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Climate Insights

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AEGON **INSIGHTS**

Addressing evolving diets and food waste to combat climate change

The global food system is a major driver of climate change, accounting for around a third of total greenhouse gas emissions. From livestock production and deforestation to food processing and transportation, the impact of how we grow, distribute and consume food is staggering. However, there are opportunities to mitigate these environmental harms through transformative changes across the food value chain. In the first two articles of Aegon Asset Management's Climate Insight Series, we explore how our food system can achieve decarbonization and the challenges it may encounter.

In this second article we focus on the demand side of the global food system, including evolving global diets and food waste. Implementing these solutions in the near term is crucial, as achieving a net-zero future is highly unlikely without significant changes to global food production.

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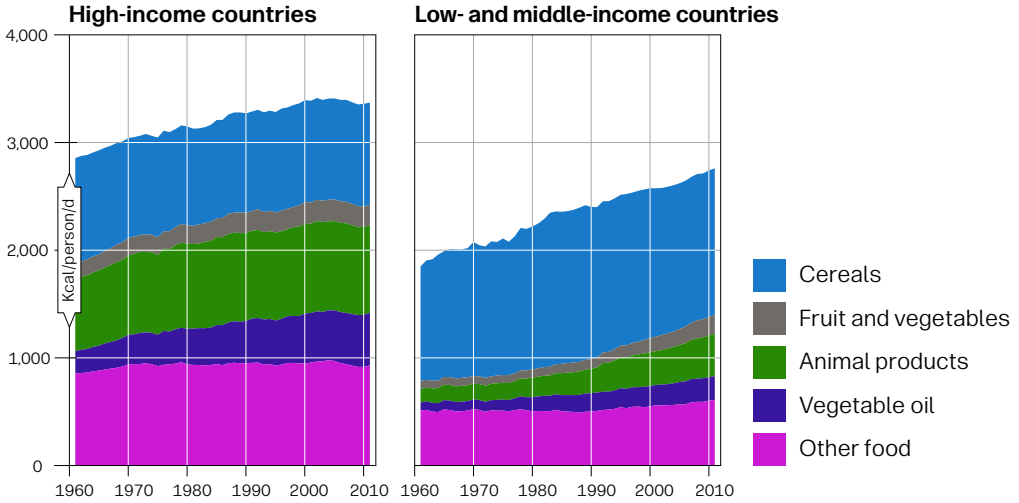
What are the issues?

The global food system is a significant contributor to climate change, driven by carbon-intensive diets and substantial food waste across the value chain. Addressing these issues through transformative changes in food production, distribution, and consumption is crucial for achieving a net-zero future.

Carbon intensity of diets

The world's population is projected to reach approximately 10 billion by 2050, with much of the growth happening in developing nations, particularly sub-Saharan Africa which will see a 10-fold increase from 1960.[1] Coinciding with this population boom is a growing global middle-class whose diet is becoming more calorically dense and carbon intensive. Diets are shifting from staples like cereals, roots, and tubers to more resource-intensive foods such as dairy, meat, fish, and processed products.[2]

Trends in food demands by income group



Source: FAO Global Perspective Studies, based on FAOSTAT (various years).

Animal-based products have a carbon footprint that is 10 to 20 times higher per kilogram of food compared to vegetables and plant-based protein options.[3] Based on the evolving global population and trends, it is expected that global emissions from our food system could increase 80% by 2050 compared to 2010 levels.[4] Furthermore, the resource intensity of these dietary trends will exacerbate climate change. A study of global diets found that if global diets were aligned with those of much of the developed world, such as the United States, Italy, France, Canada, Norway, and Denmark, more than 100% of global habitable land would be needed for agricultural purposes. This is unsustainable.

Food waste

Approximately one-third of the world's food production, by weight, is lost or wasted between the farm and the fork, amounting to over 1 billion tonnes. This loss translates to 24% of the global food supply in terms of calories. Alongside the human cost, this crisis imposes a significant financial burden of over $1 trillion annually, while contributing to roughly 8 to 10% of greenhouse gas emissions from the global food system. If changes aren't made, food waste could double by 2050, further intensifying both climate and societal impacts.[5]

The Food Waste Index Report tracks country-level progress to halve food waste by 2030. The UN has found that food waste predominantly happens at the household level, responsible for roughly 60% of 2022's food waste. Despite nearly doubling data coverage, the average per capita household food waste in high, upper-middle, and lower-middle income countries now varies by just 7 kilograms per capita per year, showing that food waste is an issue across all income levels.[6] However, data on food waste remains incomplete. Currently, only four G20 countries and the EU have comprehensive food waste estimates that are adequate for tracking progress towards their 2030 goals. Additionally, three other countries have suitable estimates for household food waste. However, awareness at a global level is rising and an increasing number of nations have included food waste in their National Determined Contributions (NDCs), which is cause for optimism that visibility should improve with regards to data.

Addressing food waste is crucial not only for achieving global food security but also for mitigating climate change and ensuring sustainable development for future generations.

Estimates of global food waste in 2022

Sector	Global average (Kg.Capita/Year)	2022 total (million tonnes)
Household	79	631
Food service	36	290
Retail	17	131
Total	**132**	**1,052**

Source: Food Waste Index Report 2024. Think Eat Save: Tracking Progress to Halve Global Food Waste (see page 12)

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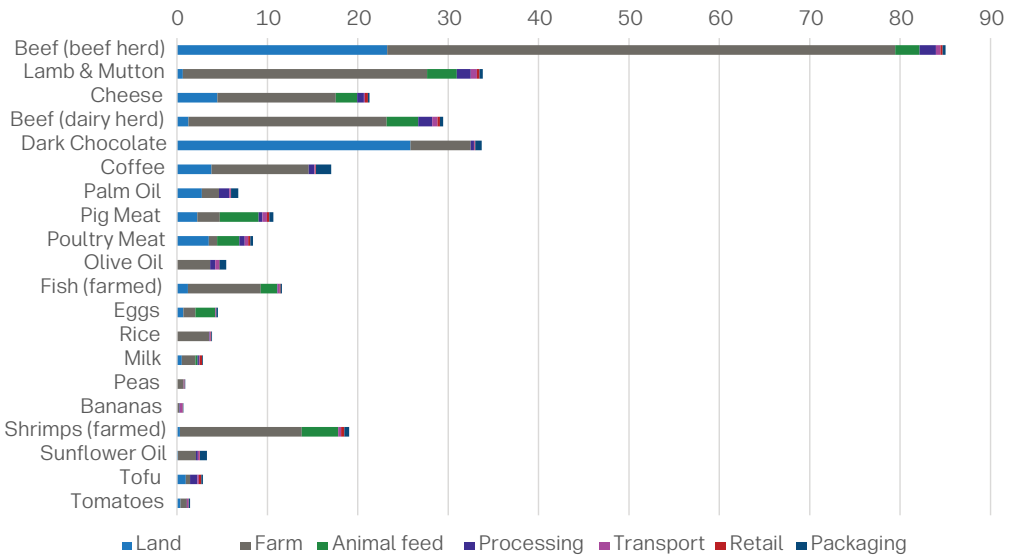
What are the solutions?

Eat less meat?

Diet is always a contentious issue, however, it is clear that a move to a less carbon intensive diet can have a large impact and it is arguable that without this it will at the very least be more difficult to achieve the goals of the Paris agreement. An Oxford University study examined dietary data from over 55,500 people across a wide range of dietary categories (meat-eaters, pescatarians, vegetarians, vegans, etc.), outlining strong links between dietary choices and carbon emissions, land use, water use, and biodiversity loss. The study found that vegan and vegetarian diets have drastically smaller carbon footprints compared to high-meat diets (over 100g/day), with reductions of 76% for vegans and 60% for vegetarians. They also concluded that the biodiversity loss was much greater for high-meat eaters compared to vegans and vegetarians, 70% reduction for vegans and 44% for vegetarians. [7] Importantly, the study highlighted that cutting down on meat consumption, rather than eradicating it completely can make a big impact. For example, the carbon footprint of moving from a high meat to a low meat diet reduces carbon emissions by c50%.

As well as the quantity of meat consumed, the type also makes a difference. For example, on average carbon footprint of pork and chicken it c3-10x less than that of beef or lamb. Beef and lamb production also use far more land, to produce the same amount of protein. It is estimated that if we were to cut out lamb and beef production we would half the amount of land globally used for agriculture.

Food: greenhouse gas emissions across the supply chain



Source: Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. Science, 360(6392), 987-992. – processed by Our World in Dataourworldindata.org/world-lost-one-third-forests'

Consumers are becoming more conscious of their environmental impact, with many recent reports showing that, when given the choice and correct information, there is interest in food options that reduce their carbon footprint. A June 2024 study published in Environmental and Resource Economics examined whether individualized carbon footprint information could influence consumer behaviour at grocery stores. The short-term findings were positive, with consumers reducing their weekly carbon emissions from groceries by 27%, particularly from beef. Impact diminished slightly over the long-term, however, there was still a clear influence when given the opportunity.[8,9] The demand for sustainably sourced products and disclosure is increasing .

Meat and dairy substitutes

The market for meat and dairy substitutes has grown significantly in recent years. These products aim to reduce dependance on carbon-intensive commodities while meeting the demand for animal-based goods. One notable advancements is cultivated meat, or cultured meat, which is produced by directly cultivating animal cells. This method eliminates the need for traditional animal farming and replicates the sensory and nutritional profiles of conventional meat. Recent studies have shown that this method is much less carbon intensive, 14% of carbon intensity of average beef/kg, and uses 19 times less land. This has been seen as a business opportunity by some of the largest meat producers like Tyson Foods and JBS, who have been investing in cultivated meat startups as far back as 2018 and as recently as 2023.[10] Large dairy producers are also following this trend, increasing their plant-based product portfolio on a yearly basis, and tying this consumer demand shift to their carbon reduction targets.[11]

Global strategies and innovations in combating food waste

While the majority of food waste occurs at the household level, addressing this issue requires more comprehensive responsibility. Governments from around the world are realizing this and creating public-private partnerships and government initiatives to address food waste across all levels of the value chain. There isn't a one-size fits all approach to solving the global issue of food waste, however, the main principles are replicable.

South Korea has become a leader in reducing emissions from food waste, having spent the last 30 years creating infrastructure and policies to reduce and repurpose it. Beginning in 1986, the Wastes Control Act outlined the responsibilities of consumers and producers in waste management and required the environment minister to create a national waste management plan every 10 years. In 2005, the government banned the dumping of food into landfills and implemented a mandated food waste recycling system using biodegradable bags in 2013. This volume-based waste fee, which amounts to an average of $6 per month per household, initially reduced domestic waste from food producers by 23% and has led to a system that recycles 98% of its food waste.[12] This composting system produces biogas and feed for livestock, while reducing methane and carbon emissions through diverting food from landfills and reducing the demand for synthetic fertilizers.

Public-private partnerships are necessary to combat food waste, as the onus can't solely be placed on consumers. Agreements like The Courtauld Commitment, launched by Waste and Resources Action Programme (WRAP) in the UK, show that collaboration across the entire food production value chain is necessary. The voluntary agreement has over 100 signatories representing manufacturers, retailers, hospitality, and food service sectors, supporting the UK's targets to halve per capita food waste by 2030 and reduce emissions from food and drink by half. Through "cross-chain collaboration" WRAP has improved efficiency at small-scale farms, enhanced supply chain visibility, and engaged with large retailers like Ocado and Premier Foods to launch food waste campaigns targeting their customers. The agreement has been successful, reducing food waste by 8% from 2018 to 2021, equivalent to £62 million in wasted food and 60,000 tonnes of GHG emissions, and increasing surplus food redistribution equivalent to 253 million meals.[13]

Apps like Too Good To Go are bridging the gap between food producers with large amounts of waste and consumers willing to purchase discounted food prior to it reaching the landfill. Launched in Denmark in 2015, the app provides an online marketplace for food that would otherwise be disposed of, helping save over 300 million meals since 2016 and helped partners recoup $980M in revenue. Now used in 19 countries across Europe and North America, with over 95 million users and 160,00 active partners, the app also gives users insight into their environmental impact by reporting emissions avoided from meals saved.[14] This multi-faceted approach benefits all parties involved, however, government initiatives are also needed in addition to consumer engagement and behavioural changes.

These diverse and innovative approaches demonstrate that with coordinated efforts from both the public and private sectors, significant progress can be made in reducing food waste and its impact on climate change.

> ***"Addressing the environmental impacts of food consumption and waste requires a multifaceted approach involving both consumer behavior and systemic changes.***

Conclusion

Addressing the environmental impacts of food consumption and waste requires a multifaceted approach involving both consumer behaviour and systemic changes. The climate change impacts that dietary choices have emphasizes the need for increased awareness and adoption of sustainable eating habits. As awareness and demand for sustainably sourced products grow, coordinated efforts from public and private sectors are crucial in mitigating environmental impacts.

Global strategies, such as South Korea's comprehensive food waste management system, demonstrate the effectiveness of public-private partnerships and government initiatives in reducing food waste. These efforts, combined with innovations in sustainable food production, such as the rise of plant-based and cultivated meat products, are essential for achieving climate goals. The progress made by countries and organizations worldwide underscores the importance of continued investment and collaboration to create a sustainable food system and reduce the overall impact on climate change.

> ***Addressing the environmental impacts of food consumption and waste requires a multifaceted approach involving both consumer behavior and systemic changes.***

Case study: Ocado Retail

Ocado Retail is a dedicated online grocery retailer serving the UK, reaching over 80% of households. This grocery delivery business is a 50:50 joint venture between Marks & Spencer Group and Ocado Group.

Being a grocery retailer, the company has potential exposure to a wide range of carbon-intensive products and unsustainable business practices. However, Ocado is working to combat the negative impacts of its supply chain through sourcing products from companies with sustainable farming practices and improving the carbon-intensity of their product portfolio. The company has sustainable sourcing targets for 2030 or earlier, covering their whole produce, grains, meat, dairy, and seafood.

Ocado is also working to improve efficiency internally and build partnerships externally to help reduce the amount of food waste that stems from their products. The company has targets to reduce food waste from their own operations by 20% by 2025 and halve it by 2030, as well as to redistribute 100% of edible food surplus by 2025. The company is doing this through a mix of partnerships to improve supply chain visibility, such as partnering with suppliers through Manufacture 2030, a platform which helps suppliers measure, improve and communicate their food waste performance. They are also working with consumers to reduce food waste at home through partnership with WRAP, trialing interventions to reduce household food waste and have removed best-before date labels in 64% of their unprepared produce lines.[15]

Furthermore, the company is working to reduce the carbon-intensity of their products through increasing the percentage of plant-based proteins they offer. In 2023 the company set a baseline for reporting their "healthy sustainable diets target", part of which will focus on plant-based products, however, no forward-looking target has been set for increasing plant-based product offerings yet. Lastly, the company has strong carbon reduction targets that are aligned with SBTi's FLAG Guidance, which include emissions from land-use change.

Ocado has set a good example for competitors with regards to reducing food waste and carbon emissions, as well as sustainable sourcing practices. However, they could strengthen their sustainable sourcing targets, especially through including a regenerative agriculture target.

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