



Plant-powered Planet

Building a healthy & sustainable food system



UK Health Alliance
on Climate Change

October 2024

Contents

Acknowledgements	3
Foreword.....	4
Executive Summary.....	5
Part 1 Transforming to healthier, sustainable and environmentally friendly food systems	7
Part 2 Plant-powered healthcare: a system fit for the future	15
Part 3 Why our current food system is bad for our health and the planet	23
References	19, 26

The UK Health Alliance on Climate Change represents health professionals across the UK who are concerned about the threat to health from the climate and nature crisis. A nutritious diet is key to preventing diet-related diseases such as type 2 diabetes, cardiovascular diseases, and certain cancers, while climate change and nature loss present major threats to health and the delivery of health and care services.

As health professionals, it is our duty to encourage our patients to eat healthy food and guide the public and governments on transitioning towards sustainable food systems that can help people lead healthier lives in a world which is thriving with biodiversity and has a stable climate.

Acknowledgements

This policy report has been written based on an analysis of the policy landscape of the UK and evidence synthesised from published scientific literature. It was developed by Anandita Pattnaik (lead author, UKHACC) with contributions from Shireen Kassam (Plant-Based Health Professionals UK), Sue Paterson (Royal College of Veterinary Surgeons), Angeline Taylor (UK Kidney Association), and Elaine Mulcahy (UKHACC). Special thanks to RealZero and the Eating Better Alliance for their valuable insights. Creative design by Tanvi Ranjan.

Find out more: For any questions or queries about this policy report, or to discuss it further, please get in touch: info@ukhealthalliance.org

Stay posted about our work: To register for updates from the UKHACC, go to: <https://action.ukhealthalliance.org/page/69209/subscribe/1>



Foreword

By Dr David Pencheon, *Ambassador (UK Health Alliance on Climate Change)*

Food is probably the most effective way to engage people positively in climate awareness and action; far more effective than starting a climate conversation directly. More people get involved when they feel they have experience, knowledge and agency. We all believe we have all of that with food. Every vision of a fair, joyous, and resilient world has food at its core.

For health professionals, health organisations, and healthcare systems, the confluence of food, health, and a sustainable world is even more profound. Firstly, it is one of the best ways to have a health, climate and nature conversation with colleagues and patients. Secondly, the way we improve how we grow and eat food can deliver many health and social benefits simultaneously: about a quarter of all greenhouse gas emissions globally are caused by the way we produce food; at the same time, what we eat (too much meat, fat, and sugar; too little vegetables, pulses, nuts, and fruit) harms our health and costs our healthcare services too much. **Type II diabetes, much of which is preventable, is already costing the NHS nearly 10% of its entire budget.** Globally, 40% of the world's population is unhealthily overweight, whilst millions still go to bed hungry – not an issue of underproduction but of colonial legacy, exploited growers, and inequitable distribution. Lastly, healthcare systems are large buyers of food and can directly shape future food systems and set influential examples with the public about food, climate and health.

The current global food system has a large part to play in every part of the health and climate crisis: loss of biodiversity, excessive freshwater use, pollution of water supplies by excessive fertiliser runoff, inefficient land use and soil degradation, catastrophic deforestation, unparalleled waste of harvested and prepared food, and the humane welfare of other species. But food is also core to human joy, conviviality, and diversity. The most common route to understanding other cultures and traditions is via food – crucial in developing respect, tolerance and peace – perhaps the most fundamental condition for human health.

There is every reason to see food, and how we change the way we produce and consume it, as one of the key areas of action for improving health, stabilising climate and restoring biodiversity. Health professionals and health organisations are numerous, trusted, networked, articulate, and knowledgeable. To be on the right side of history, we need to fulfil our duty of care to make physical, mental and spiritual health possible for everyone.

Executive Summary

The story of how food is produced and consumed is influenced by dynamically complex social, economic, environmental, and political factors. **Food systems are both driving the climate crisis and nature loss and are also affected by the consequences of these changes.** The food on our plates is linked to our health and the planet's health. Without urgent and significant cuts in greenhouse gas emissions from food systems, the targets of the Paris Agreement cannot be achieved. Transforming our food systems so that they are healthier, sustainable, affordable and efficient would have enormous benefits for society and the planet.

Recommendations to build an NHS and health sector fit for the future



Make plant-based choices the new norm and phase out processed meat in hospitals by 2030

Commit to providing healthy plant-based food as the default option in catering services and completely stop serving processed meat in hospitals through strategic initiatives.

Commit to promoting healthy and sustainable diets

Healthcare institutions, and affiliated stakeholders including Royal Colleges, professional societies and commercially supported conferences, should commit to fully plant-based catering for everyone and promote awareness of the health benefits of such diets.



Cut NHS food waste by 50% by 2030

Mandate the reporting of annual food waste across NHS trusts and develop strategies to reduce waste at the hospital level.

Empower health professionals by boosting plant-based nutrition knowledge

Build the capacity of health professionals such as doctors, nurses and dieticians on the health benefits of plant-based diets and encourage patient conversations to increase awareness.



End financial support to industrial livestock companies.

Switch to green banks and divest from large industrial livestock companies.

Recommendations for the UK government and devolved nations

Drive sustainable agricultural transformation



Support farmers to transition to producing more fruits, vegetables, whole grains, legumes and other horticultural products through effective subsidies, grants and low-interest loans. Implement stronger legislation to regulate and ban intensive livestock farming operations in the UK and ensure UK farmers are not undercut through food imports with lower welfare or environmental standards.

Cut food waste by half by 2030

Reduce food waste by requiring large businesses to report their food waste and ensuring all local councils collect household food waste for recycling every week.



Fuel innovation by investing in a sustainable, plant-powered food future

Invest in research and innovation to create a sustainable and healthy food system, with a significant portion of this funding dedicated to plant-based alternatives.



Develop a new national food strategy with plant-based food at the core

The strategy should promote and support reduced meat and dairy consumption in favour of fruits, vegetables, legumes, whole grains, and nuts. Mandate fortification of plant-based alternatives to ensure nutritional adequacy.



Revolutionise school meals by promoting health and sustainability with plant-based choices for the next generation

Revise national school meal guidelines to emphasise health and environmental benefits. Collaborate across sectors to launch education campaigns for children, introducing plant-based meals and workshops that promote healthy, sustainable habits, guiding future generations to reduce red meat and dairy consumption.



Subsidise and incentivise plant-based choices and cut red meat and dairy by 30% by 2030

Promote the consumption of nutritious fruits, vegetables, whole grains, legumes, and plant-based dairy alternatives in supermarkets, restaurants, and cafes through subsidies and incentives. Aim to reduce red meat and dairy demand by 30% by 2030. A promising strategy includes taxing red meat and using the revenue to subsidise healthier plant-based options.



Part 1

Transforming to healthier, sustainable, and environmentally friendly food systems

The Earth's surface is 29% land and 71% ocean, and out of all the habitable land (71%) about 50% is used for agriculture. Farm animals and crops to feed them comprise 77% of the total agricultural land and supply only 18% of calories and 37% of proteins globally.^[1] **In the UK, 85% of farmed land is used to raise animals for food, but only about 18% of the calorie supply is provided through meat and dairy.**^[1] Animals eat much more food than the amount of protein and calories they produce, making their consumption energy inefficient.^[2]

On average, plant-based proteins produce 70 times less greenhouse gases and use 150 times less land than a similar amount of beef.^[1] In 2021, 48kg of red meat per person per year was supplied in the UK, which is almost twice the amount recommended by the Eatwell Guide.^[3]

Modern agricultural practices have revolutionised food production to increase yield by using new breeds of crops, new irrigation techniques, chemical fertilisers and pesticides to feed 8 billion humans. However, these intensive farming methods are vulnerable. For example, monocultures (i.e. growing a single type of crop, mainly used to feed livestock) are more prone to diseases, attack from different insects, and are sensitive to climate-related events.^[1] Air pollutants like ozone, global heating, and climate-related extreme weather events are leading to crop losses.^[4] Further, farmers are at risk of heat-related illnesses such as exhaustion, heat stroke and kidney diseases due to increasing temperature rises.^[5]

Globally, there is growing hunger and undernutrition in vulnerable population groups. In 2021, 828 million people were impacted by hunger.^[6] **In June 2024 reportedly 7.2 million adults (13.6% of households) in the UK experienced food insecurity.**^[7] The consequences of climate and nature crises further threaten this scarcity of nutritional food. For example, supply chain breakages and crop failures due to extreme weather events result in higher prices of food. This in turn contributes to rises in the cost of living and exacerbates social inequities within and between countries.^[8]

The transition to a plant-based food system also has latent carbon mitigation potential. For instance, **moving away from animal farming can free up 75% of farmland globally and in the UK, which can be returned to nature and used to store carbon.**^[9] One estimate suggests that the carbon storage possible in the freed-up farmlands is the equivalent of 16 years' worth of fossil fuel emissions.^[10] Urgent cuts in food system emissions are essential to meet the Paris Agreement's goal of limiting global temperature rise to 1.5°C.



Actions that can maximise the health co-benefits

Our food systems need to meet global food demand and transform from carbon emitters to carbon sinks and from destroyer to protector of biodiversity; all at the same time. There is robust evidence to keep the food system within planetary boundaries by adopting the Planetary Health diet recommended by the EAT-Lancet Commission. This initiative could prevent 11 million premature deaths per year in adults globally.^[11] Around the world in regions known as Blue Zones, where people live beyond 100 years of age, there is the common practice of eating 95–100% plant-based foods. There is strong evidence from decades of scientific studies, that eating predominantly plant-based whole foods and reducing meat and dairy consumption can help us lead healthy long lives.^[12] The beauty of this way of eating is that it is adaptable to all cultural and traditional eating patterns and can be designed to be free of common food allergens.

While it is possible to achieve limited reductions in greenhouse gas emissions and increase productivity through innovations in animal farming, a transition to a predominantly plant-based diet and a just phase-out of animal agriculture would help achieve half of the greenhouse gas (GHG) emission reductions needed to achieve the Paris Agreement targets and freeze global rise of temperature for 30 years. It would also enable the regeneration, restoration and protection of biodiversity and reap maximum health benefits.^[13] Out of this, 90% of the benefits can be achieved by eliminating ruminant animals from animal farming.

What is a Plant-based Diet?

When we say plant-based diet (or whole-food plant-based diet), we are referring to the EAT-Lancet Planetary Health Diet. It emphasises a plant-forward diet where whole grains, fruits, vegetables, nuts and legumes comprise more than 85% of the calories consumed per day (2500kcal/day/adult).^[11] Meat and dairy would be a very small proportion of the diet, if at all.

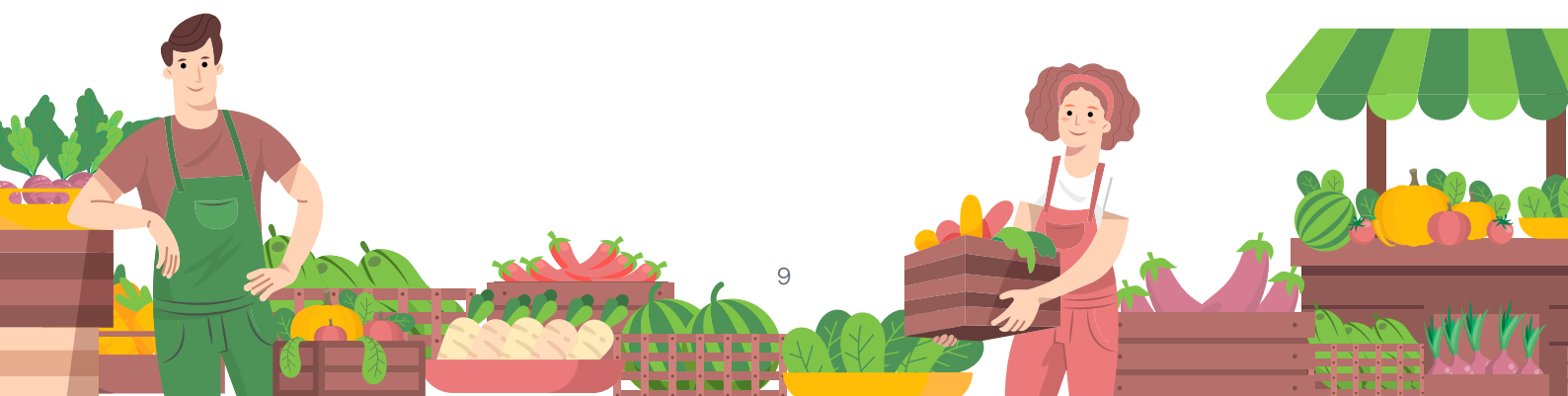


Supporting farmers switch to growing more fruits, vegetables, whole grains, legumes, and other plants

A recent report by the World Wildlife Fund found that **40% of the UK's agricultural land is used to grow food for livestock instead of people.**^[14] Furthermore, the UK imports huge amounts of low-cost soya to feed the farm animals which drives the destruction of biodiversity-rich ecosystems such as the rainforests and grasslands in Brazil.^[14] While around 78% of fruits and vegetables are imported from abroad, many of which are from climate-vulnerable countries.^[15]

In the UK intensive livestock farming operations have been reportedly increasing and there were more than 1000 such livestock farms in 2022.^[16] Of all UK farm animals, 85% are factory farmed.^[17] While intensive farming for pigs and poultry is defined based on the size of the farm and the number of animals in it, there is no formal definition for what constitutes intensive farms for cattle. There is a need for reforms to the permitting system and stronger regulations that ban the set-up of such animal farms and ensure the closure of existing ones.^[18] It is also important to recognize that the **UK imports more meat than it exports to meet national demands, underscoring the urgent need for a significant reduction in consumption.** Additionally, there are concerns about the welfare and environmental standards of these imported animal products.^[19]

The UK Government currently distributes subsidies to farmers for sustainable farming, reducing on-farm emissions, improving animal health, and conserving and restoring biodiversity and nature through the Environmental Land Management (ELM) scheme for farmers in England.^[20] Over the next three years, the plan is to phase out the previous direct payment which was proportionate to the area of farmlands, most of which were agricultural land dedicated to livestock farming. While the ELM schemes aim to promote a thriving natural ecosystem within the country, there is no consideration of the harm to wildlife internationally due to imported food. Further, the Horticulture Strategy which would have provided a blueprint for supporting the production and consumption of British-grown fruits and vegetables was abandoned in 2023 by the Department for Environment, Food and Rural Affairs (DEFRA). This decision must be reconsidered by the UK government as agricultural policies need to incentivise, subsidise and increase the production of plants for human consumption in order to reduce the costs of healthy and nutritious food for people while ensuring better food security. A study has found that **subsidisation could increase fruit and vegetable consumption by 55g a day on average and reduce diet-related mortality in 2030 by 444,000 fewer deaths.**^[21] Without an increase in homegrown fruits, vegetables, whole grains, nuts and legumes there is a risk that consumption of unhealthy diets might continue to rise.





Recommendation

Drive sustainable agricultural transformation.

Support farmers to transition to producing more fruits, vegetables, whole grains, legumes and other horticultural products through effective subsidies, grants and low-interest loans. Implement stronger legislation to regulate and ban intensive livestock farming operations in the UK and ensure UK farmers are not undercut through food imports with lower welfare or environmental standards. ^[18,19,21,22]



Reducing food waste through reporting and recycling

In the UK, about 33% of the food waste is at the farm level and of the remaining about 70% of food waste is at the household level.^[1] The UK Government has committed to reducing the 2007 food wastage level by 50% by 2030 and recent reports suggest half of this target has been achieved.^[1] The Scottish Government pledged to reduce the nation's food waste by 33% by 2025, but with slow progress, the target will most likely be missed.^[23] The Welsh Government has already mandated local authorities to collect household food waste once a week to recycle it and produce biogas and biofertilizers which can be used to organically power houses and farms, respectively.^[24] It has been proposed that all local councils in England will be doing the same by April 2026.^[25] In a bid to reduce food wastage, UK supermarkets are removing "best before" and "use by" labels.^[26] Innovative start-ups like 'Too Good To Go' are enabling restaurants and shops to sell their surplus food at a reduced price to consumers to help fight food waste.^[27] Similarly, other organisations are tackling food waste at the farm level by selling fruits and vegetables that do not make it to the retail market for various reasons such as small size, or unusual shape or colour.^[28] However, schemes like multi-buy and other promotional offers lead consumers to buy more than necessary which often results in higher household food waste.^[1]

A combination of reduction in food waste and change in dietary behaviour can result in both climate mitigation and adaptation action; due to a significant decrease in GHG emissions and reduced pressure on land and water. It would also reap benefits for human health, and ensure sustainable development and food security.^[29]





Recommendation



Cut food waste by half by 2030.

Reduce food waste by requiring large businesses to report their food waste and ensuring all local councils collect household food waste for recycling every week.^[30]

Shifting consumer trends towards making health-conscious and sustainable choices

Invest in research and innovation

The food one eats can be very personal and emotive, and tied to our social identity in various ways.^[31] The meat industry has been feeding into such ideologies through its marketing campaigns in addition to lobbying governments to prevent the implementation of policies targeted at reducing meat and transitioning to plant-based options.^[31–33]

In the UK, there is a growing demand for plant-based alternatives, which currently imports one-third of its plant-based alternatives from Europe. There is an opportunity for the UK to produce such plant-based products locally, which would reduce the costs of the goods while creating and securing new jobs.^[1] Plant-based milk products such as soya, oat, almond, rice and coconut milk have become increasingly popular, with 1 in 10 people consuming them every day.^[34]

Swift action is needed by leaders to demonstrate green ambition by investing in research and innovation to develop healthy and sustainable plant-based alternatives and further understand their health and environmental implications. **The National Food Strategy has recommended that £1 billion needs to be invested in innovation to create a better and sustainable food system and make the UK the world's most innovative nation by 2035.**^[1]



Recommendation

Fuel innovation by investing in a sustainable, plant-powered food future.

Invest in research and innovation to create a sustainable and healthy food system, with a significant portion of this funding dedicated to plant-based alternatives.^[1]



A strategic framework for shifting consumer trends

Consumption of plant-based whole-food diets is associated with benefits for health, climate and nature. UK citizens eat four times as much meat as recommended by EAT-Lancet.^[1] Adopting a fully plant-based diet has the greatest environmental benefit, regardless of where and how the food is produced.^[35] Even if everyone goes meat-free for just two days a week it would result in a 30% reduction in meat consumption. This could offset almost the entire global aviation emission, free up a carbon sink as big as India and save water that could fill 7.5 million Olympic-sized swimming pools in a year.^[36] In addition, there are significant health benefits at the population level. A modelling study showed that **if everyone in England switched to a plant-based diet the monetary savings from improved health and reduction in chronic conditions would result in a saving of £6.7 billion per year which could fund the annual salaries of 60,923 consultant doctors.**^[37,38]

A systemic transformation is necessary to reduce the consumption of red meat and dairy while increasing the uptake of fruits, vegetables, cereals, legumes and nuts. This transition would drastically reduce land, water usage and GHG emissions and improve air quality, biodiversity and health.^[13]

After the recommendations from the independent review of the national food strategy by Henry Dimbleby, the previous UK government published an updated strategy in 2022.^[39] However, it fails to make any meaningful change and falls short of outlining a whole systems approach to making food from production to supply to consumption more sustainable, efficient and healthy by transitioning to a predominantly plant-based food system that could reap maximum health and environmental benefits. The UK needs a new food systems framework that prioritises plant-based foods to ensure better health, environment, and economic outcomes in the long term. For example, the Danish government has published the world's first Danish Action Plan for Plant-Based Food to ensure the provision of healthy and tasty plant-based food for all.^[40] **In the UK, Edinburgh has become the first city to develop the Plant-Based Treaty Action Plan which aims to help improve access to plant-based foods for residents and visitors.**^[41] These initiatives are vital as eventually, food demand dictates the supply.

As demand shifts, it is essential to ensure that nutritional needs are met. And for that, policies to mandate consistent fortification of milk alternatives with essential vitamins and minerals to ensure dietary requirements are achieved are necessary as the burden of opting for fortified items currently falls on individuals. Presently, the UK government has no specific guidance for the fortification of plant-based meat alternatives.



Recommendation



Develop a new national food strategy with plant-based food at the core.

The strategy should promote and support reduced meat and dairy consumption in favour of fruits, vegetables, legumes, whole grains, and nuts. Mandate fortification of plant-based alternatives to ensure nutritional adequacy.

A healthy start for school children

The provision of information on the environmental and health harms of eating meat to adult consumers has not succeeded in influencing behaviour change.^[42] Enabling school-aged children who are in their early formative years to adopt healthy and sustainable food choices through education, provision of plant-based school meals, and including plant-based cooking lessons has the potential for large-scale dietary shifts.^[43] According to the standards for school meals, lunches at school should have at least one portion of fruit and vegetables in England and at least two portions of vegetables and one portion of fruit in Scotland and Wales and all these guidelines encourage the provision of meat and poultry in the school meals with some restrictions to red meat and processed meat.^[44–46] These guidelines need to be reviewed and updated to promote predominantly plant-based meals along with the substitution of red meat and processed meat ideally with plant-based sources of protein, but using locally sourced poultry and seafood wherever necessary. Successful initiatives such as ProVeg UK's School Plates help improve the health of school children and the planet while cutting costs.^[47]



Recommendation

Revolutionise school meals by promoting health and sustainability with plant-based choices for the next generation.

Revise national school meal guidelines to emphasise health and environmental benefits. Collaborate across sectors to launch education campaigns for children, introducing plant-based meals and workshops that promote healthy, sustainable habits, guiding future generations to reduce red meat and dairy consumption.^[43]



Providing support to increase demand for healthy, nutritious food

High-income countries such as the UK can promote and incentivise the intake of plant-based food and cut down on red meat consumption as this would shift the demand towards low-carbon, healthier options. This could have a global impact as agricultural emissions from lower and middle-income countries are due to the high demand for animal-source foods.^[48]

Food consumption can be influenced by ensuring that food prices include the environmental and health costs borne by society. Taxation of red meat (similar to the sugar tax but based on the level of environmental impacts) and redirecting the revenues into subsidising fruits, vegetables and plant-based alternatives could be a strategic solution to drive consumer preferences away from unhealthy and unsustainable animal protein. This would also influence manufacturers to reduce red meat portions in different food items such as ready-to-eat meals to reduce costs. Studies have shown that such taxation of only meat products can reduce GHG emissions by 18% while improving health outcomes.^[49] While many believe such taxation is politically impossible, there are examples from around the world where this could soon become a reality. For example, Denmark has approved an agricultural tax as a part of its commitment to reach climate goals where from 2030 each tonne of CO₂ emitted will cost €16 and this would increase to €40 by 2035; which means each cow would incur a tax of up to £80 per year.^[50] It has managed to do so by taking different stakeholders, including farmers, on board.



Recommendation



Subsidise and incentivise plant-based choices and cut red meat and dairy by 30% by 2030.

Promote the consumption of nutritious fruits, vegetables, whole grains, legumes, and plant-based dairy alternatives in supermarkets, restaurants, and cafes through subsidies and incentives. Aim to reduce red meat and dairy demand by 30% by 2030. A promising strategy includes taxing red meat and using the revenue to subsidise healthier plant-based options.^[151]

Part 2

Plant-powered healthcare: a system fit for the future

Food served in hospitals and healthcare institutions (such as the royal colleges, professional societies and commercial conferences) should contribute to the health of the people and not deteriorate it. However, despite the health harms of red meat and processed meat, these food products continue to be served in NHS hospitals and healthcare institutions to patients, staff and visitors. To build an NHS fit for the future it is essential to transform the food that is served in hospitals and healthcare institutions and make it healthy and sustainable.

In 2018–19 about 14 million kgs of unserved meals were thrown away from NHS hospitals in the UK. An estimated 39% of the annual food budget is lost due to hospital food waste (£230 million). But this is an underestimate as only 52 NHS trusts out of a total of 227 record their food waste data.^[52] Annual reporting of food waste needs to be undertaken by all healthcare institutes to help identify the total contribution and ways to reduce wastage. Dumping of food waste in landfills further contributes to GHG emissions, especially methane.

There have been many successful initiatives around the world where hospitals have set examples of how food can make both people and the planet healthy. For example, all public hospitals in New York, USA have been serving plant-based menus as the default option for their inpatients since March 2022, and apart from the health benefits it has led to a 36% reduction in carbon emissions, cost savings of \$708,000 and >90% reported patient satisfaction.^[53–55] This is a ‘Greener by Default’ initiative which means making plant-based the default while giving diners the choice to opt into meat/dairy.^[56] It is a strategic practice that ensures freedom of choice is maintained and takes into account that patients with special dietary requirements are not restricted. **In the UK, a study found more than 78% of inpatients were in favour of removing processed red meat from hospital food menus.**^[57] A modelling study found that serving only meat-free meals in public catering could save the NHS £74 million a year and this saving can be increased to £2.2 billion per year if everyone had a meat-free lunch five days a week.^[58]

‘Greener by Default’ Initiative and New York Hospitals ^[53–56]

Greener by Default makes plant-based food the default, while giving diners the choice to opt into meat/dairy. This strategy allows institutions to meet carbon reduction goals, save on food costs, and improve health and inclusivity, all while preserving freedom of choice and taking into account that patients with special dietary requirements are not restricted. In a groundbreaking move, all public hospitals in New York, USA, have been offering plant-based menus as the default option for their inpatients since March 2022. This initiative has not only promoted significant health benefits but also led to:

36%
reduction in
carbon emission

\$708,000
cost savings

>90%
reported patient
satisfaction

The UK Health Alliance on Climate Change has a list of 11 commitments outlined for healthcare institutions to demonstrate leadership by taking appropriate climate action. One of the commitments emphasises the need to prioritise plant-based and sustainably sourced foods.^[59] Healthcare institutions such as the Royal College of Emergency Medicine are leading the way in carving the pathway for a plant-based future by removing red meat and ensuring that a plant-based option (with the aim to increase such options) is always offered on all their menus.^[60] Furthermore, as healthcare organisations are increasingly committing to divest from fossil fuels it is imperative that they pledge to divest from the big meat industry. **The top 5 meat companies together emit more greenhouse gases per year than the whole of the UK and Ireland combined.**^[61]



Recommendation

Make plant-based choices the new norm and phase out processed meat in hospitals by 2030.

Commit to providing healthy plant-based food as the default option in catering services and completely stop serving processed meat in hospitals through strategic initiatives by 2030.



Suggested activities to achieve outcome:



Co-development of a structural framework toward making hospital food healthy and predominantly plant-based by the Department of Health and Social Care and Greener NHS.



Mapping of strategic initiatives in place in different hospitals within the UK to promote plant-based food and dairy alternatives and remove red meat and processed meat from menus.



Putting innovative strategies in place such as replanning menus and making plant-based food the default option.



Prioritise plant-based cooking training at NHS Chef's Academy.



Demonstrate this commitment by signing the Plant-Based Treaty.

Plant-based Treaty^[62]



The Plant-Based Treaty is a grassroots-level initiative creating bottom-up pressure for the negotiation of a global Plant-Based Treaty as a companion to the UNFCCC Paris Agreement. Modelled on the Fossil Fuel Treaty, the Plant Based Treaty aims to put food systems at the forefront of combating the climate crisis to halt the widespread degradation of critical ecosystems caused by animal agriculture and to promote a shift towards healthier, sustainable plant-based diets.



Recommendation



Commit to promoting healthy and sustainable diets.

Healthcare institutions, and affiliated stakeholders including Royal Colleges, professional societies and commercially supported conferences, should commit to fully plant-based catering for everyone and promote awareness of the health benefits of such diets.

Suggested activities to achieve outcome:



Ensure plant-based catering for visitors, staff and at their conferences.



Promote awareness of the health benefits of plant-based food amongst their members through newsletters and other channels.



Recommendation

Cut NHS food waste by 50% by 2030.

Mandate the reporting of annual food waste across NHS trusts and develop strategies to reduce waste at the hospital level.

Suggested activities to achieve outcome:



Auditing and reporting of food waste in all hospitals across the NHS trusts in the UK.



Conducting food waste hospital audits to identify scopes for improving and implementing strategies to reduce food waste.



Introduction of food waste reduction schemes such as redirecting the surplus for the staff and donations to food banks or shelter homes.



Recommendation

Empower health professionals by boosting plant-based nutrition knowledge.

Build the capacity of health professionals such as doctors, nurses and dieticians on the health benefits of plant-based diets and encourage patient conversations to increase awareness.

Suggested activities to achieve outcome:



Dedicated funding to implement the guidance outlined around healthy sustainable diets in the Education For Sustainable Healthcare and UK Undergraduate Curriculum In Nutrition for Medical Doctors.^[63,64]



Training of health professionals to increase knowledge of the advantages of plant-based diets.^[65]



Form a committee of health professionals to amend the curriculum of students to incorporate the evidence base of plant-based food, as outlined in the education for sustainable healthcare curriculum for the UK medical schools.^[63]



Recommendation

End financial support to industrial livestock companies.

Suggested activities to achieve outcome:



Switch to green banks that do not fund industrial livestock companies.



Divest from big meat companies, beginning with the 55 industrial livestock companies named in the “Still Butchering the Planet” report.^[61]

References

1. The National Food Strategy – The Plan. 2021 Jul. Available: <https://www.nationalfoodstrategy.org/>
2. ClimateFoodGuide.org. Climate-Friendly Food Guide – celebrating the joys and benefits of plant-based foods. Available: <https://awellfedworld.org/wp-content/uploads/ClimateFoodGuide-2023.pdf>
3. Ritchie H, Rosado P, Roser M. Meat and Dairy Production. Our World in Data. 2017 [cited 31 May 2023]. Available: <https://ourworldindata.org/meat-production>
4. Air pollution and food production. [cited 19 Mar 2024]. Available: <https://unece.org/air-pollution-and-food-production>
5. El Khayat M, Halwani DA, Hneiny L, Alameddine I, Haidar MA, Habib RR. Impacts of Climate Change and Heat Stress on Farmworkers’ Health: A Scoping Review. *Front Public Health*. 2022;10: 782811. doi:10.3389/fpubh.2022.782811
6. FAO, IFAD, UNICEF, WFP and WHO. The State of Food Security and Nutrition in the World 2023. FAO; IFAD; UNICEF; WFP; WHO; 2023. doi:10.4060/cc3017en
7. Food Insecurity Tracking. [cited 31 Jul 2024]. Available: <https://foodfoundation.org.uk/initiatives/food-insecurity-tracking#tabs/Round-15>
8. Food and Agriculture Organisation of the UN. The State of Food and Agriculture 2023: Revealing the true cost of food to transform agrifood systems. 2023. doi:10.4060/cc7724en
9. Ritchie H. If the world adopted a plant-based diet, we would reduce global agricultural land use from 4 to 1 billion hectares. Our World in Data. 2024 [cited 26 Apr 2024]. Available: <https://ourworldindata.org/land-use-diets>
10. Hayek MN, Harwatt H, Ripple WJ, Mueller ND. The carbon opportunity cost of animal-sourced food production on land. *Nature Sustainability*. 2020;4: 21–24. doi:10.1038/s41893-020-00603-4
11. Willett W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S, et al. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *Lancet*. 2019;393: 447–492. doi:10.1016/S0140-6736(18)31788-4
12. Food Guidelines. In: Blue Zones [Internet]. 30 Jul 2016 [cited 28 May 2024]. Available: <https://www.bluezones.com/recipes/food-guidelines/>
13. Eisen MB, Brown PO. Rapid global phaseout of animal agriculture has the potential to stabilize greenhouse gas levels for 30 years and offset 68 percent of CO2 emissions this century. *PLOS Climate*. 2022;1: e0000010. doi:10.1371/journal.pclm.0000010

14. World Wildlife Fund. The Future of Feed: How low opportunity cost livestock feed could support a more regenerative UK food system. 2022. Available: https://www.wwf.org.uk/sites/default/files/2022-06/future_of_feed_full_report.pdf
15. UK Health Security Agency. Climate change: health effects in the UK. 2012 Sep. Available: <https://www.gov.uk/government/publications/climate-change-health-effects-in-the-uk>
16. Wasley A. UK has more than 1,000 livestock mega-farms, investigation reveals. The Guardian. 18 Aug 2022. Available: <https://www.theguardian.com/environment/2022/aug/18/uk-has-more-than-1000-livestock-mega-farms-investigation-reveals>. Accessed 26 Apr 2024.
17. Factory Farming Map. [cited 11 Jul 2024]. Available: <https://www.ciwf.org.uk/our-campaigns/factory-farming-map/>
18. Permitting Reform: Reducing Environmental Damage from Intensive Livestock Farms. Wildlife and Countryside Link ; 2024 Jun. doi:10.3389/fsufs.2022.1012691/full
19. UK Trade Policy & Animal Welfare. ResPublica; 2022. Available: <https://www.respublica.org.uk/wp-content/uploads/2022/07/UK-Trade-Policy-Animal-Welfare.pdf>
20. Funding for farmers, growers and land managers. In: GOV.UK [Internet]. [cited 20 Mar 2024]. Available: <https://www.gov.uk/guidance/funding-for-farmers>
21. Springmann M, Freund F. Options for reforming agricultural subsidies from health, climate, and economic perspectives. *Nat Commun.* 2022;13: 82. doi:10.1038/s41467-021-27645-2
22. Harwatt H, Hayek MN, Behrens P, Ripple WJ. Options for a Paris compliant livestock sector. Timeframes, targets and trajectories for livestock sector emissions from a survey of climate scientists. Harvard Law School; 2024. Available: <https://animal.law.harvard.edu/wp-content/uploads/Paris-compliant-livestock-report.pdf>
23. Chapter 2. Our actions to deliver a circular economy. [cited 21 Aug 2024]. Available: <https://www.gov.scot/publications/scotlands-circular-economy-waste-route-map-2030-consultation/pages/4/>
24. How can recycled food waste create energy? [cited 22 Mar 2024]. Available: <https://www.walesrecycles.org.uk/how-can-recycled-food-waste-create-energy>
25. Smith L. Household waste collection in England and Wales: FAQs. 2023 [cited 25 Mar 2024]. Available: <https://commonslibrary.parliament.uk/household-waste-collection-in-england-and-wales/>
26. Masterson V. UK supermarkets scrap “best before” dates to cut food waste. In: World Economic Forum [Internet]. 17 Aug 2022 [cited 20 Mar 2024]. Available: <https://www.weforum.org/agenda/2022/08/waitrose-scrap-best-before-dates-cut-food-waste/>
27. Join Our Food Waste Movement. [cited 20 Mar 2024]. Available: <https://www.toogoodtogo.com/en-gb>
28. Our Mission. [cited 25 Mar 2024]. Available: <https://www.oddbox.co.uk/why>
29. IPCC, Masson-Delmotte V, Zhai P, Tabatabaei M. Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above. unknown; 2018. doi:10.1017/9781009157940
30. Sixth Carbon Budget. In: Climate Change Committee [Internet]. Committee on Climate Change; 9 Dec 2020 [cited 22 Mar 2024]. Available: <https://www.theccc.org.uk/publication/sixth-carbon-budget/>
31. Sievert K, Lawrence M, Parker C, Baker P. Understanding the Political Challenge of Red and Processed Meat Reduction for Healthy and Sustainable Food Systems: A Narrative Review of the Literature. *Int J Health Policy Manag.* 2021;10: 793–808. doi:10.34172/ijhpm.2020.238
32. Carter N. Harvesting Denial, Distractions, & Deception: Understanding Animal Agriculture’s Disinformation Strategies and Exploring Solutions. Freedom Food Alliance; 2024 Feb. Available: <https://www.freedomfoodalliance.org/thereport>
33. The New Merchants of Doubt: How Big Meat and Dairy Avoid Climate Action. Changing Markets Foundation ; 2024 Jul. Available: <https://changingmarkets.org/report/the-new-merchants-of-doubt-how-big-meat-and-dairy-avoid-climate-action/>

34. Plant Milk. In: Issuu [Internet]. 29 Feb 2024 [cited 27 Jun 2024]. Available: https://issuu.com/hubbubuk/docs/plant_milk_polling_headlines_hubbub_2024
35. Scarborough P, Clark M, Cobiac L, Papier K, Knuppel A, Lynch J, et al. Vegans, vegetarians, fish-eaters and meat-eaters in the UK show discrepant environmental impacts. *Nat Food*. 2023;4: 565–574. doi:10.1038/s43016-023-00795-w
36. Kuepper B. Impacts of a Shift to Plant Proteins – Effects of reduced meat production on GHG emissions, land, and water use. 2023 Nov. Available: <https://profundo.nl/download/impacts-of-reduced-meat-consumption-2311>
37. Henderson N, Sampson C. The impact of higher uptake of plant-based diets in England: model-based estimates of health care resource use and health-related quality of life. *medRxiv*. 2023. p. 2023.12.26.23300536. doi:10.1101/2023.12.26.23300536
38. Pay scales for consultants in England. In: The British Medical Association is the trade union and professional body for doctors in the UK. [Internet]. British Medical Association; 27 Sep 2019 [cited 29 Feb 2024]. Available: <https://www.bma.org.uk/pay-and-contracts/pay/consultants-pay-scales/pay-scales-for-consultants-in-england>
39. Government food strategy. In: GOV.UK [Internet]. [cited 28 Mar 2024]. Available: <https://www.gov.uk/government/publications/government-food-strategy/government-food-strategy>
40. Action Plan on Plant-Based Foods. In: Ministeriet for Fødevarer, Landbrug og Fiskeri [Internet]. [cited 28 Mar 2024]. Available: <https://en.fvm.dk/focus-on/action-plan-on-plant-based-foods>
41. The City of Edinburgh Council. Plant-Based Treaty Action Plan. [cited 2 Apr 2024]. Available: <https://democracy.edinburgh.gov.uk/documents/s65215/Item%207.2%20-%20Plant%20Based%20Treaty%20Action%20Plan.pdf>
42. Bianchi F, Dorsel C, Garnett E, Aveyard P, Jebb SA. Interventions targeting conscious determinants of human behaviour to reduce the demand for meat: a systematic review with qualitative comparative analysis. *Int J Behav Nutr Phys Act*. 2018;15: 102. doi:10.1186/s12966-018-0729-6
43. Roque L, Graça J, Truninger M, Guedes D, Campos L, Vinnari M, et al. Plant-based school meals as levers of sustainable food transitions: A narrative review and conceptual framework. *Journal of Agriculture and Food Research*. 2022;10: 100429. doi:10.1016/j.jafr.2022.100429
44. School food standards practical guide. In: GOV.UK [Internet]. [cited 1 May 2024]. Available: <https://www.gov.uk/government/publications/school-food-standards-resources-for-schools/school-food-standards-practical-guide>
45. Welsh Government. Healthy eating in maintained schools: Statutory guidance for local authorities and governing bodies. 28 Sep 2022. doi:10.5380/ce.v27i0.87400
46. Section 3: Food and Drink standards for primary schools. [cited 1 May 2024]. Available: <https://www.gov.scot/publications/healthy-eating-schools-guidance-2020/pages/4/>
47. ProVeg School Plates Programme. In: ProVeg UK [Internet]. 4 Apr 2022 [cited 21 May 2024]. Available: <https://proveg.com/uk/school-plates-programme/>
48. Sutton WR, Lotsch A, Prasann A. Recipe for a Livable Planet: Achieving Net Zero Emissions in the Agrifood System. World Bank; Available: <https://openknowledge.worldbank.org/entities/publication/406c71a3-c13f-49cd-8f3f-a071715858fb>
49. Pinto RL. The effects of introducing a carbon-meat tax in the EU: a literature review. *unio*. 2021;7: 106–123. doi:10.21814/unio.7.2.4033
50. Denmark agrees carbon tax on agriculture. [cited 27 Jun 2024]. Available: <https://www.britishtagsgriculturebureau.co.uk/updates-and-information/denmark-agrees-carbon-tax-on-agriculture/>
51. Goudie S. The Broken Plate 2023: The State Of The Nation's Food System. The Food Foundation; Available: https://foodfoundation.org.uk/sites/default/files/2023-06/TFF_The%20Broken%20Plate%202023_DigitalFINAL_1.pdf

52. Shelley CP. Report of the independent review of NHS hospital food. [cited 29 Feb 2024]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/929234/independent-review-of-nhs-hospital-food-report.pdf
53. NYC Health + Hospitals Now Serving Plant-Based Meals as Primary Dinner Option for Inpatients At All of Its 11 Public Hospitals - NYC Health + Hospitals. In: NYC Health + Hospitals [Internet]. 9 Jan 2023 [cited 19 Mar 2024]. Available: <https://www.nychealthandhospitals.org/pressrelease/nyc-health-hospitals-now-serving-plant-based-meals-as-primary-dinner-option-for-inpatients-at-all-of-its-11-public-hospitals/>
54. NYC Health + Hospitals Celebrates 1.2 Million Plant-Based Meals Served - NYC Health + Hospitals. In: NYC Health + Hospitals [Internet]. 14 Mar 2024 [cited 19 Apr 2024]. Available: <https://www.nychealthandhospitals.org/pressrelease/nyc-health-hospitals-celebrates-1-2-million-plant-based-meals-served/>
55. Babich JS, McMacken M, Correa L, Polito-Moller K, Chen K, Adams E, et al. Advancing Lifestyle Medicine in New York City's Public Health Care System. *Mayo Clinic Proceedings: Innovations, Quality & Outcomes*. 2024;8: 279–292. doi:10.1016/j.mayocpiqo.2024.01.005
56. Greener by Default. In: Greener by Default [Internet]. [cited 27 Jun 2024]. Available: <https://www.greenerbydefault.com/>
57. Truman M, Smith L-J, Kassam S. Attitudes of hospital patients regarding removal of processed and unprocessed red meats from menus to support sustainable healthcare targets: A single-centre survey. *Lifestyle Med*. 2023;4. doi:10.1002/lim2.87
58. Stileman S. The £2.2 billion windfall for the NHS: New research reveals how the UK could unlock savings. [cited 19 Apr 2024]. Available: <https://www.conservativeanimalwelfarefoundation.org/plant-based-diet/the-2-2-billion-windfall-for-the-nhs-new-research-reveals-how-the-uk-could-unlock-savings/>
59. Our commitments. In: UK Health Alliance on Climate Change [Internet]. [cited 24 May 2024]. Available: <https://ukhealthalliance.org/about/our-commitments/>
60. Climate and Health Scorecard. Royal College of Emergency Medicine. Available: https://f1f53af9-10a6-48cc-b6e9-e1d632f27836.filesusr.com/ugd/6441ef_1768bd6975fe46f0ba0be421ecf6b576.pdf
61. Still Butchering The Planet. Feedback; 2024 Mar. Available: <https://feedbackglobal.org/wp-content/uploads/2024/03/Feedback-2024-Still-Butchering-the-Planet-Report.pdf>
62. The Plant Based Treaty - Plant Based Treaty. In: Plant Based Treaty - The Plant Based Treaty - Eat Plants, Plant Trees [Internet]. Plant Based Treaty; 27 May 2021 [cited 1 Aug 2024]. Available: <https://plantbasedtreaty.org/the-pbt/>
63. Tun SYM, Martin T. Education for Sustainable Healthcare - A curriculum for the UK. Medical Schools Council; 2022. Available: https://www.medschools.ac.uk/media/2949/education-for-sustainable-healthcare_a-curriculum-for-the-uk_20220506.pdf
64. Nutrition Training For Medical Doctors. In: Association for Nutrition [Internet]. [cited 28 Jun 2024]. Available: <https://www.associationfornutrition.org/careers-nutrition/wider-workforce/nutrition-training-for-medical-doctors>
65. Kassam S, Kassam Z, Rd LS. Plant-Based Nutrition in Clinical Practice. In: Hammersmith Books [Internet]. [cited 21 May 2024]. Available: <https://www.hammersmithbooks.co.uk/product/plant-based-nutrition-in-clinical-practice/>

Part 3: Additional Information

Why our current food system is bad for our health and the planet

As the world grapples with the consequences of climate and ecological crises, the food system provides a unique opportunity to provide effective solutions.

Climate Crisis and Food

The two major drivers of anthropogenic climate change are fossil fuels and food systems.

Of the total global fossil fuel usage per year, about 15% is linked to food production.^[1] Globally, food systems contribute to 30% of the total greenhouse gas emissions (GHG). Of these emissions, about 57% are associated with red meat and dairy (red meat refers to any mammalian meat for human consumption).^[2] In the UK, the agriculture sector was responsible for 11% of the total greenhouse gas emissions in 2020, of which red meat and dairy accounted for more than 70% of food consumption and production-related emissions.^[3] To comply with the Paris Agreement target of limiting global heating to 1.5°C it is critical to cut down emissions from the agricultural sector along with transitioning away from fossil fuels to cleaner sources of energy.^[4,5]

Despite producing enough food to feed 1.5 times the world population, around 1.3 billion tonnes of food is wasted every year, from harvest stages to consumer levels.^[6] Food waste accounts for 50% of the total food-related GHG emissions.^[7] **The UN's Sustainable Development Goal is to reduce global food waste and losses in production and supply by 50% by 2030 which would remove 25% of total food-related greenhouse gas emissions.**^[7] Fruits and vegetables account for only 2.4% of supply-related food waste emissions while meat and dairy products account for 73.4%. In the UK, about 33% of the food waste is at the farm level and of the remaining about 70% of food waste is at the household level.^[8]

Climate-related extreme weather events such as flooding, wildfires, droughts, and storms increase the risk of food insecurity due to food crops being destroyed leading to reduced supply and higher costs. This would aggravate the burden on the lower socioeconomic groups who are already struggling with the cost of living crises and widen preexisting health inequalities.

There is a significant opportunity in the agriculture sector to swiftly reduce non-CO₂ GHG emissions (such as methane and nitrous oxide) which would provide a buffer period for the world to equitably transition away from fossil fuels towards renewable energy.^[9] This is because methane and nitrous oxide decompose relatively rapidly as they have half-lives of 9–12 and 115 years respectively (while carbon released into the atmosphere can stay virtually forever).^[8,10]

The digestive process in ruminant animals like cattle, sheep and goats and their manure is responsible for 32% of all agriculture-related methane emissions.^[11] The decomposition of food waste in landfills also produces significant methane. Methane is responsible for 30% of the total temperature rise we are facing now and with a 42% contribution, the agriculture sector is the largest source of man-made methane.^[9] In addition to being a potent trapper of heat, methane is responsible for the formation of ground-level ozone (a toxic air pollutant that causes over a million premature deaths annually, reduces crop productivity and harms ecosystems).^[11]

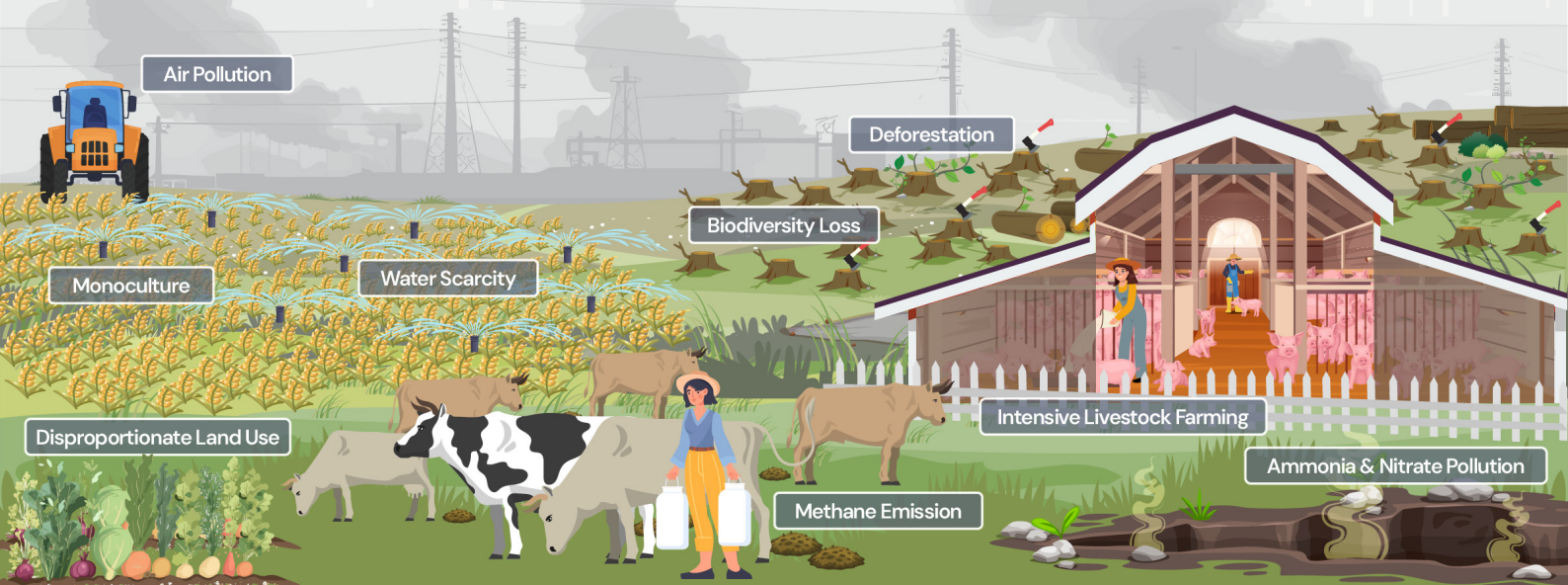
If both meat consumption and food waste are decreased by 50%, global food waste-related emissions can be reduced by 43%.^[7]

Impacts of the food system on the environment

Current food system practices are the primary driver of biodiversity loss due to large-scale deforestation and land use changes leading to habitat destruction. The existence of wildlife is further threatened by climate change-related extreme weather events such as floods, heatwaves, wildfires and droughts. Agricultural use of chemical fertilisers, pesticides, excessive water and manure management is leading to pollution and depletion of water bodies. **The UK is one of the most nature-depleted countries in the world and has the most polluted water bodies in Europe.**^[8,12]

Human life is dependent on nature for everything. Even modern medicine is heavily reliant on nature as it has been a source of essential medications for centuries. A decline in wildlife threatens the procurement and discovery of new drugs.^[8] **In the UK over 14% of native species are facing extinction and over 40% are in decline.**^[12]

Food production contributes to air pollution, with agriculture being the largest producer of ammonia and other nitrogen pollutants, and contributes to ground-level ozone.^[13] Up to 30% of air pollution in UK cities comes from farming, the vast majority from animal agriculture.^[14] Air pollution is linked to multiple health conditions such as respiratory diseases, cardiovascular diseases, dementia, mental health issues, and poor pregnancy outcomes. **In the UK, about 29,000 to 43,000 early deaths are associated with air pollution.**^[15]



Consequences of unhealthy food and unsustainable practices

Today's sedentary lifestyle and unhealthy food intake are leading to a rapid rise in obesity and related diseases around the world. Every 1 in 4 adults and 1 in 5 children in the UK are clinically obese.^[16] The accessibility and affordability of non-nutritious food, often high in trans fats, saturated fat, sugar and salt, is adding to the disease burden. For example, **healthy nutritious foods on average cost £10 for 1,000 calories compared to just £4.45 for 1,000 calories of unhealthy, obesogenic foods.**^[17] This trend is leading to the widening of health inequality as individuals from poor households in deprived socioeconomic areas are twice as likely to be obese and eat 42% less fruits and vegetables than the recommended 5 portions of fruits and vegetables a day.^[18] In the UK in 2020, approximately 70,000 deaths were linked to inadequate consumption of nutritious plant-based foods and nearly 42,000 deaths were associated with overconsumption of dairy, red meat, and processed meat (meat that has undergone processes to enhance either flavour or shelf life).^[3]

Excessive consumption of diets rich in red meat, especially processed, is associated with an increased risk of type 2 diabetes, cardiovascular diseases, dementia and several cancers.^[19–21] The World Health Organization has classified both processed meat (group 1, which is in the same category as tobacco and asbestos) and red meat (group 2A) as carcinogens.^[22] For reference, **the Eatwell Guide recommends limiting to 70 grams of red or processed meat a day which is roughly equivalent to ½ a patty of a burger or 1½ pork sausages.**^[23]

Plant-based foods are low in saturated fat, do not contain cholesterol and are the only source of fibre, which is essential to reduce the risks of heart disease, stroke, type 2 diabetes and bowel cancer. Adults require 30 grams of fibre per day but on average only 20 grams of fibre per day is consumed in the UK. NHS England recommends promoting initiatives to increase dietary fibre.^[24]

There is growing evidence of the health benefits of plant-based meat alternatives as compared to the consumption of red meat and they are also becoming increasingly popular despite concerns about them being ultraprocessed. Studies have found several beneficial effects on cardiovascular health and no adverse effects from replacing plant-based meats with red meat in diets.^[25,26] There are also concerns about obtaining the required amounts of essential nutrients such as protein, calcium, iron, iodine and vitamin B12 when consuming plant-based food. However, the daily requirement for all of these can be achieved by incorporating a variety of nuts, legumes, whole grains, fruits and vegetables in the diet along with regular supplementation of vitamin B12 and ensuring consumption of fortified foods.

The overuse of antibiotics to control diseases in farm animals has resulted in growing antimicrobial resistance, which contributed to 4.95 million deaths globally in 2019.^[27] Antimicrobial resistance is a dangerous condition in which microbes stop responding to drugs making it difficult to treat infectious diseases and making surgical procedures riskier. The leakage of antimicrobials into the environment due to agricultural use is not only polluting but also

multiplies the chance of developing resistance. Without effective reduction and sustained stewardship of antibiotics, vulnerable countries around the globe will bear the brunt of AMR, with an estimated 10 million annual deaths by 2050.^[28]

The hidden costs of the current food systems associated with health, environment and society are at least \$10 trillion a year.^[29] The highest proportion of costs (70%) are due to unhealthy diets leading to obesity and related diseases and about 20% are associated with environmental changes.

References

1. Global Alliance for the Future of Food. Power Shift: Why We Need to Wean Industrial Food Systems Off Fossil Fuels. 2023. Available: https://futureoffood.org/wp-content/uploads/2023/10/ga_food-energy-nexus_report.pdf
2. Romanello M, Napoli C di, Green C, Kennard H, Lampard P, Scamman D, et al. The 2023 report of the Lancet Countdown on health and climate change: the imperative for a health-centred response in a world facing irreversible harms. *Lancet*. 2023;402: 2346–2394. doi:10.1016/S0140-6736(23)01859-7
3. Mulcahy E, Evans R, Brookes F, Fredriksson G, Pattnaik A. The Lancet Countdown on Health and Climate Change Policy brief for the UK. 2023. Available: <https://s41874.pcdn.co/wp-content/uploads/UK-Lancet-Countdown-policy-brief-2023-v1-1.pdf>
4. Clark MA, Domingo NGG, Colgan K, Thakrar SK, Tilman D, Lynch J, et al. Global food system emissions could preclude achieving the 1.5° and 2°C climate change targets. *Science*. 2020;370: 705–708. doi:10.1126/science.aba7357
5. Harwatt H, Hayek MN, Behrens P, Ripple WJ. Options for a Paris compliant livestock sector. Timeframes, targets and trajectories for livestock sector emissions from a survey of climate scientists. Harvard Law School; 2024. Available: <https://animal.law.harvard.edu/wp-content/uploads/Paris-compliant-livestock-report.pdf>
6. Ambassadors G. How to feed 10 billion people. In: UNEP [Internet]. United Nations Environment Programme; 13 Jul 2020 [cited 19 Mar 2024]. Available: <https://www.unep.org/news-and-stories/story/how-feed-10-billion-people>
7. Zhu J, Luo Z, Sun T, Li W, Zhou W, Wang X, et al. Cradle-to-grave emissions from food loss and waste represent half of total greenhouse gas emissions from food systems. *Nat Food*. 2023;4: 247–256. doi:10.1038/s43016-023-00710-3
8. The National Food Strategy – The Plan. 2021 Jul. Available: <https://www.nationalfoodstrategy.org/>
9. IPCC. Synthesis Report of the IPCC Sixth Assessment Report. 2023.
10. Eisen MB, Brown PO. Rapid global phaseout of animal agriculture has the potential to stabilize greenhouse gas levels for 30 years and offset 68 percent of CO₂ emissions this century. *PLOS Climate*. 2022;1: e0000010. doi:10.1371/journal.pclm.0000010
11. United Nations Environment Programme. Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions. 2021 May. Available: <https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions>
12. ALateano. The realities of UK nature – in pictures. In: WWF [Internet]. 5 Feb 2019 [cited 1 Aug 2023]. Available: <https://www.wwf.org.uk/future-of-uk-nature>
13. Air pollution and food production. [cited 19 Mar 2024]. Available: <https://unece.org/air-pollution-and-food-production>
14. Kelly JM, Marais EA, Lu G, Obszynska J, Mace M, White J, et al. Diagnosing domestic and transboundary sources of fine particulate matter (PM_{2.5}) in UK cities using GEOS-Chem. *City and Environment Interactions*. 2023;18: 100100. doi:10.1016/j.cacint.2023.100100

15. Public Health. LAQM; 1 Mar 2017 [cited 20 Mar 2024]. Available: <https://laqm.defra.gov.uk/air-quality/guidance/public-health/>
16. Obesity. In: nhs.uk [Internet]. [cited 18 Mar 2024]. Available: <https://www.nhs.uk/conditions/obesity/>
17. Goudie S. The Broken Plate 2023: The State Of The Nation's Food System. The Food Foundation; Available: https://foodfoundation.org.uk/sites/default/files/2023-06/TFF_The%20Broken%20Plate%202023_DigitalFINAL_1.pdf
18. NHS England. Food and nutrition. [cited 19 Mar 2024]. Available: <https://www.england.nhs.uk/ahp/greener-ahp-hub/specific-areas-for-consideration/food-and-nutrition/#:~:text=Food%20is%20responsible%20for%20around,of%20the%20NHS's%20total%20emissions.>
19. Gu X, Drouin-Chartier J-P, Sacks FM, Hu FB, Rosner B, Willett WC. Red meat intake and risk of type 2 diabetes in a prospective cohort study of United States females and males. *Am J Clin Nutr.* 2023;118: 1153–1163. doi:10.1016/j.ajcnut.2023.08.021
20. Farvid MS, Sidahmed E, Spence ND, Mante Angua K, Rosner BA, Barnett JB. Consumption of red meat and processed meat and cancer incidence: a systematic review and meta-analysis of prospective studies. *Eur J Epidemiol.* 2021;36: 937–951. doi:10.1007/s10654-021-00741-9
21. Truman M, Smith L-J, Kassam S. Attitudes of hospital patients regarding removal of processed and unprocessed red meats from menus to support sustainable healthcare targets: A single-centre survey. *Lifestyle Med.* 2023;4. doi:10.1002/lm2.87
22. Cancer: Carcinogenicity of the consumption of red meat and processed meat. [cited 29 Feb 2024]. Available: <https://www.who.int/news-room/questions-and-answers/item/cancer-carcinogenicity-of-the-consumption-of-red-meat-and-processed-meat>
23. Meat in your diet. In: nhs.uk [Internet]. [cited 18 Mar 2024]. Available: <https://www.nhs.uk/live-well/eat-well/food-types/meat-nutrition/>
24. How to get more fibre into your diet. In: nhs.uk [Internet]. [cited 17 May 2024]. Available: <https://www.nhs.uk/live-well/eat-well/digestive-health/how-to-get-more-fibre-into-your-diet/>
25. Crimarco A, Springfield S, Petlura C, Streaty T, Cunanan K, Lee J, et al. A randomized crossover trial on the effect of plant-based compared with animal-based meat on trimethylamine-N-oxide and cardiovascular disease risk factors in generally healthy adults: Study With Appetizing Plantfood-Meat Eating Alternative Trial (SWAP-MEAT). *Am J Clin Nutr.* 2020;112: 1188–1199. doi:10.1093/ajcn/nqaa203
26. Nagra M, Tsam F, Ward S, Ur E. Animal vs plant-based meat: A hearty debate. *Can J Cardiol.* 2024. doi:10.1016/j.cjca.2023.11.005
27. Antimicrobial resistance. [cited 18 Mar 2024]. Available: <https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance>
28. Andersen I. Tackling antimicrobial resistance: Stopping pollution at source. In: UNEP [Internet]. United Nations Environment Programme; 7 Feb 2023 [cited 26 Apr 2024]. Available: <https://www.unep.org/news-and-stories/speech/tackling-antimicrobial-resistance-stopping-pollution-source>
29. Food and Agriculture Organisation of the UN. The State of Food and Agriculture 2023: Revealing the true cost of food to transform agrifood systems. 2023. doi:10.4060/cc7724en

Plant-powered Planet

Building a healthy & sustainable food system



