loss and waste. The relationships are strategic in nature, working together to deliver the greatest impact and to inspire food loss and waste action across regions.” - Michael Jones, International Partnerships Manager, WRAP.

ibcsd **GRASP 2030**

How Voluntary Agreement Deliver the Success of Reducing FLW

Our partner, WRAP (Waste & Resources Action Programme), launched Voluntary Agreement named Courtauld 2025 in UK. During 2015-2018 the voluntary agreement between government, business, association and NGOs has achieved:

- 1.7million tonnes of food waste within the supply chain was saved
- £4.7billion saved
- 2x increase in food donation
- 27% reduction in edible food waste
- 5 Mt-eq annual carbon savings

"A collaboratively agreed, self-determined pact to take action on food waste generated at the relevant stages of the food system."

Global Voluntary Agreement of Food Loss and Waste

USA (PACIFIC COAST, PACTO COMIDA, BAMX Mexico)
 United Kingdom
 South Africa (SOUTH AFRICAN FOOD LOSS & WASTE INITIATIVE)
 Australia (AUSTRALIAN FOOD PARTNERSHIP)

Investment for Sustainable Future

Source: IBCSD Indonesian Business Council for Sustainable Development

Enabling 'Target Measure Act'

GRASP 2030, Pacto por la Comida and the South African Food Loss and Waste initiative provide a calendar of signatory activity delivered by a PPP host, with technical assistance from WRAP. The calendar of activity includes collaborative working groups, individual and group activities to support the adoption of Target, Measure and Act.

At the heart of PPP delivery is data and insight, providing an evidence-based approach to understanding and tackling food loss and waste 'hotspots' across the supply chain through impactful interventions. Food business signatories are required to measure and provide the PPP with annual data to measure progress and continually refine the initiative to focus on the most impactful interventions.

Each PPP contributes towards the shared ambition of striving for the UN SDG 12.3 target within their influence. For example, fresh produce company Farmwise Marketing, a signatory to the South Africa Food Loss and Waste Initiative decided to utilise produce that did not meet specification grades. This meant the development of 'mash lines' and 'decided lines' and the donation of all processing by-products to animal feed. By creating value out of things that otherwise would have been “waste” – they increased crop utilisation, cost savings, and generated employment for working on the new product lines.

Progress

Through the FLAWLESS project, the PPP model was developed, launched and mobilised in Indonesia, Mexico and South Africa. Each PPP has recruited major and influential signatories from across the food system and 'onboarded' signatories to turn commitment to implementation in delivering Target, Measure, Act. Complemented by a calendar of activity, each PPP has collaborative working groups covering topics such as food donation, policy and regulation and key food categories to overcome challenges. Signatories in each PPP create and deliver on an action plan of activity that will contribute towards the UN SDG 12.3 target which is regularly reviewed. All the PPPs are working with the signatories to measure and report on food loss and waste with collective progress to be publicly reported. In Indonesia and Mexico, the PPPs have undertaken citizen behaviour change activity, demonstrating activity from the 'farm to fork'. Together, the PPPs in Indonesia, Mexico and South Africa represent over 150 stakeholders from across the food system, committed and aligned to delivery of UN SDG 12.3 target.

“Food loss and waste is a global issue which cannot be tackled by one actor alone, it requires effort by all. Public-private partnerships are a vehicle for systemic change and long term impact through collaborative action. We have seen what can be achieved in the UK (The Courtauld Commitment) through this approach and with food loss and waste public private partnerships now established in six continents, we will see incremental impact that deliver the UN SDG 12.3 target.” - Michael Jones, International Partnerships Manager, WRAP.

FLAWLESS legacy

Whilst the FLAWLESS project finished in 2022, its activity and impact continues in Indonesia, Mexico and South Africa. The financial mechanisms created and tested in country are being pursued and the carbon standard methodology for food loss and waste provides a platform for the development of trading. The public-private partnerships are growing in strength in delivering food loss and waste reduction through the Target, Measure, Act approach with published progress on the way.

If UN SDG 12.3 target is to be delivered, we need to see more food loss and waste public-private partnerships established around the world and interventions such as financial mechanisms need to be leveraged to scale impact. The FLAWLESS project has shown that commitment, partnerships and collaboration can make a difference. Together, we can fix our broken food system so that it is sustainable and equitable for current and future generations.

UNEP's Multi-Stakeholder Initiatives Catalysing Regional Food Loss and Waste Action



Photo: Rice serving in a restaurant. Source: Huy Phan (Pexels)

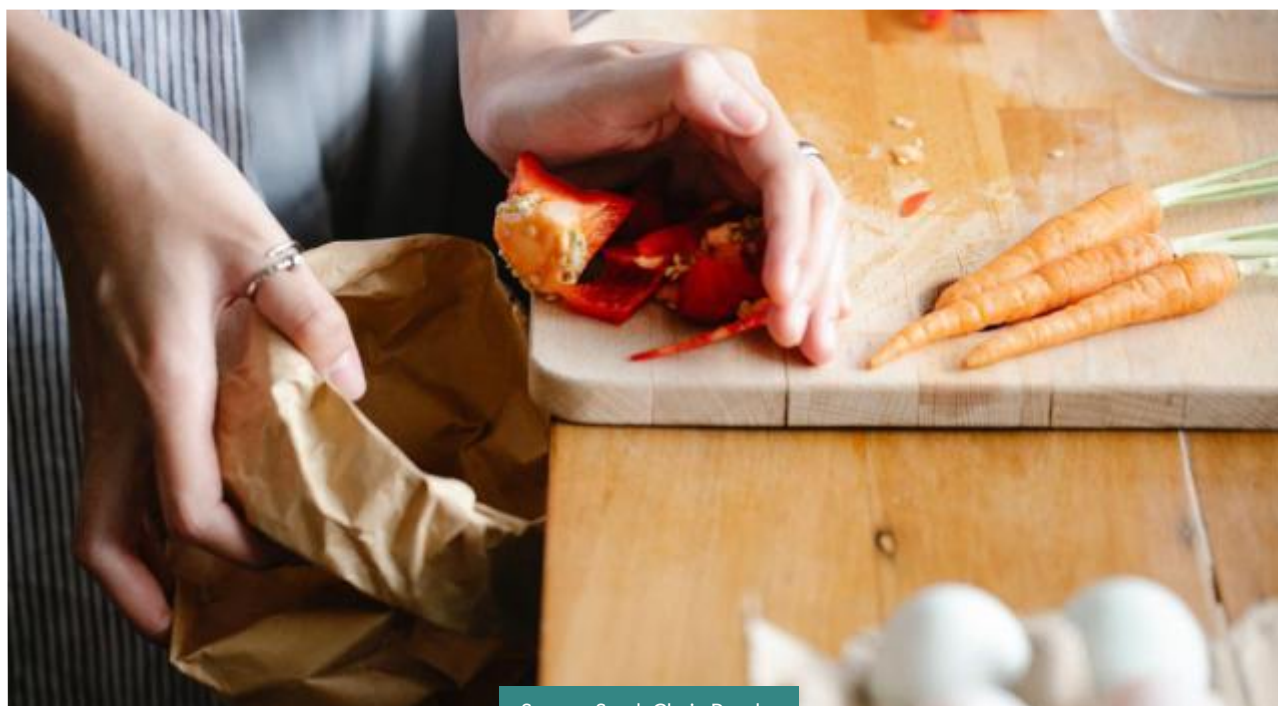
Since formation in the 1972, United Nations Environment Programme's (UNEP) has been playing a pivotal role in addressing global environmental issues and is now actively tackling food loss and waste. Its initiatives range from comprehensive reports on food waste statistics to strengthening capacities with regional dialogues and innovative digital technologies. Through multi-stakeholder initiatives and emphasizing data-driven strategies, UNEP is driving international efforts to reduce food waste, climate and enhance food security.

Key messages

- As co-leads members of the Food is Never Waste Coalition, UNEP and other leading organisations emphasise the Target, Measure, Act approach to promote standard food waste data methodology
- The UNEP Food Waste Index Report 2021 showed that 931 million tonnes of food ended up in the bin in 2019 – the equivalent of 23 million fully loaded 40-tonne trucks,
- UNEP convenes leads the Cool Coalition which aims to promote efficient and climate-friendly technologies to prevent food loss and waste across supply chains while reducing greenhouse gas emissions.
- Public-private partnerships are an effective way to eliminate food loss and waste across value chains collaboratively. UNEP conducted feasibility studies for PPPs in Brazil and Colombia in 2022, and this year a multi-stakeholder initiative, “Pacto contra a fome” (The Pact against hunger) was launched to tackle hunger and food waste in Brazil.
- In Colombia, UNEP supports the use of green and digital technologies including the development of food redistribution and upcycling apps.

UN agencies leading on food loss and waste

Founded in 1972 after the United Nations Environmental Conference on Human Environment in Stockholm, the United Nations Environment Programme’s (UNEP)’s core mission is to find solutions to the triple planetary crisis- climate change, pollution and biodiversity loss.¹ As the custodian of the indicator SDG 12.3b, UNEP co-hosts with FAO the International Day of Awareness on Food Loss and Waste on 29 September each year.² Mandated by the United Nations Environment Assembly (UNEA) Resolution 4/2, UNEP builds capacity and advocates for improved enabling conditions to halve food loss and waste.



Source: Sarah Chai - Pexels

¹ The Triple Planetary Crisis: Forging a new relationship between people and the earth ; 2020; [Link](#)

² FAO; Campaign on International Day of Awareness on Food Loss and Waste; 2023 [Link](#)

Food waste - A common problem

Using data from 54 countries, The UNEP Food Waste Index Report 2021, developed in collaboration with WRAP, is the world's most comprehensive report into global food waste in homes, the food service sector and retail.³ The UNEP Food Waste Index Report 2021 revealed that around 931 million tonnes of food waste were generated in 2019, 61 per cent of which came from households, 26 per cent from food service and 13 per cent from retail.⁴

Earlier narratives of global food waste suggested that consumer food waste occurred mainly in developed countries, while production, storage and transportation losses were concentrated in developing countries. However, this report has found that household food waste per capita is similar across high-income, upper-middle-income and lower-middle-income countries with new data to be published in the new Food Waste Index at COP28.

The Food Waste Index report shows that 931 million tonnes of food ended up in the bin in 2019 – the equivalent of 23 million fully loaded 40-tonne trucks, which, if laid bumper-to-bumper, would circle the earth 7 times. That's 17% of all the food available to consumers that didn't make it to a mouth.



Source: Jonathan Kemper - Unsplash

Strengthening the capacities of governments for national food waste prevention strategies

In 2021, UNEP's initiative "Global Opportunities for SDGs" (GO4SDGs) together with WRAP and One Planet Network- Programme on Sustainable food Systems launched Regional Working Groups on Food Waste for Asia Pacific, West Asia, Africa, and Latin America & the Caribbean to provide capacity building on the measurement and reduction of food waste.⁵ Each regional working group comprises government officials from national and subnational levels, NGOs, universities, think tanks, and national networks working on food waste measurement and prevention strategies.

³ UNEP Food Waste Index Report 2021; ([Link](#))

⁴ Food Waste Index Report 2021; ([Link](#))

⁵ Regional Working Groups on Food Waste: Measurement and reduction ([Link](#))

Promoting cold chain to end food loss and waste

UNEP also leads the Cool Coalition – a joint effort of over 100 governments, cities, businesses, development organisations, and civil society groups.⁶ The Cool Coalition fosters advocacy, knowledge and action to accelerate the global transition to efficient and climate-friendly cooling to prevent FLW across the food value chain (1). In 2022, UNEP and FAO collaborated in preparing the publication Sustainable Food Cold Chains: opportunities, challenges and the Way Forward, which states food cold chains are critical to meeting the challenge of feeding an additional two billion people by 2050, harnessing the resilience of rural communities, and preventing an increase greenhouse gas emissions.

Pact against hunger and food waste in Brazil

Food insecurity in Brazil, like in many other countries, has been a significant concern in the post-COVID-19 era. For many Brazilians, lockdowns and restrictions led to job losses, reduced incomes, and economic instability. The pandemic disrupted food supply chains, causing temporary shortages and price fluctuations. Vulnerable populations in Brazil had limited access to food during these disruptions. Against this backdrop, Pacto contra a fome⁷ (The Pact Against Hunger), a multisectoral partnership of the government, private sector and civil society working towards combating hunger and reducing food waste in Brazil, was launched in May 2023.⁸

The partnership was developed following an extensive study by Integration consulting that sought to link food waste and causes of hunger in Brazil in 2021. The study showed that, within this reality, there are some groups that are more vulnerable to hunger, which are: families headed by women (19.3% of the total), black and brown populations (18.1% of the total) and urban populations (15% of your total).

Since its inception, the movement has informed and raised awareness about the problems of hunger and food waste thus uniting all Brazilians around the same purpose: ensuring that each person has access to adequate food.

Using green and digital technologies to reduce food waste in Colombia

In Colombia, about 10 million tons of food estimated to cost about 45 million Colombian pesos are lost and wasted each year, enough to feed the population of Bogota – the country's capital and largest city. Of every 3 tons of food produced in the country, 1 ton ends up in the garbage.⁹

To address this challenge, UNEP, with the support of the University of Los Andes and within the context of the Green Tech Project, launched #SinDesperdicio Bogotá, a programme focused on strengthening the entrepreneurial skills of digital start-ups.¹⁰ Different types of technologies have been developed, ranging from repurposing food waste such as SCP Alimentación Animal Ecológica, Salva, Sticky Snacks and Zeotropic, to apps aimed at

⁶“Cool Coalition” comes together to save lives, energy and trillions for the global economy; [\(Link\)](#)

⁸ Pact Against Hunger is launched in São Paulo with support from the Federal Government; Ministry of Development and Social Assistance Family and Fight Against Hunger; [\(Link\)](#)

⁹ Food and Nutrition Security in Columbia; Challenges And Opportunities For Food And Nutrition Security In The Americas: The View Of The Academies Of Sciences; [\(Link\)](#)

¹⁰ Using Green And Digital Technologies To Reduce Food Waste At The Consumer Level; 2021; [\(Link\)](#)

strengthening engagement between producers and consumers, including Toc-Toc and Siembra Co.

Data as the foundation for change

Tackling the food waste funding gap requires a multifaceted approach that involves various stakeholders, including governments, businesses and civil society. Data collection provides the basis to build the case for tackling food waste, to provide an understanding of the nature of food waste in a country, to inform a national food waste strategy based on food waste hotspots and to track food waste over time. Accurate, traceable and comparable measurement is a key starting point for national food waste strategies and policies to deliver the 50% reduction in consumer food waste targeted in SDG 12.3.

Currently, 17 countries have high-quality data compatible with SDG 12.3.1(b) reporting for at least one sector, with a further 42 countries with some measurement estimate which, with some small updates, could create an SDG 12.3 - compatible estimation.

The Food Waste Index Report 2023 - with new global estimates will be published at COP28 in December 2023.

However, sufficiently delivering reductions in food waste can be an essential avenue for stakeholders to save money, improve food security, reduce environmental impacts and add value to circular economy processes.

A few countries are progressing well on SDG 12.3, but most are just getting started. It is an ambitious target, with essential impacts, on hunger, economies, climate, nature, and pollution.



Case Studies

**REGIONAL AND NATIONAL
POLICY INITIATIVES**

| Global Scope, Local Action

FAO's Code of Conduct for food loss and waste reduction accelerating Food Systems Transformation



Photo by Kostiantyn Li - Unsplash

The Food and Agriculture Organization of the United Nations (FAO) developed the Voluntary Code of Conduct for Food Loss and Waste Reduction (CoC), following a request of the 26th Session of FAO's Committee on Agriculture (COAG). Developed through an inclusive process, with multi-stakeholder consultations held at global and regional levels, the CoC has a global scope and presents actions and measures that countries, national and sub-national authorities, food supply chain actors, private sector, civil society organizations (CSOs), academic and research institutions, and others can put in place for reducing food loss and waste. This case study highlights the varied facets of this CoC and its progress through the years, with rising regional and national adaptation endeavours.

Key messages

- The Voluntary Code of Conduct for Food Loss and Waste Reduction (CoC) is recognised as a crucial global framework for tackling Food Loss and Waste. It provides a guideline for food systems actors across the food value chain for enhancing adaptability to diverse socio-economic, geographic and other contexts.
- Implementing the CoC requires a delicate balancing of the various stakeholder engagements needed at different points for ensuring food security and food system transformation. With a keen focus on addressing the urgency of delivering on the Sustainable Development Goals, the CoC lays emphasis on local contextualisation, enhancing capacity of actors along the way, and supporting country-level and regional adaptation within the context of existing local frameworks.
- The agencies of public and private sector actors share a chief responsibility towards addressing food loss and waste. While the public sector can bridge institutional gaps and provide space for incentivising the reduction of food loss and waste, the private sector can support the much-needed innovations and enhance investments to reduce food loss and waste.

The Delicate Balancing Act

Global food systems are facing an increasing number of interconnected challenges of crises, conflicts and climate change. To be able to feed a global population expected to reach 10 billion by the year 2050, efforts are needed to transition food systems onto a sustainable trajectory to deliver safe, affordable and healthy diets for all. At the same time, growth should be inclusive, ensure economic and social development, and not compromise future generations with negative impacts on natural resources, ecosystems and the environment.

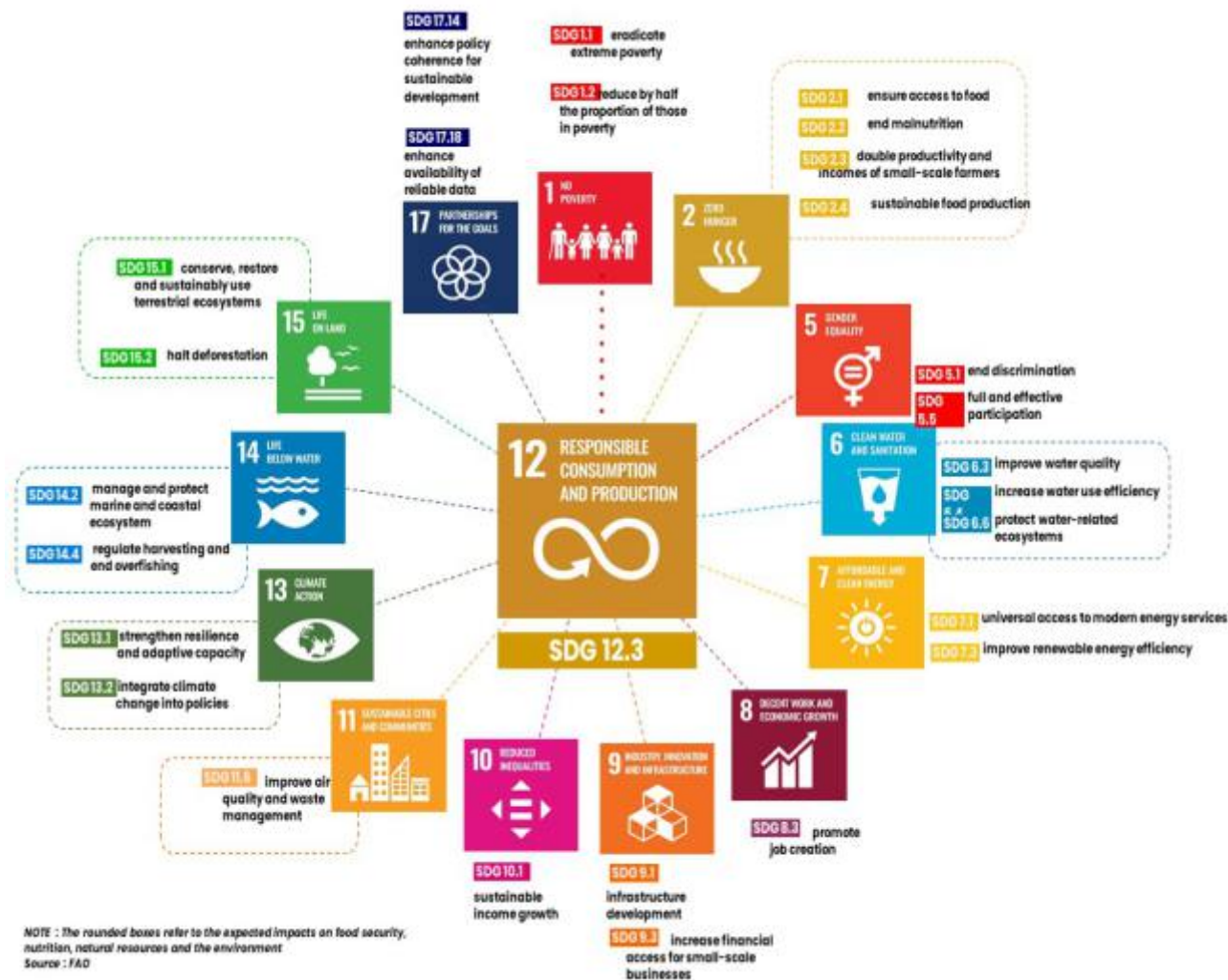
Towards this objective food loss and waste prevention and reduction holds the power to accelerate transformational change and make agrifood systems more resilient, efficient, sustainable and inclusive.

There is wide recognition across the world that food loss and waste (SDG 12.3) is a critical issue linked to most other SDGs i.e. SDG 2 (ending hunger and achieving food security and improved nutrition), SDG 6 (sustainable water management), SDG 11 (sustainable cities and communities), SDG 13 (climate change), SDG 14 (marine resources) and SDG 15 (terrestrial ecosystems, forests, land and biodiversity). Also SDG 1 (ending poverty), SDG 8 (sustainable economic growth and decent employment) and SDG 10 (reducing inequalities).¹

There is thus an ever-increasing need to raise awareness and build robust regulatory frameworks and policy coherence for contributing to progress on this SDG12.3.

The FAO's Code of Conduct on Food Loss and Waste Reduction provides such a voluntary framework for guiding countries and regions focusing on food loss and waste reduction.

¹ The State of Food and Agriculture, 2019; [\(Link\)](#)



Food Loss and Waste and the SDGs, Adapted from State of Food & Agriculture Report 2019 (FAO)

A key lever for food systems transformation

The relation between food loss and waste, and food security and nutrition is complex. Food security and nutrition does not simply improve if less food gets wasted, and more food made available. An improvement in food availability really depends on where in the food supply chain and in which geographical location food losses or waste are being reduced and where food insecurity exists. Backed by this evidence, the genesis of the international code of conduct for food loss and waste reduction was started in 2018 when it was first recommended by the Committee on Agriculture (COAG). Thereafter the FAO held a series of consultative processes at regional and global levels, to capture views of policymakers, the private sector, producer organisations, civil society organisations, and development sector partners, for condensing it into the form of the Voluntary Code of Conduct for Food Loss and Waste Reduction. The final approved version of the CoC presented to members in 2021 thus has been written as a 'living document' that calls to action, countries and regions for reducing food loss and waste in typical contexts. With the expanding import of the CoC due to ever-growing pressures at the delicate nexus of agriculture, food and climate; the CoC is being continually adapted by countries and regions to reflect particular socio-economic, geographic and other priorities.

Therefore, one of the initial obstacles in formulating such a document was to make sure its language and principles were all-encompassing on the one hand and avoided specificity (which would make it difficult to adapt to) on the other.

Guiding principles of the CoC for reducing food loss and waste

The guiding principle of the Code is the interconnected nature of sustainability goals and the idea of maintaining balance. This is a global framework with general principles and actions that can be adapted locally, nationally, and regionally. “These are bottom line principles that must be followed to ensure that when we are addressing the issue of food loss and waste reduction – no matter the geographical or other conditions – if we comply with these general principles, it means we are sustainable” says Divine Nije, Deputy Director, Food Systems and Food Safety Division, FAO.

While the Code provides a long list of food systems actors, it underlines the role of the government actors to take the lead in food loss and waste matters within their jurisdictions to develop intervention packages aimed at effectively and sustainably reducing food loss and waste.

For the Code to get into an applicable form, it needs to be adapted to regional contexts. The FAO provides technical support to any country that requests it towards Code adoption. This ranges from building awareness of different stakeholders (policymakers, consumers etc.), building technical capacities at different levels, and helping or working with international finance institutions to get support in terms of investments for infrastructure, intervention, and support partnerships in the value chain. There are cases in point that serve as new benchmarks of countries taking action to stem food loss and waste, having sought FAO's support for implementation of their food loss and waste ambitions, in line with implementation of national pathways that emerged beyond the UNFSS Summit of 2021 and its subsequent stock-take.

More than eighty countries identified food loss and waste as an issue in their national pathways and the FAO is supporting them to contextualise the Code and other related instruments for tackling food loss and waste reduction.

Taking measured steps

Creating a dynamic and inclusive CoC has involved a tedious investment of intentions by a multitude of partners through iterative consultation processes.

At the implementation front therefore, implementing agencies of government and other agencies in the country context, must ensure capacity strengthening of actors and fusing the CoC within the existing country or regional frameworks, for reach desired outcomes.

The level of intricacy and challenge rises, when FLW reduction structures are already in place, say in a country / regional context, as this requires adjusting existing structures to redesign new ones. Many countries in the African region, for instance, already have national agricultural investment plans in place that must align well with their ambition to adapt the CoC.

There are emerging, model standards in-the-making however, inspiring action and ideation around the world, with examples of regional and country relevance already established with localised adaptations of the Code already done. As first movers and of the largest proponents, Latin America has drawn the Model Law for Prevention of Food Loss and Waste²

² Model Law for Prevention of Food Loss and Waste (Available in Spanish); Adopted by Latin American and Caribbean Parliament (PARLATINO) ([Link](#))

drawing on the recommendations of the FAO's Voluntary Code of Conduct for Food Loss and Waste Reduction. Given that parliamentarians can act as proactive political agents when it comes to improving food systems and eating habits in order to deal with the FLW; during 2020, multiple instances of dialogue and training were held with parliamentarians of the PARLATINO committees, in these exchange sessions, FAO technical teams shared experiences in the reduction and prevention of FLW in the Region, as well as the guiding principles of the CoC-FLW. Following these exchange sessions, a model law draft began to be developed, which was reviewed by various PARLATINO committees, resulting in the final document that defines the Model Law for the prevention and reduction of food loss and waste.³

There are also other regional and country versions. “Countries are also developing legislation around the Code, such as Peru, Uruguay, Paraguay, and have requested the FAO's technical support to implement their respective national versions” says Njie. The FAO has also published a legal brief for parliamentarians of the Latin America and Caribbean region, which also draws on the CoC.

The Near East and North Africa (NENA) region is yet another case in point with its recently released adapted document inspired by the FAO's Voluntary Code of Conduct, for its basis of developing national strategies, policies, and legislation enabling food loss and waste reduction in keeping with national agrifood system objectives of the NENA countries. The actions and principles put forward herein have the ultimate goal of accelerating the region's transition to building back better with sustainable and more resilient agrifood systems.

Meanwhile, countries in Central Asia and Eastern Europe – Azerbaijan, Bosnia Herzegovina, Georgia, Kyrgyzstan, Uzbekistan, Turkmenistan, and Tajikistan, to name a few – have been receiving support from FAO to strengthen their food loss and waste policies and regulatory frameworks in alignment with the guidelines defined within the CoC. In sub-Saharan Africa, there are discussions about an adapted version of this global Code. “So there are already initial movers in terms of national-level implementations. For instance once regional versions are finalised in Africa, we hope to see a stream of inspired national implementations happening at the country's-level,” says Divine.

The relevance of regional versions of the CoC speaks to the diverse needs and respective national and regional priorities while defining the nuances of adapted versions. For instance, low and middle-income countries are seen to record more post-harvest loss while in high-income countries, there is a higher tendency for food waste, the differentiation factor being, the latter will have strong institutional support and infrastructure that is more adept at stemming food loss as opposed to food waste.

The European Commission in its agenda, for instance, emphasises addressing inefficiencies in the 'downstream' parts of supply chains,⁴ by reshaping food environments and working with food services and the hospitality industry. “In the Near East region, natural resources like water are scarce, so food loss and waste interventions here must speak to the sustainable use of these natural resources. This need not necessarily be the case in other regions that have different priorities. The CoC contains language and guidance that speaks to adaptation to multiple contexts,” says Njie.

³ Food loss and waste in Chile: Advances and Challenge (Available in Spanish); 2019 ([Link](#))

⁴ EU Platform on Food Losses and Food Waste ([Link](#))



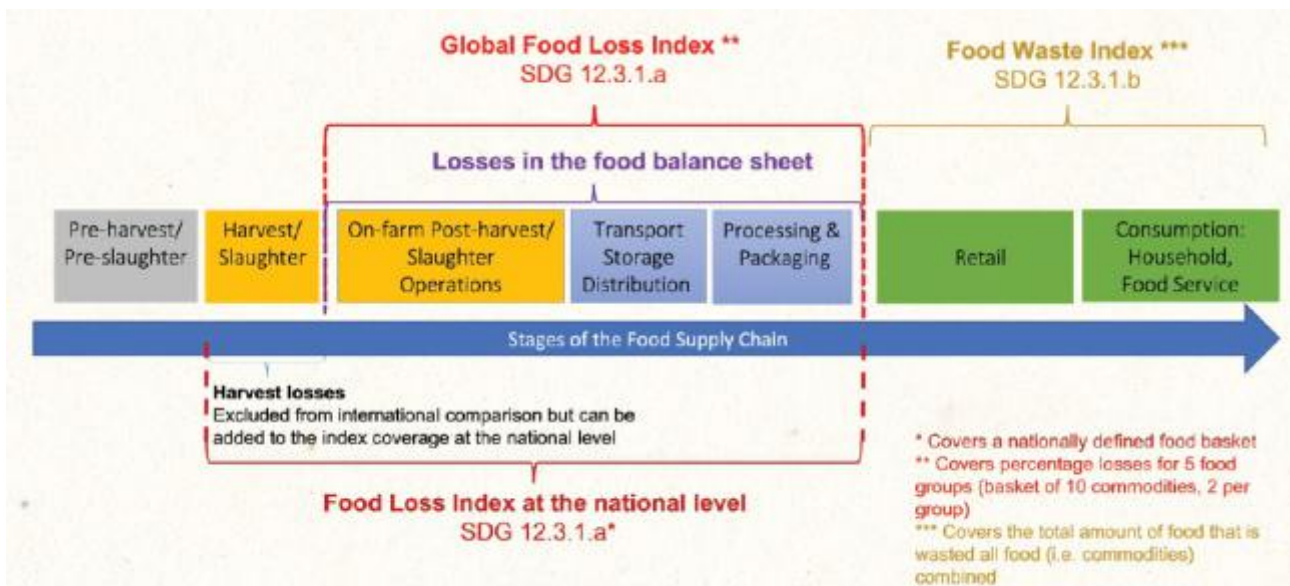
FAO Campaign banner released for the fourth International Day of Awareness of Food Loss and Waste (IDAFLW) observed each year on 29 September 2023 ([Link](#))

The way forward for Food Loss and Waste Reduction: A Shared Responsibility

There is recognition of the urgency to accelerate action for achieving the 2030 agenda. There is also recognition that interventions of food loss and waste speak to all 17 SDGs. It allows us simultaneously to address poverty, alongside the inclusion of women, marginalised groups, indigenous people, and youth, and also address environmental issues. This is an advantage and a motivating factor for food loss and waste reduction interventions.

Meanwhile, “lack of evidence on the state of food loss and waste in the countries, the causes and critical points that generate them, is one of the most common barriers that countries face when adopting the Code, according to Sara Granados, FAO, Latin America.

The agenda of the 2030 SDG 12 is to “ensure sustainable consumption and production patterns”, and it includes Target 12.3, “by 2030, to halve the per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses”. This target is split into a Food Loss and a Food Waste component with different indicators and mandates. FAO has developed a method to measure and monitor the progress on indicator SDG 12.3.1a with the Food Loss Index (losses that occur from harvest) that measures changes in losses over time helping to monitor trends in food losses and direct interventions for maximising impact. Indicator SDG 12.3.1b



Zone of applicability of the Food Loss Index and the Food Waste Index; Adapted from FAO 2019a, Voluntary Code of Conduct for Food Loss and Waste Reduction ([Link](#))

Food Waste Index covers waste happening at the retail and consumption levels and is under the mandate of the UNEP.⁵

It is with this intention of translating the stark evidence to action for accelerated food systems transformation, that the fundamental responsibility for implementing the Voluntary Code of Conduct for Food Loss and Waste Reduction rests with the public sector. However more importantly this must be a joint effort between the public and private sector primarily supported by all other key actors across the food value chain. With the public sector taking the lead in addressing any institutional gaps, building more conducive policy environments, the private sector can be adequately incentivised and encouraged to make the right investments, and implement innovations for stemming food loss and waste.

The CoC as a publication is available electronically on the FAO's website and knowledge platforms, and can be downloaded for use by different target audiences. To promote wider awareness and adaptation of the CoC, the FAO is providing technical expertise and support to countries to expand the evidence base for improved policy making on food loss and waste reduction, in the Latin America and Caribbean, Near East and North Africa, and Asia-Pacific regions. The FAO is also using the CoC as a basis for supporting legislative activities in the Eastern Europe and Central Asia region.

⁵ SDG 12 sub indicators for Food Loss Index and Food Waste Index, FAO, 2019a ([Link](#))

The Food Safety Standards Authority of India (FSSAI)

Guiding the Optimisation of Surplus Food Donation



Food waste is a multi-dimensional issue and tackling it needs a holistic approach, where the government along with all other key partners plays a pivotal role

FSSAI is India's apex food regulating body for laying down science-based standards for articles of food, and regulating their manufacture, storage, distribution, sale and import to ensure availability of safe and wholesome food for human consumption. Since 2018 it has embarked on a unique initiative called "Save Food, Share Food" to promote the donation of surplus food in a safe manner.

Key messages

- A third of all food in India gets spoiled or wasted before it is consumed.
- FSSAI lays down science-based standards for articles of food and regulates their manufacture, storage, distribution, sale and import to ensure availability of safe and wholesome food for human consumption.
- The 'Eat Right India' movement of FSSAI is based on three key themes - Eat Safe, Eat Healthy, and Eat Sustainable. The 'Save Food Share Food' is an initiative of FSSAI that falls within the ambit of the Eat Sustainable theme.

- The IFSA network of food-collection agencies within the Save Food Share Food, through collaborative action is trying to minimize surplus food wastage.
- Key focus areas of the 'Save Food Share Food' initiative are: Integration of food donating and collection agencies, volunteers and beneficiaries; facilitating end-to-end solutions for tackling surplus food waste; providing cross-learning opportunities for stakeholders; increasing outreach of the program pan-India.
- To ensure scale-up of this effort 'State Connects' are being jointly organized by FSSAI and CII to mitigate food waste through surplus food donation.

Reducing food waste has repercussions on addressing food and nutrition security, reducing carbon emissions, and ultimately leading to building more resilient and safe food systems at a macro level.

Globally, an estimated 17 percent of total global food production is wasted in households, in the food service and in retail all together. Yet another stark reality is that between 691 and 783 million people faced hunger in 2022. Food that is lost and wasted accounts for 38 percent of total energy usage in the global food system.¹ India alone with a population of over 1.4 billion, produces 0.5 kg of organic waste per individual per day.²

India, the growing food basket: Turning food waste challenge into opportunity

India is the largest producer of milk and pulses, and second-largest producer of rice, wheat, sugarcane, groundnut, vegetables and fruits globally³ and is consistently growing in scope, as the food basket for the world.

However, at the other end of the spectrum around 90 kgs of food waste per capita per year is reported in India in the high-income group (Noted as 68, and 63 in the middle- and poor sectors respectively)⁴. Major food wasted in India emanates from hotels, restaurants, supermarkets, residential blocks, cafeterias in airlines and food processing industries.

On the one hand, the lack of adequate and efficient cold chain infrastructure is a critical supply-side bottleneck in India leading to massive post-harvest losses; while on the other, rising incomes and poor levels of awareness on food waste mitigation, contribute to hastening environmental degradation.⁵

India is actively involved in the SDGs and is integrating them within its national development agenda, however it has yet to set course to a food loss and waste reduction target under SDG Target 12.3. Surplus food redistribution can be a way to relieve co-existing challenges of food insecurity and food waste. Food donation has been a cultural practice in India since long. Streamlining this practice with food safety regulation can be a game-changer. No wonder the country's premier food safety body FSSAI, took on this challenge in collaboration with private sector and development sector partners to promote donation of surplus food.

FSSAI ensures food regulations are in place to make sure that safe and hygienic surplus food is being distributed. To this effect it rolled out the "Food Safety and Standards (Recovery And Distribution of Surplus Food) Regulations, 2019"⁶ detailing responsibilities for key stakeholders for surplus food collection and distribution, specifically, the food business

¹ FAO estimates 2022

² United Nations Environment Programme's (UNEP) Food Waste Index Report 2021

³ FAO estimates 2022

⁴ United Nations Environment Programme's (UNEP) Food Waste Index Report 2021

⁵ Niti Aayog, Strategy for New India @ 75

⁶ Food Safety and Standards (Recovery and distribution of surplus food) Regulations, 2019 ([Link](#))

operators and surplus food distribution organizations with respect to handling, transportation, storage and labeling of food being distributed.

FSSAI's call to scale action, with the 'Save Food, Share Food' initiative

Food systems are complex in nature and require a more holistic and coordinated approach. The 'Whole of Government' and 'Whole of society' approaches adopted by FSSAI thus reinforce its role as an 'enabler and reinforcer' for fostering a collaborative and inclusive environment for advancing a more sustainable food system for India.



Within the purview of this role the FSSAI has embarked on the 'Eat Right India' movement that is based on three key themes - Eat Safe, Eat Healthy, and Eat Sustainable. The Save Food, Share Food⁷ is an initiative of FSSAI that falls within the ambit of the Eat Sustainable theme, and endeavors to prevent food waste in the food industry by promoting surplus food donation.

It encompasses a pan-India network of surplus food distribution agencies, 85 NGOs, known as the Indian Food Sharing Alliance (IFSA) that operate to encourage safe collection and distribution of surplus, hygienic and safe food through structured food collection and distribution mechanisms, to feed those who need it the most.



Still at a nascent stage of working out the particulars, including building more awareness, developing the database of food sharing agencies and NGOs, and congregating key stakeholder consultations, this initiative of FSSAI has on-board also the Confederation of Indian Industry (CII with a formal MoU is a key partner

for leveraging industry support), food donating agencies, and other food and beverage organizations (FBOs).

In a next-level effort, to garner state-level commitments, the first 'State Connect', has been jointly-organized by FSSAI and CII in Goa (a union territory of India) for introducing the Save Food Share Food initiative to encourage local adaptation, create awareness on its Eat Right India initiative and overall strengthen food safety and regulatory ecosystems.

These efforts are set to build momentum for the initiative at the national, state and district levels. The CII's role has been pivotal here, supporting the FSSAI and working with private sector businesses, hand-holding and guiding them to help understand their specific roles.

"FSSAI doesn't just restrict itself to the agenda of being a regulatory body, but also its initiatives like Eat Right India, and Save Food, Share Food, are facilitating varied partners to come together to collaborate on solutions for tackling surplus food wastage in the country. CII has been at the forefront for supporting such initiatives" says Jane Karkada, Executive Director at Confederation of Indian Industry (CII).

⁷ Save Food Share Food at FSSAI Website at [\(Link\)](#)



90 kgs of food waste per capita per year was reported in India just in the high-income group. Improvements in food safety, food loss and waste stand to accelerate food systems transformation efforts.

Public-Private Engagement: Joining forces to fight food waste

There are various challenges pertaining to manpower and infrastructure support for surplus donated food to reach on time, via the necessary transport vehicles, is stored properly and refrigerated as needed. Food donating agencies however mostly run on philanthropic models and lack these support facilities, and are mostly operated by volunteers. Multi stakeholder collaboration however can spell innovative and localized solutions.

“The government can not solve this challenge on its own, especially in a huge country the size of India; for the government to reach everywhere with solutions is difficult. But having an active and robust private sector which is ready to support and partner with us on many such programmes, is critical to the success of such a project especially since the programme is totally voluntary. Despite that, there are so many food donating agencies and FBOs who are reaching out for participating in Goa, Gujarat and other parts of the country.” says Sharma.

The way forward: Saving and sharing the right and safe food

There are some interesting developments underway to look forth to within the Save Food Share Food initiative, in the near future. With its revamped website, an IVR-based helpline number to help food donors connect with surplus food distribution organizations, and even a mobile application in-the-making to help donors easily access and donate; the initiative is set to see a savvier version roll out soon.

Being a food regulating body for the country, FSSAI's role for preventing surplus food waste is all the more critical for generating large-scale awareness on the issue among citizens, food businesses and recovery agencies. Thus raising the momentum of dialogue and action on this issue, the FSSAI is geared up for its next level of state-level consultations for ensuring food safety, preventing surplus food waste, and promoting surplus food donation. State Connect

sessions are being planned in every state in collaboration with State FDAs to generate awareness on the Save Food Share Food initiative. This initiative is thus an important example of a successful format of public private engagement (PPE) for tackling surplus food waste.

Other developments to look forward to are, the development of Safety Guideline modules for surplus food distribution for the food industry and NGOs under the Food Safety Training and Certification (FoSTAC) training; industry support avenues being explored under the Corporate Social Responsibility ambit of private corporations. New collaborations with industry for promoting prevention of food waste and surplus food donation are also being explored by an expanding network of food distribution agencies. Also the development of technology-based solutions is underway for digitizing the process of surplus food distribution for enhancing access.

Ms. Inoshi identifies adopting a holistic and collaborative approach as being pivotal for tackling this challenge as she says, “We can't say 'don't cause food waste'. It can well be a consequence of our food systems that are slowly but surely transforming for the better; but certainly no food business or agency or even a person, intends to waste food. What we have to say and work together towards is, 'to please ensure that this food waste can be salvaged and instead be converted to a benefit via a food donating agency collecting this in time and donating to those who probably need it the most.”

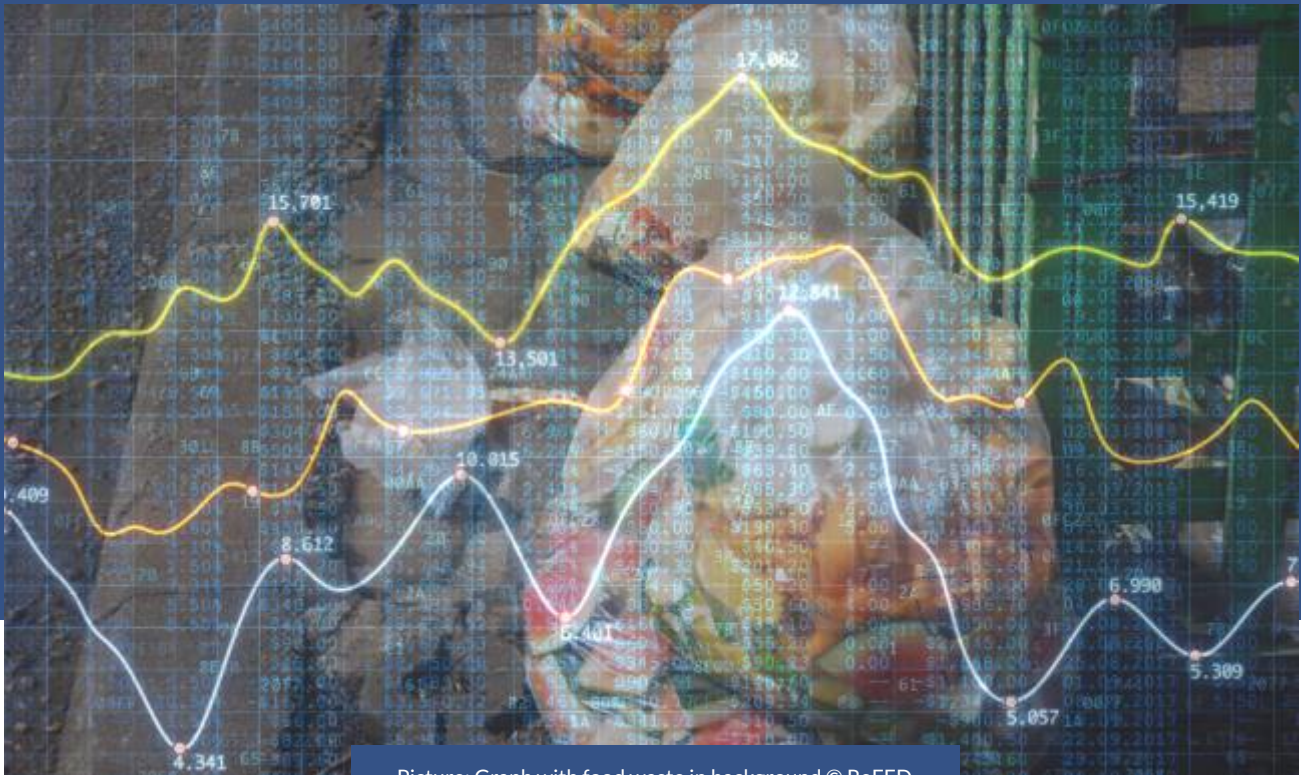


Case Studies

EVIDENCE-BASED RESEARCH

Harnessing Data

How ReFED is Working to Stop Food Waste by Advancing Data-driven Solutions



This case study explores ReFED's use of data to mitigate food waste and loss in the United States of America. ReFED is a US-based NGO working to stop food waste by advancing data-driven solutions. Alongside Cascadia Policy Solutions, WWF, and WRAP, ReFED also serves as a Resource Partner for the Pacific Coast Food Waste Commitment (PCFWC), a public-private partnership that works on the West Coast of the US and Canada with a climate imperative to reduce food waste.

Key messages

- In the US, a staggering 38% of all food goes unsold or uneaten – the equivalent of 149 billion meals annually
- One in ten Americans are food insecure, lacking reliable access to sufficient, affordable, nutritious, and culturally appropriate food
- In the US, most food waste happens at the household level, followed by consumer-facing businesses like restaurants and food service
- The average American throws out \$690 worth of food at home annually; some of this is inedible eggshells, bones, etc., but more than 60% is edible
- The retail sector in the US generated the lowest amount of surplus food, but more than half of this was due to confusion over date labels

Reducing food waste in the United States

"In the US, 38% of food goes unsold or uneaten, and most of that goes to waste. That's the equivalent of almost 149 billion meals' worth of food that we are letting go unsold or uneaten each year. The impact of surplus food and food waste on our climate and environment are enormous, since food that is never eaten still requires resources to grow, harvest, transport, cool, cook or otherwise prepare," - Jackie Suggitt, ReFED.

In 2015, a research collaboration of more than 30 industry, nonprofit, foundation, and government leaders committed to reducing food waste in the United States morphed into an American non-profit, now called ReFED, a name originally developed from "Rethinking Food Waste Through Economics and Data."

The collaboration created the "Roadmap to Reduce US. Food Waste by 20%," the first-ever national economic analysis and action plan to tackle the issue at scale.

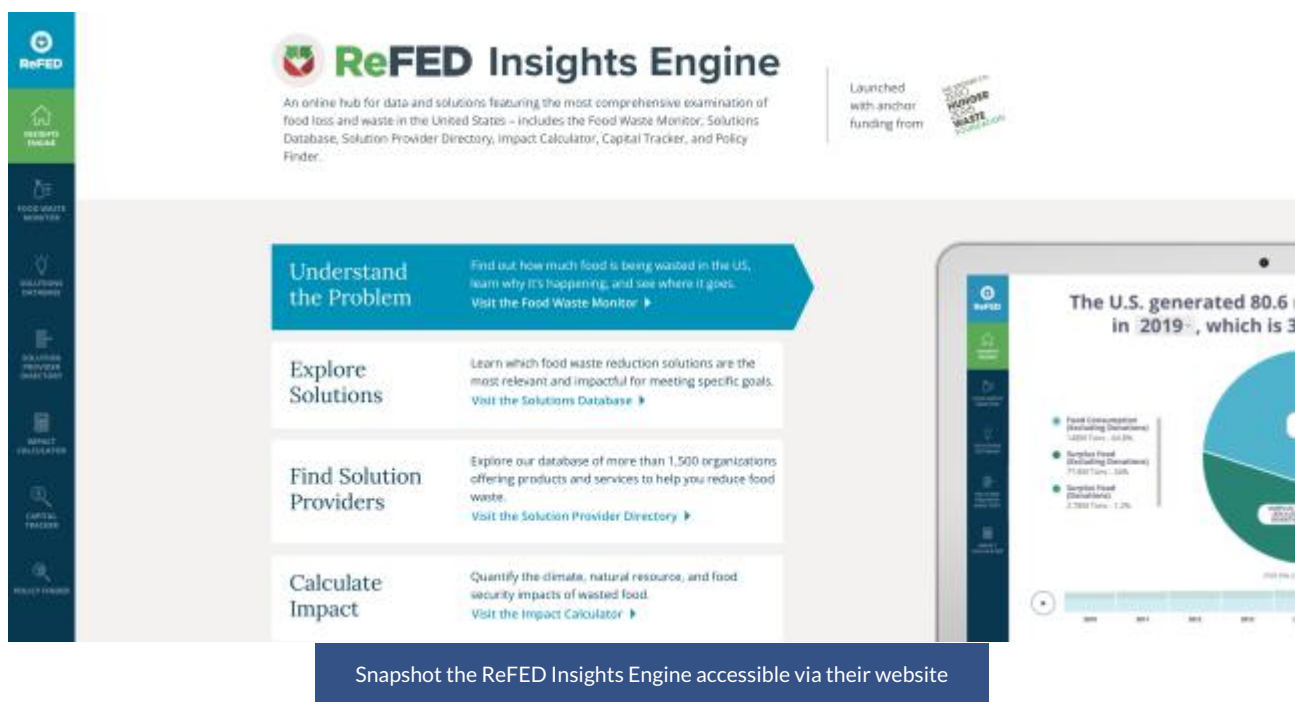
The first roadmap was designed to fill the gap between awareness and action by creating transparency in the waste flows, costs, and opportunities of a more efficient food system.

Using data to understand food supply chain

ReFED's founding insight was that food waste is a systemic problem, resulting from the various stages of the food supply chain. The research revealed the need to inform food waste mitigation with sustained and systemic data and the economic opportunity offered by implementing food waste solutions.

While food waste was already a conscientious problem touching off organisational and individual action, efforts were uncoordinated and inefficient. Reducing food waste would require system-wide data to identify the right mix of players, identify and analyse solutions, guide investment and track solutions adoption.

To serve as a guide for food system stakeholders addressing the food waste challenge, ReFED developed and produced a suite of tools and resources that provided a full-supply-chain picture of US food waste, a cost-benefit analysis of solutions to the problem, an impact analysis, an overview of capital invested in the space, a review of various governmental policies, and a directory of solution providers – all grounded in credible data and accessible methods to track progress.



Launched in 2021, ReFED's six-tool Insights Engine was introduced as a groundbreaking resource that could help the food system shift from awareness about the food waste problem to action. This interactive platform combines dozens of public and proprietary datasets, research studies, and interviews with subject matter experts to create a trusted source of data and solutions that provides those connected to the food system – both directly and indirectly – with the necessary information to take action against food waste.

COVID-19 insights

Labour, retail and food service disruptions across the food system at the peak of the COVID-19 pandemic contributed to a 1.3% decline in food waste in 2020 in the US. Cooking at home increased due to restaurant closures, while retailers sometimes struggled to keep products on shelves from increased demand.

During the lockdown, the food service surplus declined by 36%, while the retail surplus decreased by 2.6%. On the other hand, residential surplus food increased during this time by 12% as home purchasing increased, accompanied by hoarding and panic buying.¹

The Pacific partnership approach

ReFED is a resource partner in the Pacific Coast Food Waste Commitment (PCFWC). This public-private partnership works along the West Coast of the US, including the states of Washington, Oregon and California, and the cities of Seattle, Portland, San Francisco, Oakland and Los Angeles,² along with the Canadian province of British Columbia. The PCFWC boasts 17 signatories from the private sector, but the group originated from local government bodies working together as the Pacific Coast Collaborative (PCC) to reduce greenhouse emissions by 80% before 2050.

With an economy of 55 million people and a combined GDP of \$3 trillion, the Pacific Coast Collaborative initially worked on transport, ocean acidification, refrigeration and other climate-focused areas.³ In 2018, they focused on food waste in partnership with the private

¹ A., Hardwood, S., Mao, M., Ringland, and J., Zurita, 'ReFED's new estimates on food waste in the United States: 2020-2021, trends, and covid-19 impact', ReFED, May 2023

² PCC, 'Reducing Wasted Food,' Pacific Coast Collaborative, 2023.

³ PCC, 'Reducing Wasted Food,' Pacific Coast Collaborative, 2023.

sector. They brought in ReFED, World Wildlife Fund, and WRAP (Waste & Resources Action Programme) as resource partners to launch the Pacific Coast Food Waste Commitment (PCFWC).

ReFED's primary focus in the PCFWC is collecting and analysing data from food business signatories. This is a critical step in any waste reduction initiative, as it identifies where resources should be focused to have the most significant impact. Once anonymised, aggregated data is shared publicly to serve as a point of comparison for other food businesses to benchmark their own efforts. In addition, WRAP brings its expertise to managing similar collaborations worldwide, and WWF oversees business recruitment and ongoing engagement, including running pilots and convening working groups.⁴

Surplus food had returned mainly to pre-pandemic levels by 2021, highlighting the importance of multi-stakeholder collaboration and investment in food waste solutions.

PCFWC: Directing food where it's most needed

Artificial intelligence, e-commerce, upcycling, and employee engagement were among the standout initiatives out of nine projects piloted by the PCFWC to help businesses cut waste within their operations. An initial data assessment provided a focus for PCFWC to identify food waste hotspots, better profile food waste and test nine high-potential solutions.

In one project, two PCFWC-affiliated supermarket chains worked with two AI providers, Shelf Engine and Afresh, to better predict demand. Each store reduced waste by 14.8% on average.⁵ Scaled to a national level, AI-informed ordering could lead to more than \$2 billion in savings and help avoid nearly 13.3 million metric tonnes of CO₂ emissions.⁶



Commenting on the solution, Jackie Suggitt said, "It brings in consumer purchasing behaviour, historical data, weather data, and it really tries to refine what you're ordering to eliminate food waste in the retail sector value chain."

The PCFWC also partnered with Cascadia Consulting Group for a report on e-commerce solutions to food waste. The analysis resulted in four key strategies for leveraging e-commerce to reduce waste. For example, web-based sales accompanied by consumer education about what is safe to consume while also highlighting the environmental benefits of using food up could drive less waste. Additionally, subscription services helped retailers forecast demand more accurately.⁷

The report also included a series of case studies. Imperfect Foods sold cosmetically imperfect foods via their website, and their active customer base grew 40% from 2020 to 2021, while average order value rose nearly 70% over the year.⁸

Fresh Direct marketed unique products via its website, including smaller eggs laid during the hen's first six weeks of laying. The Flashfood app allowed customers to select and purchase fresh food nearing its "best before" date at reduced prices. Approximately 11,000 shoppers took advantage of the deals, resulting in tens of thousands of pounds of food rescued from potential waste.

⁴ ReFED. 'Insights Engine,' ReFED, 2023.

⁵ PCFWC. 'Using Artificial Intelligence to Reduce Food Waste in Grocery Retail,' Pacific Coast Food Waste Commitment, Fall 2022, pp. 1-13.

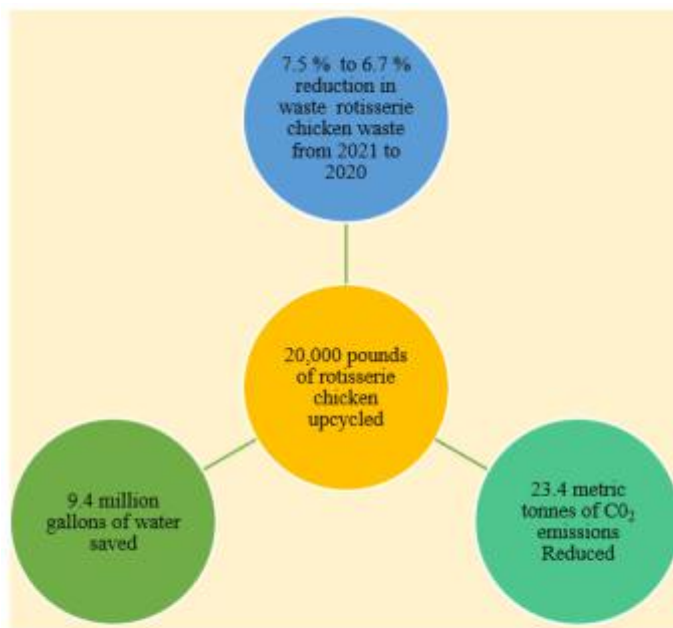
⁶ ReFED. 'The Food Waste Problem,' ReFED, 2023.

⁷ PCFWC. 'How E-Commerce Strategies Can Help Reduce Wasted Produce,' Pacific Coast Food Waste Commitment, Spring 2023, pp. 1-7.

⁸ PCFWC. 'How E-Commerce Strategies Can Help Reduce Wasted Produce,' Pacific Coast Food Waste Commitment, Spring 2023, pp. 1-7.

In a separate case study, Bob's Red Mill, a food manufacturer, ran an employee engagement campaign featuring a contest for ideas to reduce food waste in its operations with high-tech and low-tech approaches. From 176 creative, innovative food waste reduction ideas crowdsourced from its manufacturing line employees, the winning idea was responsible for reducing waste by 70% on a single production line.⁹

In another case study, New Seasons Market recycled food surplus into new products and meals. Over 20,000 pounds of rotisserie chicken were upcycled into a new pulled chicken product. The initiative decreased the percentage of rotisserie chicken waste from 7.5% in 2021 to 6.7% in 2022, avoided more than 23.4 metric tonnes of CO₂ emissions, saved 9.4 million gallons of water and produced a new high-sales volume product for customers.¹⁰



New Seasons Market recycled food

Food waste is a solvable problem

While solutions to reduce food waste exist, there are a range of reasons why they can be challenging to implement. For example, Implementing food waste reduction solutions requires collaboration between different departments within participating businesses, including buyers, merchants, store managers, chefs, waste managers, and financial analysts, which can be difficult to coordinate.

Additionally, health regulations in the US vary by city and state, arising from "home rule" authority in some localities and differing interpretations of the FDA Food Code, which only loosely defines basic requirements for food safety.¹¹ This hampers national and global companies from developing uniform food donation policies across their organisations.

Building high-value partnerships

Since 2016, ReFED has evolved into one of the nation's leading food waste organisations due to building high-value partnerships, identifying unique groups' strengths to make progress together, and incentivising new players into the food waste space.

And while the overall amount of surplus food in the US seems to have leveled off, the amount of surplus food per capita appears to have declined slightly. Reducing food waste is one of the top individual behaviours people can take to reverse climate change, Suggitt noted.

ReFED's frameworks and methodologies have been adopted or used by over 20 organisations, including the Organization for Economic Cooperation and Development, Asia-Pacific Economic Cooperation, Walmart, Deloitte, and Johns Hopkins University.

⁹ PCFCW. 'Institutionalizing a Waste Reduction Culture in Food Manufacturing,' Pacific Coast Food Waste Commitment, Fall 2022, pp. 1-16.

¹⁰ PCFCW. 'PCC Community Markets' Upcycling Initiatives & Food Waste Reduction Commitment,' *Pacific Coast Food Waste Commitment*, Summer 2023, pp. 1-9.

¹¹ ReFED. *The Food Waste Problem*, ReFED, 2023.

Collaboration on shared goals can make a positive difference

Mitigating food loss and waste will require consumer, producer, and government engagement and financial investment.

ReFED estimates that \$18 billion in investment is needed annually to significantly reduce food waste.

“The current amount of funding in the space does not align with the scale and impacts of the issue, even while the size of the food waste opportunity is becoming increasingly evident.” Alex Coari, ReFED’s Vice President of Capital, Innovation & Engagement.

Effective deployment of capital and policy, with stakeholders from across the value chain collaborating on shared goals, can make a notable difference in driving economic, social, and environmental benefits for communities and investors, addressing climate change, and building a more resilient, waste-free food system.

Methane and Ozone Air Pollution Through the Lens of Food Loss and Waste

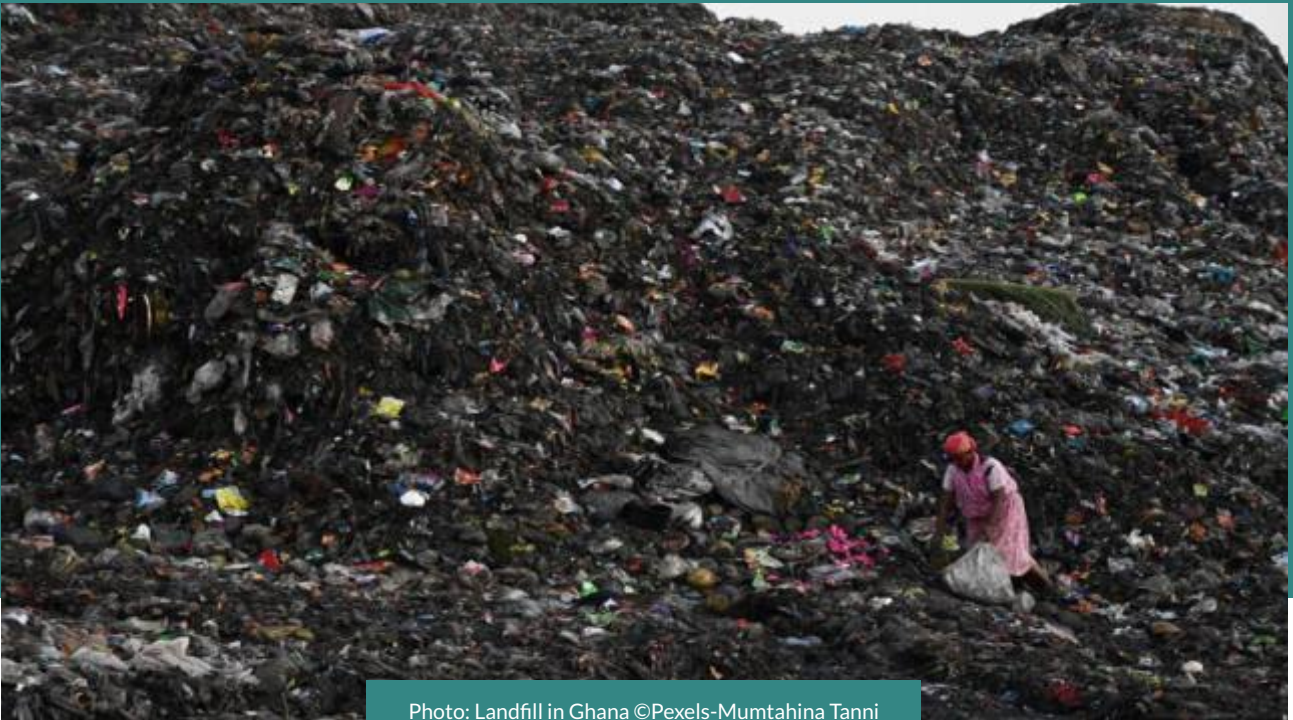


Photo: Landfill in Ghana ©Pexels-Mumtahina Tanni

Potent greenhouse gases and short-lived climate pollutants from our global food systems are increasing at an alarming rate, adversely affecting our ecosystems. This case study highlights research concerning methane emissions (including those from food and waste) undertaken as part of the Global Methane Assessment (GMA) published by the United Nations Environment Program (UNEP) and the Climate and Clean Air Coalition (CCAC). The GMA focuses on the impacts of methane emissions and assesses mitigation measures by public and private actors and the multiple benefits to climate, human health and ecosystems. This assessment was developed by a global team of authors, including researchers from the Stockholm Environment Institute (SEI).

This case study also highlights research done by SEI in collaboration with the Clean Air Fund (CAF) and World Economic Forum (WEF) on reducing air pollutant emissions from the private sector who already report on their GHG emissions including methane in some cases. The members of the Alliance for Clean Air, the first coalition of companies, are aiming to quantify and reduce their air pollutant emissions across their value chains.

Key messages

- Methane is a potent greenhouse gas (GHG) and short-lived climate pollutant (SLCP), and is a significant precursor of tropospheric ozone formation. The three key anthropogenic sources of methane are the oil and gas sector, agriculture and waste.
- Methane's atmospheric lifetime of approximately twelve years is much shorter than that of CO₂, which means that taking action to reduce methane emissions can result in rapid reductions in climate, forcing associated warming, and ozone pollution. Several mitigation measures are available for each key emitting source of methane, including improved agricultural practices, improved waste management, and reduced methane losses from oil and gas production.
- Current practices of producing and distributing food can include substantial losses before consumption, and there is considerable food waste after consumption, which is often disposed of through incineration or in uncapped and often informal landfills. This is a waste of food and resources in a world with hunger, poverty and increased food demand, owing to rising population. These practices also contribute to climate change through GHG and SLCP emissions and affect human health due to exposure to air pollution.
- Different actors have opportunities to reduce methane emissions from agricultural practices or by reducing food loss and organic waste, and improving waste disposal practices. For government actors, actions such as improved market infrastructure, last-mile connectivity (key to reducing agri-food loss and waste) or improving waste management policies can have multiple benefits. Businesses also have a critical role in reducing methane, other GHGs and air pollutant emissions starting with the quantification of the environmental implications of their complex value chains in collaboration with their suppliers and supplier networks.
- Businesses and Governments can include air pollutant and methane emissions in their existing GHG inventories and work towards developing integrated mitigation assessments.

Background

Over half of global methane emissions come from human activities, with the remainder coming from natural sources of methane, such as wetlands. The anthropogenic emissions of methane come mainly from three sectors: 35% from fossil fuels, 20% from waste and 40% from agriculture. Methane is a natural byproduct of the digestive process in ruminants such as cattle, sheep, and goats. The gas is also produced by decomposing organic matter, such as livestock manure and agricultural waste. In rice paddies, flooded fields promote the growth of methane-producing anaerobes in the soil. Not only does methane have a warming effect, but it is also one of the main precursors of ground-level ozone formation, which affects human health and reduces crop and forest yields.

Methane is now gaining notoriety as a GHG that has a more significant impact on warming per molecule (compared to CO₂) and is the second most important GHG for global warming that has been seen to date, and concentrations in the atmosphere are increasing at alarming rates. One difference between methane and carbon dioxide is that methane is a shorter-lived gas in the atmosphere, which means that methane concentrations will respond rapidly once emissions are controlled, reducing its warming influence within decades.

In 2022, SEI co-authored the Global Methane Assessment (GMA)^{1,2}, published by UNEP and the CCAC. According to the GMA, “for every million tonnes of decreased methane emissions, about 4,000 asthma-related incidents and emergency department visits, along with 90 hospitalisations per year, could be avoided. The significance of these figures lies in their impact on health and quality of life.

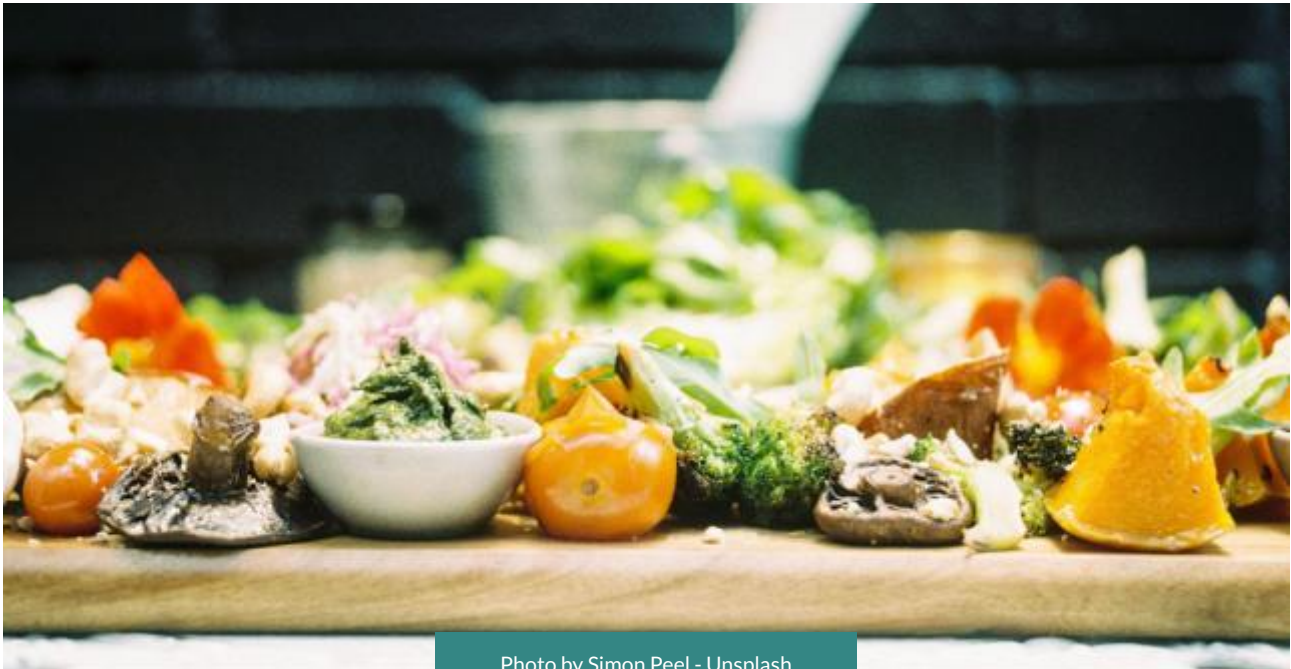


Photo by Simon Peel - Unsplash

Food waste and greenhouse gases

Discarded food along value chains, disposed of in uncapped landfills, contributes to the production of GHGs like methane.

When disposed of in a landfill with no cap collecting the methane, the organic matter rots (decomposes) and emits carbon dioxide and methane into the atmosphere, contributing to global warming.³ Carbon dioxide emissions, the leading cause of global warming, which remains in the atmosphere for a long time (approximately 100 years on average), mainly emanate from the use of fossil fuels and land use change.

“Greenhouse gas emissions have an impact on our food systems. But our food systems also have an impact on greenhouse gas emissions.” - Eleni Michalopoulou, Research Associate, Stockholm Environment Institute

Key facts and figures

- Anthropogenic methane emissions come mainly from three sectors: 35% from fossil fuels, 20% from waste and 40% from agriculture.
- Methane is a potent GHG with more significant impact of global warming per molecule compared to CO₂ and it's the second most important GHG for global warming.

¹ CCAC and UNEP, 'Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions,' Climate and Clean Air Coalition (website), 2021.

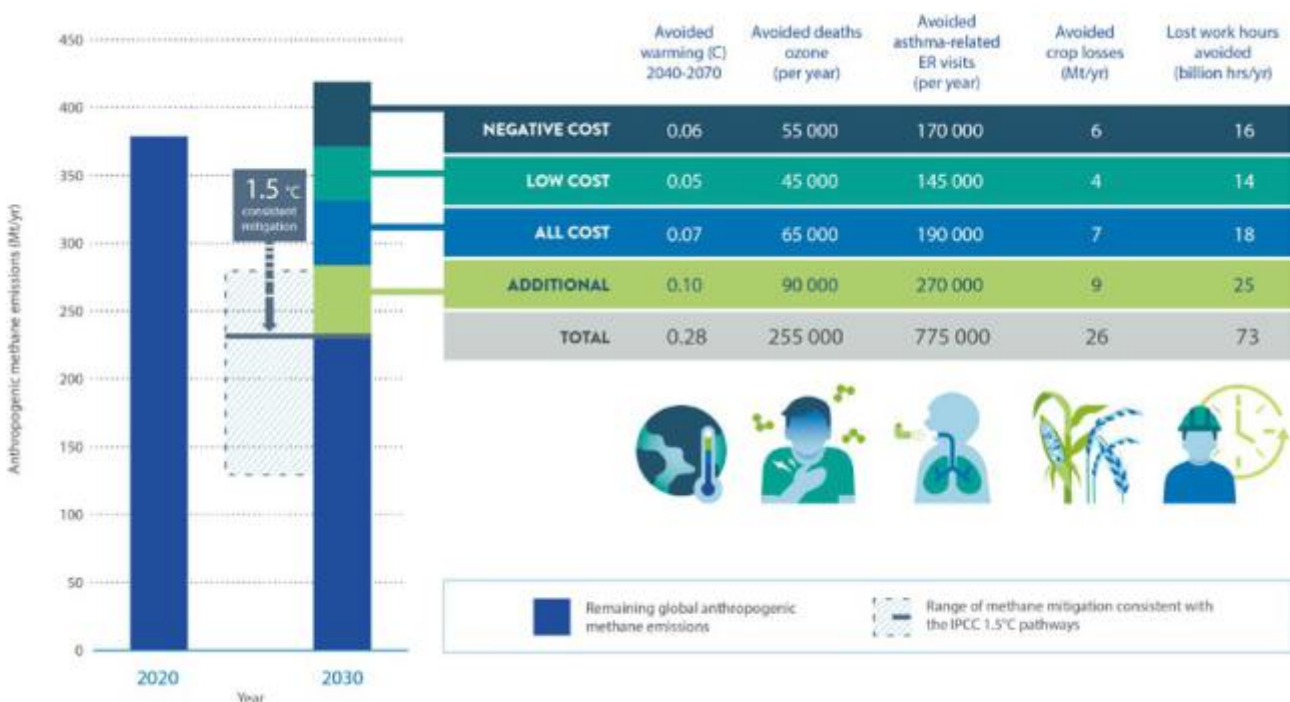
² Food and Agriculture; SEI; [\(Link\)](#)

³ UNEP, 'UNEP Food Waste Index Report 2021,' United Nations Environment Programme (website), 2021.

- The Global Methane Assessment (GMA) found that for every million tonnes of decreased methane emissions, about 4,000 asthma related-incidents and emergency departments along with 90 hospitalizations per year, could be avoided.
- National governments have signed the Global Methane Pledge to reduce methane emissions by 30% in 2030 compared to 2020, potentially preventing 255,000 premature deaths, 775,000 asthma related hospital visits, 73 billion hours of lost labour from extreme heat and 26 million tonnes of crops losses globally.
- Efforts to reduce food waste, optimise livestock management and promote healthier diets could slash methane emissions by 65-80 Mt/year in the coming decades.

Fulfilling the Global Methane Pledge

National governments have a large role to play in reducing methane emissions. Partly in response to the findings of the GMA, about 150 countries have signed the Global Methane Pledge (GMP). Launched at COP26, the GMP aims to reduce methane emissions by 30% in 2030 compared to 2020. The GMP has the potential to generate momentum to implement action to reduce methane emissions. More than 50 countries have developed or are developing national methane action plans, and substantial new financial resources are being directed to methane action.



Current and projected anthropogenic methane emissions and the identified mitigation potential in 2030 of targeted controls and their costs (low cost is greater than zero and less than 2018 US\$ 600 per tonne of methane) as well as a set of additional measures.

(Source: UNEP and Climate and Clean Air Coalition 2021. [Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions](#))

Nations have a crucial role in curbing agriculture and food-related methane emissions by prioritising behavioural change and innovative policies. Efforts such as reducing food waste, optimising livestock management, and embracing healthier diets with reduced meat and dairy consumption, could slash methane emissions by 65–80 Mt/year in the coming decades⁴. Food waste from 'ugly food' often ends up in landfills. We can help reduce food waste by urging people to eat food based on nutritional quality, not aesthetics. Enforcement

⁴ CCAC and UNEP, 'Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions,' Climate and Clean Air Coalition (website), 2021.

of proper waste management policies at local and state levels is critical. Encouraging waste reduction and diversion from landfills by repurposing food waste to animal feed, composting or donating to food banks can mitigate the environmental impact of food waste, especially in urban areas.

Businesses working to reduce methane

The private sector has the potential to play a substantial role in methane, air pollution and other GHG mitigation. Businesses and organisations can optimise their supply chains, especially during the last mile connectivity, to reduce food loss and waste through improved market infrastructure, better packaging to increase shelf life and storage solutions.

One company quantifying emissions and promoting measures to reduce them is IKEA, which operates in-store restaurants and cafes in several countries. It was one of the first global businesses to publish across the value chain in line with its People and Planet Positive Strategy to reduce food waste by 50% in its operations.⁵ IKEA's food waste management efforts include menu planning, portion control, surplus food redistribution in partnership with local food banks, an increased number of plant-based options in its food range and sustainable sourcing.⁶

IKEA has also been raising awareness among its customers about food waste by placing educational materials, posters and information displays in its stores to inform customers about food waste. IKEA also provides food storage products such as containers and reusable bags designed to help customers store food more effectively and reduce waste from food spoilage. They also offer a wide range of plant-based foods in their in-store restaurants and cafes as well as their supermarket aisles that is more sustainable with lower emissions.

Alongside its plant-forward menu, IKEA launched the 'Better Now' initiative in 2018 to repurpose rice straws from India into rugs and furniture. Rice straw is typically burned after the grain is harvested, significantly contributing to air pollution.

IKEA has been exploring the use of rice straw in India and Ghana, traditionally considered agriculture waste, as a sustainable resource that can be repurposed into furniture, mats and rags.

Beyond GHG reporting

While the private sector has been increasing its efforts on quantifying and reporting GHG emissions, quantifying and reporting their air pollutant emissions has only very recently been included in corporate sustainability reports.

IKEA is one of the 10 founding members of the 'Alliance for Clean Air', a corporate movement for clean air to accelerate climate action, was launched at COP26 by the World Economic Forum in partnership with the Clean Air Fund. The 16 alliance members include Google, Accenture, Biogen, Bloomberg, EY, GEA, GOTO, GSK, HALEON, IKEA MAERSK, Mahindra, Moderna, Oracle, Siemens and WIPRO, and it is supported by SEI.

SEI research and policy work has contributed to reducing food waste, promoting sustainable consumption, and mitigating food systems' environmental impact for the past three decades. SEI has facilitated collaborations and partnerships focused on boosting the ambition of Nationally Determined Contributions (NDCs) to the United Nations Framework Convention for Climate (UNFCCC), ratified by 198 countries that have committed to act on climate change and regularly report on their progress.^{7,8}

⁵ CAF, 'IKEA leads the way on corporate transparency and action on Air Pollution,' Clean Air Fund (website), February 2023.

⁶ IKEA, 'IKEA Sustainability Report Fy22,' IKEA, 2022, pp. 1-53.

⁷ UNFCCC. 'Fact sheet: The need for mitigation,' United Nations Framework Convention on Climate Change, 2023, pp. 1-7.

⁸ Analysis and Tools for Nationally Determined Contributions; [\(Link\)](#)

SEI, the CCAC and IKEA partnered in a project to create a practical guide that allows companies to quantify their air pollutant emissions and include them as part of their sustainability reports and GHG inventories.⁹ The guide was launched at COP27 and endorsed by the Alliance for Clean Air. The 16 companies of the Alliance have committed to quantifying their value chain air pollutant emissions from critical sectors, including electricity generation, transport, industrial processes, agriculture and waste.

“Through the air pollution guidance, we as a business can measure our impact and take action to minimise or eliminate it.”

- Andreas Ahrens, Head of Climate at the Inter IKEA Group

Acting now to reduce food-related emissions is an urgent priority

Available methane measures can simultaneously reduce human-caused methane emissions by as much as 45%, or 180 million tonnes a year (Mt/yr) by 2030. This will avoid nearly 0.3°C of global warming by the 2040s and complement all long-term climate change mitigation efforts. It would also, each year, prevent 255,000 premature deaths, 775,000 asthma-related hospital visits, 73 billion hours of lost labour from extreme heat, and 26 million tonnes of crop losses globally.¹⁰

“Methane mitigation can save lives, prevent respiratory disease, help prevent further warming and contribute to healthier ecosystems. The measures that must be taken to achieve this are readily available and cost-effective. There is no reason not to act now. Explicitly and specifically addressing methane emissions will benefit everyone, particularly the vulnerable.”

- Eleni Michalopoulou, Research Associate, SEI

Reducing human-caused methane emissions is one of the most cost-effective strategies to rapidly reduce the rate of warming and contribute significantly to global efforts to limit temperature rise to 1.5°C. Launched at COP26, the Global Methane Pledge (GMP) aims to reduce methane emissions by 30% in 2030 compared to 2020. With 2030 just seven years away, we must act boldly and make thoughtful, transformative changes without inadvertently creating new challenges.

⁹ CAC and UNEP, 'Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions,' Climate and Clean Air Coalition (website), 2021.

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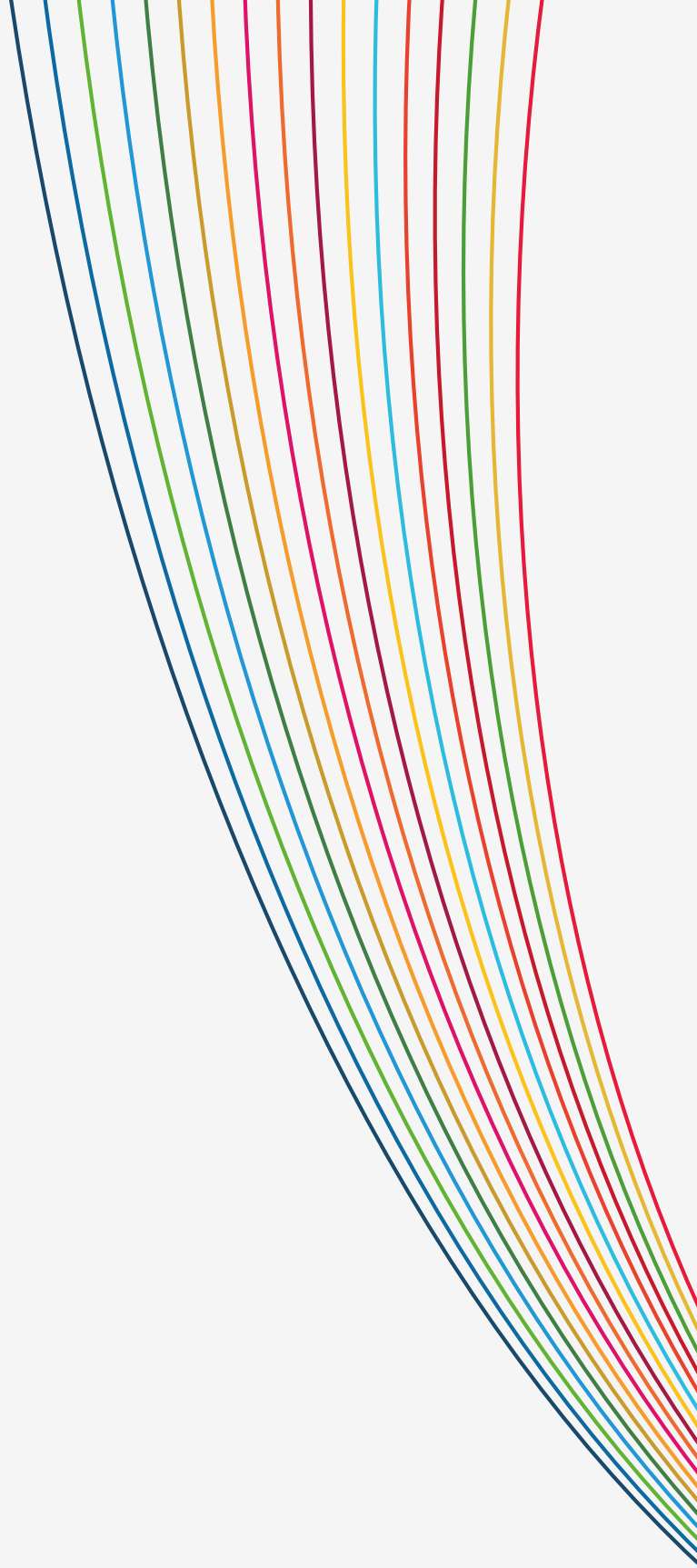
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