

An aerial photograph of a vast palm tree plantation. The palm trees are densely packed, creating a repeating pattern of green fronds. A narrow dirt road runs vertically through the center of the image. A small, dark-colored car is parked on the road, providing a sense of scale to the massive forest.

FOOD CULTURE: THE IMPACTS OF WHAT WE CONSUME

Julie's Bicycle

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WHY READ THIS BRIEFING?

Understanding the full extent of the ways in which our diets impact on the climate and ecological crises can be stomach-turning. Mass deforestation, pollution, collapse of marine ecosystems, growing antibiotic resistance and new pandemics are some of the headline impacts. Most food systems have evolved (or are evolving) to become complex, globally sourced and carbon heavy, all whilst the benefits brought by them are deeply unequal across society. One third of what we produce becomes food waste; waste which produces 8-10% of global emissions.¹

Our food system needs to change urgently in the race to limit global heating, in a way which restores the very ecological systems (such as biodiversity, soil and water), which food production relies upon.

This briefing is for anyone working in the cultural sector who wants to understand the environmental and social impacts of food and drink choices and how to minimise them, as an individual consumer and as a cultural organisation.

¹ UNEP, 2021, UNEP Food Waste Index Report 2021, available online: <https://www.unep.org/resources/report/unep-food-waste-index-report-2021>, accessed 04/04/22

WHAT CAN WE DO?

The cultural sector has an important role to play in this transition. Patterns of consumption and production need to radically change, and this requires a shift in our food culture. As individual consumers and as a sector we can not only influence system change, but we can also make conscious decisions which limit the impact of our personal and audience's food and drink choices. Festivals such as Shambala have been meat and fish free for years, an inspiring example of audience engagement with a positive lasting impact on behaviour change and on emissions.

This briefing unpacks the environmental and social impacts of food production and consumption. Understanding the impacts is a first step to avoiding them, and to making informed decisions that can benefit people and the planet.



DO:

- ✓ Make your audience food offering 100% plant based.
- ✓ Assess the life cycle impacts of your food and drink choices (environmental and social).
- ✓ Work closely with local suppliers and producers and seek ongoing improvements in food and drink sustainability through your procurement policies and procedures.
- ✓ Ask yourself:
 - Where does it come from?
 - What land and resources were used to grow the plant or animal (how many chemicals, how much water, how much land, energy, food etc.)?
 - Who produced, picked and packaged the food – were the workers/landowners rights upheld, their pay fair, and treatment just?
 - How far has it travelled and how did it travel?
 - What kind of manufacture and processing was required? Were these processes energy/water/chemical intensive?
 - How is it packaged and can the packaging be reused/recycled easily?
 - Can I reduce the energy used to prepare food? (microwave, canned foods etc).
 - Can we actively or proactively measure demand to reduce food waste?
- ✓ Look for certified options, such as organic, Fair-Trade, Soil Association, Marine Stewardship Council and Rainforest Alliance certified options.
- ✓ Consider carbon foot printing your menu. (See Section 5.1).

DON'T:

- ✗ Assume that something vegan is always eco-friendly. For example, almond and coconut milk have high water footprints and are not typically produced close to home.
- ✗ Forget the importance of effective messaging. The way that you describe foods and the proportion of plant based to meat-based options on a menu all have a vital role in influencing consumer behaviour. (See section 5.2).
- ✗ Get overwhelmed trying to get it completely perfect the first time. Making informed decisions isn't always easy, foods don't generally come with carbon footprint labels or transparent information on sourcing. Changing to more positive choices won't always happen overnight, it is a journey of exploration. Take it one step (or swap) at a time, learn and progress from there.

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1. INTRODUCTION

There are few things that are as deeply inherent to our cultures as food. Food brings people together, helps us to celebrate significant events, tells stories from our history and is tied to our beliefs and life choices. Our diets, however, are fuelling both the climate and ecological crises. Studies have shown that drivers linked to food production cause around 70% of terrestrial biodiversity loss² and according to the IPCC the food sector accounts for 21 to 37 percent of global greenhouse gas emissions.³


As our food system has become increasingly global and complex, we have become increasingly disconnected from understanding how our consumer choices impact the Earth, and the livelihoods of those who live on the land used to grow and produce our food.

Agricultural production is set to increase by 70% by 2050 compared to 2009, as the world population and demand for food increases.⁴ A web of environmental and social factors complicates the transition to a sustainable global food system including: accounting for cultural and socio-economic changes in demand for different types of food; climate change

threats to food security; the contribution of animal farming and fishing to rising antibiotic resistance; and the increasing threat of future pandemics as we erode the boundaries between nature and domesticated livestock. Food, water and biodiversity are fundamentally what keep us alive, but if current practices continue, our health, wellbeing and that of the planet will undoubtedly be compromised.

We need to address the entire food system to transition to a more sustainable model of consumption, from focusing on the health of the soil we use to grow crops, to restoring biodiversity on agricultural lands, better product transparency and consumer information, through to re-imagining local, community-based models for growing and sharing food. **Plenty of solutions exist, and the creative sector can support the uptake and cultural shift that's needed in the coming years.**

This briefing will explore how our food and drink choices impact emissions, ecosystems, issues of social justice, and what the arts and culture can do to power the transition to a more sustainable food sector.

 **A SOCIETY REENGAGED IN ITS OWN LOCAL FOOD SUPPLIES WOULD DEAL WITH A HOST OF PROBLEMS, FROM HEALTH AND HAPPINESS TO DECENTRALISATION, SUSTAINABILITY AND WEALTH DISTRIBUTION. THERE'S HOPE TOO BECAUSE LIKE MANY OTHERS BEFORE ME, I'VE SEEN THAT GIVEN A CHANCE, NATURE'S POWERS OF RECOVERY ARE BOUNDLESS.**

Andy Cato, Musician, Producer, DJ and First-Generation Farmer

2 WWF, 2020, Living Planet Report 2020 – Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland.

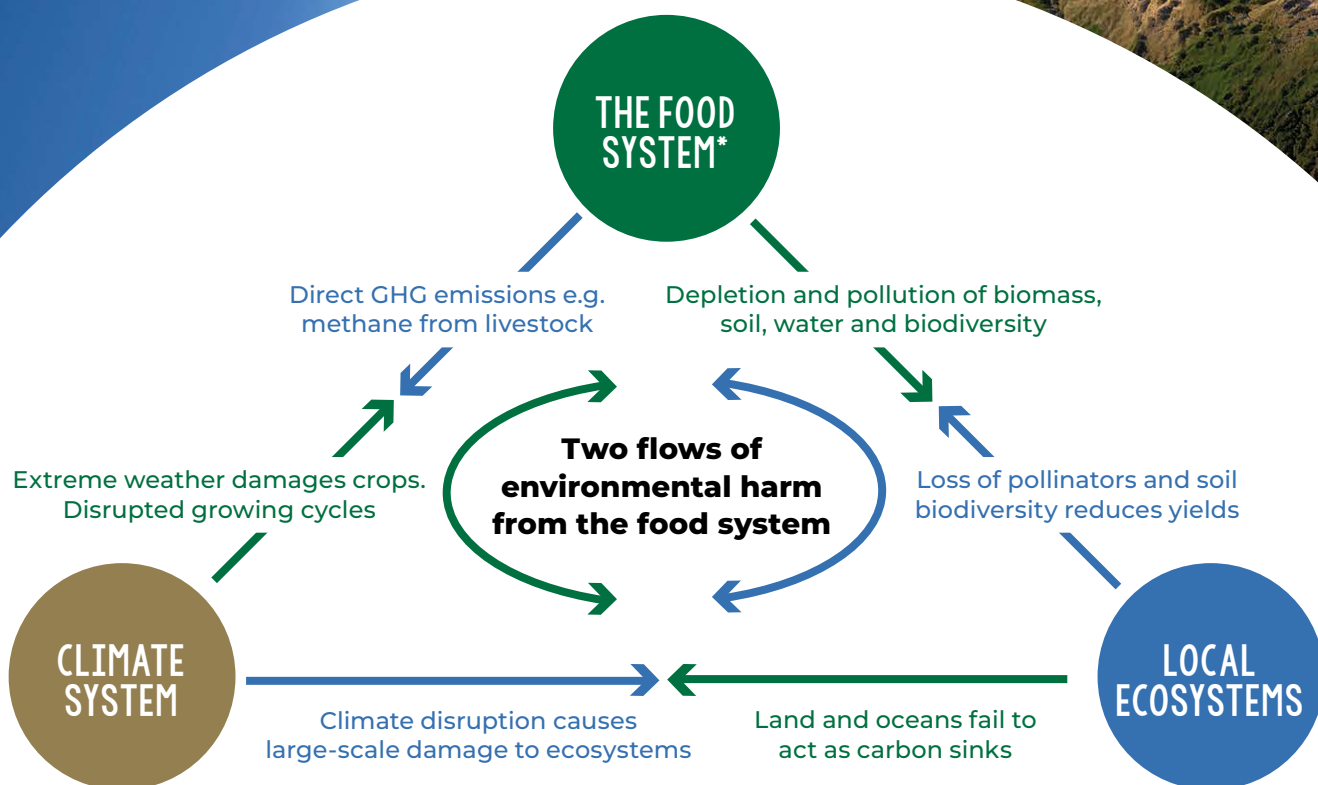
3 Mbow, C., Rosenzweig, C., Barioni, L. G., Benton, T. G., Herrero, M., and Krishnapillai, M. (in press). "Food security," in *Climate Change Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, Greenhouse Gas Fluxes in Terrestrial Ecosystems*, eds P. R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts.

4 FAO, 2009, How to Feed the World in 2050 (High-Level Expert Forum, 2009), online: https://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf accessed 09/02/22

2. IMPACTS OF OUR GLOBAL FOOD SYSTEM

THE GLOBAL FOOD SYSTEM IS THE SINGLE BIGGEST CONTRIBUTOR TO BIODIVERSITY LOSS, DEFORESTATION, DROUGHT, FRESHWATER POLLUTION AND THE COLLAPSE OF AQUATIC WILDLIFE. IT IS THE SECOND-BIGGEST CONTRIBUTOR TO CLIMATE CHANGE, AFTER THE ENERGY INDUSTRY.

National Food Strategy 2021



*Food system: Agriculture, fishing, production, packaging, transport and waste

Fig.1 Source: The Science Museum Group. Sustainable Food: Public Attitudes and Engagement in the UK, Brazil and India



2.1 Biodiversity Loss and Deforestation

Since the dawn of the industrial revolution, we have **dramatically altered around 75% of the Earth's land surface**.⁶ We use half of the world's habitable land for agriculture, and have converted swathes of habitat and natural areas into monocultures at the expense of biodiversity survival.⁷ The UK is one of the most nature-depleted countries in Europe, with agriculture identified as the most important driver of biodiversity change in the last 45 years. Agricultural intensification led to the removal of vast swathes of forests

AGRICULTURE IS RESPONSIBLE FOR 80% OF GLOBAL DEFORESTATION, AND DRIVERS LINKED TO FOOD PRODUCTION CAUSE 70% OF TERRESTRIAL BIODIVERSITY LOSS.⁵

and hedgerows, more pesticides, fertilisers, and new cropping regimes, all to maximise food production.⁸

In South East Asia and Brazil, biodiversity rich tropical forests are being converted into palm plantations, cattle ranches or soy plantations, at the expense of natural systems which are vital carbon sinks. **Almost half of all tropical deforestation between 2000 and 2012 resulted from the illegal conversion of forests for commercial agriculture.**⁹

5 WWF, 2020, Living Planet Report 2020 – Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland.

6 Ellis, E.C. et al, 2010, Anthropogenic Transformation of the Biomes, 1700 to 2000, *Global Ecology and Biogeography*, 19 (5), 589-606

7 Ellis, E.C. et al, 2010, Anthropogenic Transformation of the Biomes, 1700 to 2000, *Global Ecology and Biogeography*, 19 (5), 589-606

8 Hayhow DB, et al, 2019, The State of Nature Report 2019. The State of Nature Partnership, online: [State-of-Nature-2019-UK-full-report.pdf](https://www.state-of-nature.org.uk/state-of-nature-2019-uk-full-report.pdf) ([nbn.org.uk](https://www.nbn.org.uk)) accessed 09/02/22

9 Trase, 2020, Illegal deforestation and Brazilian soy exports: the case of Mato Grosso, online: [http://resources.trase.earth/documents/issuebriefs/TraseIssueBrief4_EN.pdf](https://resources.trase.earth/documents/issuebriefs/TraseIssueBrief4_EN.pdf) accessed 15/12/21



2.2 Water Pollution, Oceans and Over Extraction

Food production is not only driving biodiversity decline, it is also polluting and draining our precious supplies of freshwater: **only 3% of all water on Earth is freshwater and 70% of withdrawals are used for agriculture.**¹⁰

In addition, 78% of global ocean and freshwater eutrophication (a bloom in phytoplankton caused by excess nutrients in a water body) is caused largely by agricultural runoff from fertilisers and pesticides.¹¹ In the oceans and lakes, eutrophication produces 'dead zones'; areas without enough oxygen to support aquatic and marine life. These are increasing rapidly and 700 dead zones were recorded in 2019.¹² Again, the UK situation is particularly shocking: we have some of the most polluted waters in Europe. **Only 16% of England's surface and ground waters**

meet the criteria for "good ecological status" and worryingly, all of our lakes and rivers fail to meet the criteria for "good chemical status".¹³

ee WE CAN'T CONTINUE THIS DECIMATION OF 85% OF THE WORLD'S CHALK STREAMS... THEY'RE OUR AMAZON RAINFOREST. IF IT WAS SOME OTHER COUNTRY DOING THIS, THE UK WOULD BE AT THE...UN SHOUTING AND SCREAMING.

Feargal Sharkey, Former Frontman, The Undertones and Environmental Campaigner

¹⁰ FAO, 2017, Water for Sustainable Food and Agriculture, A report produced for the G20 Presidency of Germany, online: <https://www.fao.org/3/i7959e/i7959e.pdf> accessed 16/10/21

¹¹ Poore and Nemecek, 2018, Reducing Food's Environmental Impacts through Producers and Consumers, Vol. 360, Issue 6392, pp.987-992, online: <https://www.science.org/doi/10.1126/science.aag0216> accessed 07/01/22

¹² United Nations, Department of Economic and Social Affairs, Sustainable Development, Goal 14, online: <https://sdgs.un.org/goals/goal14>, accessed 14/12/21

¹³ The National Food Strategy, 2021, An independent review for Government, online: <https://www.nationalfoodstrategy.org/>, accessed 09/02/22



2.3 Food and Justice

The way that we produce and consume food intersects deeply with social justice. We need to not only produce food more sustainably, but we need to do it in a way that doesn't exploit or harm people, and also ensures that everybody has access to healthy and sufficient food and water sources.

The current global free-trade system subsidises large agri-businesses, destroying local markets and therefore the livelihoods and abilities of local people to produce and sell food. **Less than twenty corporations control the global food chain**, with some types of food heavily monopolised. For example, just four corporations control 99% of livestock breeding and just four traders control 75% of the grain and soy market.¹⁴ A growing movement of people around the world are protesting against free trade. The recent year long protest by Indian farmers in response to new agricultural laws which threaten their lives and livelihoods is one of the largest strikes in human history.¹⁵ Individual

TRANSFORMING THE FOOD SYSTEM IS ESSENTIAL, AND IT NEEDS TO BE DONE WITH THE SUSTAINABLE DEVELOPMENT GOALS, GLOBAL EQUITY AND HUMAN RIGHTS AT ITS HEART.

acts of desperation are also increasingly common, such as the suicide of Korean farmer, Lee Kyung Hae, who stabbed himself outside the venue of the World Trade Organisation (WTO) Ministerial in Cancun in 2003, in protest to the marginalisation of small-scale food producers by WTO-led free trade deals. In 2021, 5579 farmers in India committed suicide and the Farm Safety Foundation (FSF) reported that 133 people in UK farming and the associated agricultural trades took their own lives in 2019-20.

The food system reflects health inequalities; globally, 420,000 people die from food borne illnesses each year.¹⁶ One in three people don't have access to adequate food¹⁷, yet **one third of all the food produced globally is wasted.**

¹⁴ La Via Campesina, International Peasant's Movement, online: <https://viacampesina.org/en/freedom-from-hunger-poverty-debt-and-death-freedom-from-free-trade-agreements/> accessed 07/02/22

¹⁵ New Socialist, 2021, Understanding Kisaan Andolan, An extended study of the historical and world-ecological context of the Farmers' Movement struggles, online: <http://newsocialist.org.uk/understanding-kisaan-andolan/> accessed 09/02/22

¹⁶ World Health Organisation, 2020, Food Safety, online: <https://www.who.int/news-room/fact-sheets/detail/food-safety>, accessed 12/01/22

¹⁷ FAO, The State of Food Security and Nutrition in the World 2021, available online: <https://www.fao.org/state-of-food-security-nutrition> accessed 09/02/22

“On whatever front we work for food system change, we are called to stay conscious of the inseparability of sustainability and justice – in our history, in the present, and in our strategies for transformation.”

Rafter Ferguson, Scientist, Food and Environment

Globally deforestation for agriculture is commonly linked to human rights abuses and conflicts over land. Global Witness reports conflicts between local communities and soybean and livestock farmers are on the rise, with 212 land rights campaigners killed in 2019, the highest rate on record. **Around two thirds of low-income livestock keepers are women, who face disadvantages due to limited access to land, services and farm ownership.**¹⁸

In the UK, an estimated 8.4 million people are ‘food insecure’, meaning that they worry about the ability to obtain food, they might have to compromise the quality and variety of food they buy, reduce quantities, skip meals or experience hunger. **Yet we waste 15 billion meals a year.**¹⁹ Charities such as Fare Share and Food Cycle aim to capture and redistribute food to those in need.

But the answer should not rely on voluntary food banks in an economy as wealthy as the UK’s. Holistically changing the food system – the way that we produce, shifting our diets and redistribution of resources as well as tighter environmental and welfare controls – are needed to fix these complex and reinforcing problems.



The FAO describes six pathways to food system transformation, all of which intersect with social justice and sustainable development:²⁰

- Integrating humanitarian, development and peacebuilding policies in conflict-affected areas.
- Scaling up climate resilience across food systems.
- Strengthening resilience of the most vulnerable to economic adversity.
- Intervening along the food supply chains to lower the cost of nutritious foods.
- Tackling poverty and structural inequalities, ensuring interventions are pro-poor and inclusive.
- Strengthening food environments and changing consumer behaviour to promote dietary patterns with positive impacts on human health and the environment.

The Land Worker's Alliance are working to create a better food and land system for everyone. Land in Our Names, are an organisation focused on land justice, reconnecting black communities with land in Britain.

¹⁸ Friends of the Earth, 2021, The Meat Atlas: Facts and Figures about the Animals We Eat, available online: <https://friendsoftheearth.eu/publication/meatatlas-2021/> accessed 10/02/22

¹⁹ WRAP, 2021, Action on Food Waste, online: <https://wrap.org.uk/taking-action/food-drink/actions/action-on-food-waste> accessed 23/01/22

²⁰ FAO, 2021, The State of Food Security and Nutrition in the World 2021, available online: <https://www.fao.org/state-of-food-security-nutrition> accessed 09/02/22

2.4 Emissions & Contribution to Climate Change

Nationally and internationally, agriculture accounts for a substantial proportion of greenhouse gas emissions, approximately **one third of all global emissions**²¹ and around 10% in the UK (solely domestic food production).²²

Most of these emissions come from animal agriculture: 85% of total land that produces UK food is used to graze livestock or produce crops to feed to animals.²³

Considering the transition we must make to **net zero**, the UK's food system has decarbonised at half the pace of the wider economy, and agriculture has barely decarbonised at all in over a decade. Globally, emissions from food systems have increased by 17% over the past three decades, largely as a result of a doubling of emissions from pre- and post-production processes²⁴ (for example fertiliser manufacture and food processing).



21 Crippa, M., Solazzo, E., Guizzardi, D. et al., 2021, Food systems are responsible for a third of global anthropogenic GHG emissions. *Nat Food* 2, 198–209

22 Gov UK, 2019, Agricultural Statistics and Climate Change online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835762/agriclimite-9edition-02oct19.pdf, accessed 05/01/22

23 The Committee on Climate Change, 2020, Agriculture Land Use Change, online: <https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Agriculture-land-use-land-use-change-forestry.pdf> accessed 16/10/21

24 Tubiello et al, 2021, Pre- and post-production processes along supply chains increasingly dominate GHG emissions from agri-food systems globally and in most countries, online: https://essd.copernicus.org/preprints/essd-2021-389/?utm_campaign=Cropped&utm_content=20211117&utm_medium=email&utm_source=Revue%20Land accessed 05/01/22

Breakdown of emissions in the UK food & drink sector

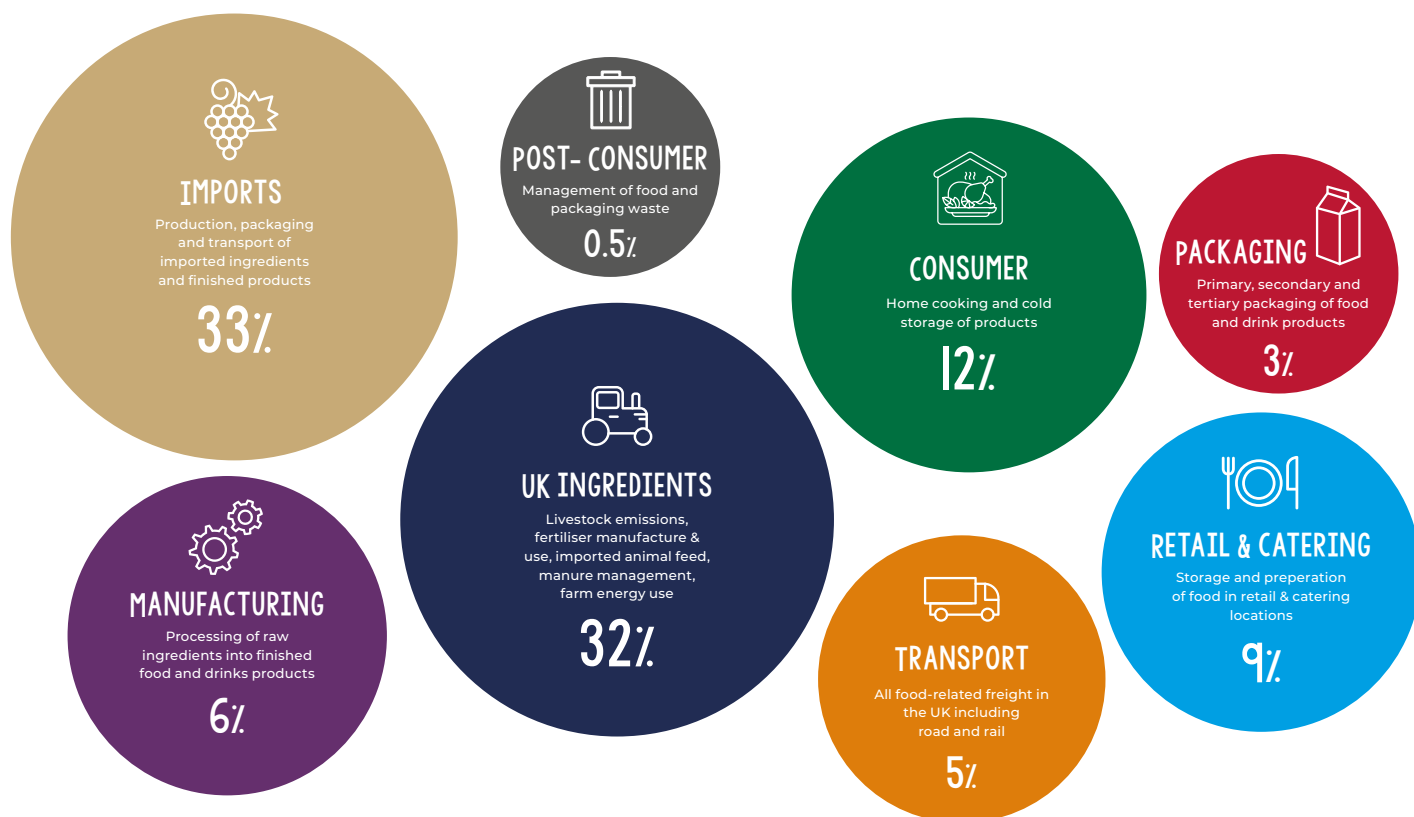


Fig.1 Emission sources in the UK food and drink sector

Source: FDF, 2021, [Roadmap to Net Zero, Overview for the UK Food and Drink Sector](#).

Tackling emissions from our food system, requires an understanding of the full life cycle impacts of our food including: transparency on the sourcing; where and how it's grown (including social and ethical considerations); the methods used to transport it; how far it travels; the energy used to process it; the materials used to package it; the energy used in the supermarkets where it is refrigerated and sold and; eventually, how it is cooked and whether (or not) it is eaten, sent to landfill or composted. (See fig 1).

Unravelling this life-cycle is complex which can make it difficult as a consumer to make informed decisions.

For example, the amount of heating used to grow tomatoes may have more of an impact on emissions than where the tomatoes came from, when choosing between European growers for example.²⁵ Whilst some of the necessary changes must be made at a policy level (e.g. better labelling), as consumers **we can demand more information about the supply chain and environmental impacts of the food we buy.**

Importantly, cultural organisations can work more closely with suppliers, caterers and local businesses to increase transparency and understanding, provide the information needed to reduce impacts, and dispose of uneaten food responsibly.

²⁵ Theurl et al, 2013, Contrasted greenhouse gas emissions from local versus long-range tomato production, *Agronomy for Sustainable Development* 34(3)

3. PLANET FRIENDLY PALATES

. HOW OUR FOOD AND DRINK CHOICES MAKE A DIFFERENCE

3.1 So, do we all need to go vegan to save the planet?

On average, plant-based foods produce around 50% less CO₂ than animal-based products²⁶ (see fig.3). **Globally, 77 percent of agricultural land is used to raise animals or the crops to feed them.**²⁷ In order to farm animals, we use excessive amounts of water, land and energy for grazing, growing animal feed, transporting and processing the meat into other food products. That's why animal-based products have some of the highest carbon footprints of all food groups. Eating meat is also a less efficient way to gain calories: even chicken, which might seem like a less resource intensive meat, requires putting nine calories into the chicken in order to get one calorie

out. That means nine times more land, water, pesticides and energy.

Globally, we need to reduce meat consumption by around 50%. In the developing world, meat demand is projected to increase by 12% by 2029 as populations increase and consumption trends change.²⁸ **Meat consumption per capita is comparatively low in much of the developing world,** and additional consumption is predicted to only increase slightly, despite growing populations.

In the UK, we need to reduce meat consumption by 20-50% to reach net zero by 2050, a significant contributor to the UK's national emissions reduction strategy. The National Food Strategy also sets a goal of 30% reduction by 2030.

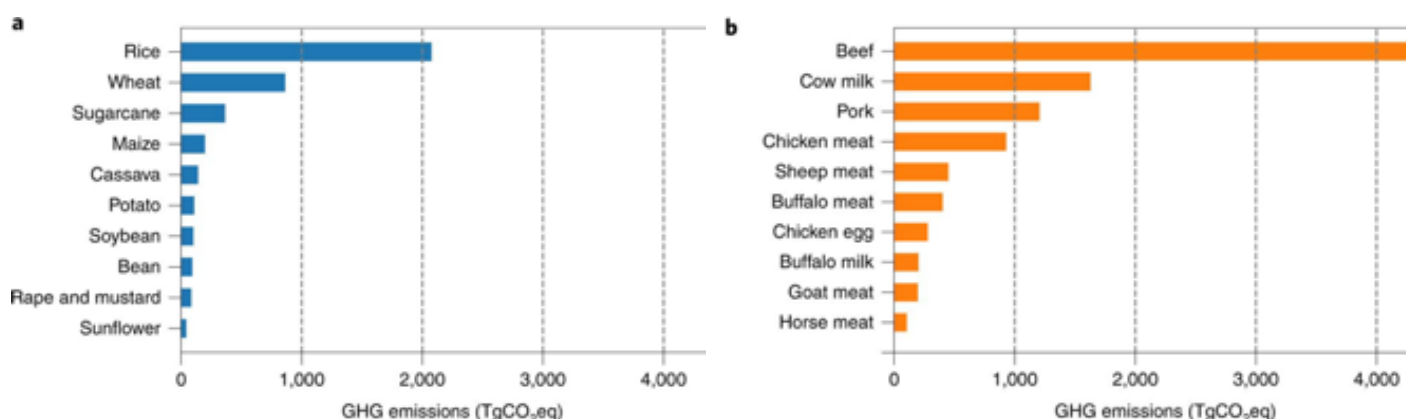


Fig. 3 Greenhouse gas emissions of plant-based vs animal-based foods. Source: Xu et al, 2021, [Global greenhouse gas emissions from animal-based foods are twice those of plant based foods](#), *Nature Food*, 2, 724-732

26 Xu et al, 2021, Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods, *Nature Food*, 2, 724-732

27 Friends of the Earth, 2021, The Meat Atlas: Facts and Figures about the Animals We Eat, available online: <https://friendsoftheearth.eu/publication/meatatlas-2021/> accessed 10/02/22

28 OECD-FAO Agricultural Outlook 2020-2029, Ch.6 Meat, available online: <https://www.oecd-ilibrary.org/sites/29248f46-en/index.html?itemId=/content/component/29248f46-en>, accessed 10/02/22



**90% OF SOY PRODUCTION
GOES TO FEEDING ANIMALS.
SOY AND LIVESTOCK
FARMING ARE THE TWO
BIGGEST CONTRIBUTORS TO
DEFORESTATION WORLDWIDE.**

(FOE, 2021)

3.2 But isn't all the soy in our veggie burgers killing the Amazon?

The UK imports 3.3 million tonnes of soy per year. The land needed to grow this requires an area 11 times the size of Greater London. Of this imported soy, 77% originates from areas with a high deforestation risk.²⁹ Over the past decades, soy has undergone the largest expansion of any global crop, with the fastest growth in South America where it has increased by 123% between 1996 and 2004.

Edible crops are wasted when fed to animals. For every 100 calories of (human-edible) soy fed to an animal, the human consumer on average receives just 17 calories from the meat/ dairy product, or 22 calories for eggs, 12 calories of chicken, 10 of pork, and 3 of beef.³⁰ **Using soy for direct human consumption could help improve food sustainability and reduce the strain on current food sources.**

²⁹ WWF, 2014, The growth of soy: Impacts and solutions, WWF International, Online available: https://wwfint.awsassets.panda.org/downloads/wwf_soy_report_final_feb_4_2014.pdf, Accessed 21 January 2021.

³⁰ Stevenson, P., 2022, CIWF, Industrial Livestock Production The Twin Myths of Efficiency and Necessity, online: <https://www.ciwf.org.uk/media/7425974/industrial-livestock-production-the-twin-myths-of-efficiency-and-necessity.pdf>, accessed 10/02/22



3.3 Is there such a thing as sustainable fish?

Fishing sustainably requires a good understanding of fish populations. If too many adult fish are taken from the ocean, then a healthy population of fish cannot be sustained, stocks become overfished and eventually collapse. Technically, fish can be sustainable if the population of a fish species remains large enough to reproduce, if it's done in a way that doesn't damage the marine environment (e.g. cyanide or trawl fishing) and isn't linked to human rights abuses or slavery. However, ensuring supply chains are transparent and fishing practices are properly and regularly assessed, is highly challenging,

and some unsustainable practices may slip through the net. For example, many "marine reserves" actually allow industrial fishing, which fails to protect marine life at risk from these large-scale fishing practices.³¹ In the EU, the intensity of trawling in so-called protected areas is actually greater than in unprotected areas.³²

According to the latest assessment by the UN Food and Agriculture Organisation, **93.8% of the world's marine fish populations are either "fully fished" or "overfished", and they continue to decline.** "Fully fished" means that fish are being caught at their "maximum sustainable yield": the most that can be taken without crashing the stock. **Fisheries collapse will**

³¹ Kroodsmas and Farthing, 202, Global Fishing Watch, Transparency in Fisheries is essential, online: <https://globalfishingwatch.org/transparency/transparency-in-fisheries-is-essential/> accessed 10/02/22

³² Dureuil et al, 2018, Elevated Trawling inside protected areas undermines conservation outcomes in a global fishing hot spot, *Science*, Vol 362, Issue 6421, pp. 1403-1407

undoubtedly impact on the 3 billion people worldwide who rely on the ocean for their livelihoods³³ and as a source of protein.

Fishing is also linked to human rights abuses and injustices. Vast fishing ships from more economically powerful nations threaten to deprive local people of their subsistence.³⁴ According to the Raks Thai Foundation, an estimated 200,000 migrant workers from Cambodia, Myanmar and Laos are exploited by the \$6.5bn Thai fishing industry. Some of the fish caught by these slavery boats is used in pet food and as feed in prawn fisheries.³⁵

Fish farming can also come with a whole host of its own environmental impacts. Farmed fish have to be fed with corn, soy or smaller fish which can undermine the larger marine ecosystem. Research from the University of British Columbia Fisheries Centre estimates that around **37% of all global seafood is now ground into feed, either for fish farms or to feed pigs and poultry.** Diseases, viruses and pests can spread quickly in farmed fish and may spread into wild populations, as can non-native species.

Scotland is one of the largest salmon producers in the world, producing around £2bn a year for the Scottish economy, however, between **2002 and 2019 fish mortality quadrupled in Scotland** and a combination of damage to marine ecosystems, pollution, parasites and high fish mortality



create environmental costs of around £1.4bn a year.³⁶

Shrimp farming is another form of impactful aquaculture, and a major contributor to the destruction of important mangrove habitats, mainly in southeast Asia³⁷. One study found that between 2000 and 2016, shrimp, rice, and palm oil cultivation are responsible for around half of global mangrove losses.³⁸

Overall, this is a challenging industry to certify, but **to guide consumer choices, standards like ‘dolphin friendly’ tuna or MSC certified fish can help to ensure fish is from a sustainable source.** Another good source of information is the Marine Conservation Society’s Good Fish Guide and App, which is updated regularly to reflect the current state of different fish species.

33 United Nations, The Sustainable Development Goals, Goal 14, online: <https://sdgs.un.org/goals/goal14>, accessed 15/02/22

34 The Guardian, 2021, EU accused of Neo-colonial Plundering of Tuna in Indian Ocean, available online: <https://www.theguardian.com/environment/2021/mar/05/eu-accused-of-neocolonial-plundering-of-tuna-in-indian-ocean>

35 The Guardian, 2019, Tricked into Slavery in the Thai Fishing Industry, online: <https://www.theguardian.com/world/2019/sep/21/such-brutality-tricked-into-slavery-in-the-thai-fishing-industry>, accessed 05/01/22

36 The Guardian, 2021, Global Salmon Farming Harming Marine Life and Costing billions of Damage, online: <https://www.theguardian.com/environment/2021/feb/11/global-salmon-farming-harming-marine-life-and-costing-billions-in-damage> accessed 07/02/21

37 Lacerda et al, 2021, 20-Years Cumulative Impact From Shrimp Farming on Mangroves of Northeast Brazil, Front. For. Glob. Change, <https://doi.org/10.3389/ffgc.2021.653096>

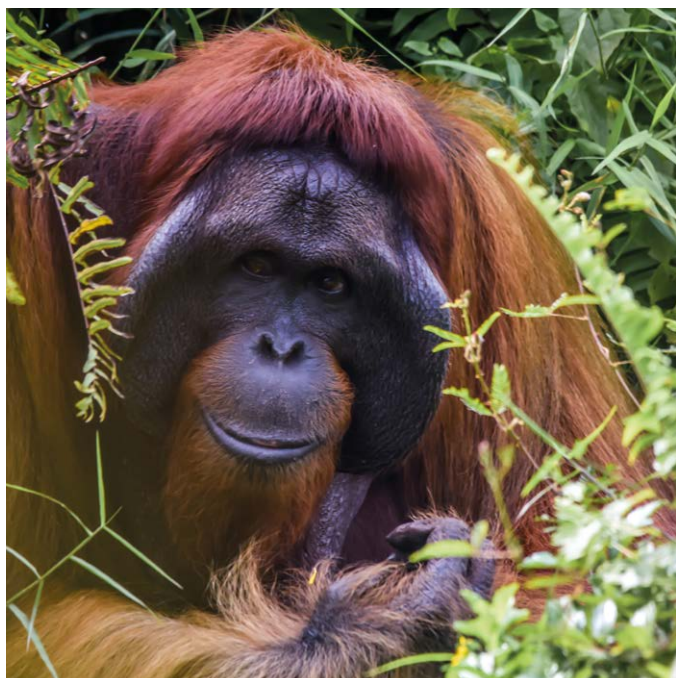
38 Goldberg, L., et al, 2020, Global decline in human-driven mangrove loss. *Glob Change Biol.* 26:5844-5855. doi: 10.1111/gcb.15275

3.4 Palm Oil – can I eat my favourite chocolate and not kill orangutans?

Palm oil is found in a huge variety of products, including cosmetics, cleaning products, food and drink products. In fact, half of the processed goods in supermarkets contain it and millions of tonnes are used as a biofuel in cars.

Demand has rocketed in the past decades, growing 15-fold in the last forty years.³⁹ Palm oil is largely

produced in biodiversity rich tropical regions, including Western and Central Africa, South-East Asia and Central and South America. Production is linked to extensive deforestation, declining populations of rare and endemic species – for example Borneo has lost 50% of its orangutan population in 16 years – and displacement of indigenous communities. Despite decades of action from activists, campaigners and NGOs fighting for more sustainable palm oil, the supply chain is still far from transparent, with corruption and political issues rife. Even the Roundtable on Sustainable Palm Oil (RSPO) certified palm oil continues to be linked to deforestation and forest fires.⁴⁰



Despite the impacts of production, palm oil is a highly efficient crop to grow, as it requires far less land area than other types of oil producing plant. **Boycotting palm oil is not the solution.** Research by the The International Union for Conservation of Nature (IUCN) shows that boycotting palm oil would displace, rather than halt biodiversity loss, due to an increase for other crops which need more land.⁴¹ Instead we need to use our power as consumers to push for supply chain transparency (environmental and social), we need to consume and waste less palm oil (and food) in general, for example, by avoiding processed foods and demanding the best available information to make informed decisions. WWF have palm oil buyers scorecards and an app that you can use while shopping to check product credentials. **The Ethical Consumer produces guides and products lists to help consumers avoid unsustainable palm oil.**

ACHIEVING A SUSTAINABLE PALM OIL INDUSTRY HAS NEVER BEEN MORE URGENT, BUT IT REMAINS SHROUDED IN COMPLEXITY.

WWF

³⁹ IUCN, 2018, Oil palm and biodiversity, Issues Brief. Online: <https://www.iucn.org/resources/issues-briefs/palm-oil-and-biodiversity#why> accessed 10/02/22

⁴⁰ Greenpeace, 2018, Final Countdown, Now or Never to Reform the Palm Oil Industry

⁴¹ IUCN, 2018, Oil palm and biodiversity, Issues Brief. Online: <https://www.iucn.org/resources/issues-briefs/palm-oil-and-biodiversity#why>

4. WHERE DO WE GO FROM HERE?

. OPPORTUNITIES OF A FOOD SYSTEM TRANSFORMATION

The combination of deforestation, biodiversity devastation, human rights abuses, land, soil and water degradation, spiralling emissions, animal welfare concerns, and our collapsing marine ecosystems paint a dire picture of our current food system. We need to completely overhaul our patterns of production and consumption. We need to employ a myriad of solutions to tackle the current social and environmental issues that have evolved as a result of consumption patterns associated with mass production and globalisation.

It is possible to reverse the damages caused – positive change is already in motion, supported by consumer attitudes and demand, and new policy frameworks.

Many farmers and food producers have already started to respond to the stresses of climate change, soil erosion and water pollution by moving towards less intensive and regenerative models of agriculture.

Additionally, Indigenous communities have practiced sustainable livestock farming for centuries, we can learn from indigenous methods of agriculture, such as the communities that sustain African rangelands with pastoralism, while also maintaining them as an important carbon sink in the process.

Consumer demand is changing too: plant-based diets are growing in popularity, and for many, the Covid-19 pandemic brought us closer to nature, gave us more time to consider growing



The opportunities and benefits of moving to new models of production and consumption are potentially transformative: we can choose models which regenerate nature, provide equal and affordable access to healthy food, which is resilient to our changing climate and doesn't threaten human health on a global scale. The shift must be political, practical and crucially, culturally embedded.

or making our own food, rather than relying on the convenience and speed of packaged foods and ready meals. In recent months, Brexit disruptions to supply chains have led to public anxiety around availability of food in the UK, as the interconnected and international nature of our domestic food system has been brought to centre stage. **Now is a key moment for change.**

Producing more locally, through for example:

- community food growing initiatives
- redistribution/food waste projects
- converting more urban spaces to grow food (e.g. rooftop gardens, allotments on disused urban land, peri-urban farming, vertical farming and hydroponics).

These models have the potential to enhance social cohesion, sense of community, quality of urban spaces, and the wellbeing and skills of people using them, nurturing a connection to nature and where our food comes from.

In all of these key areas, the cultural sector can play a pivotal role in developing and participating in projects. Preliminary research from the University of Sussex has also found that city allotments can produce similar amounts of food as conventional farming⁴², which could have significant ramifications for food production globally and for how we live in cities across the world.

⁴² The Guardian, 2021, City Allotments Could be as Productive as Conventional Farms Research Finds, online: https://www.theguardian.com/environment/2021/dec/15/city-allotments-could-be-as-productive-as-conventional-farms-research-finds?CMP=Share_iOSApp_Other&fbclid=IwAR2ggnDX2_nmE7Jqk_DaZQg1x-jSd8FDEJM-ZSDmUNQLybfdLQJe-S1Rn5Y accessed 15/12/21



5. INNOVATION AND SOLUTIONS:

TAKING ACTION

5.1 Green your offering

Recent research found that for a meat eater to opt for a veggie dish, the menu must be at least 75% vegetarian. Increasing the proportion of plant-based food on a menu to at least 75%, is one of the most effective ways to lower the impact of your food offering.⁴²

Choose certified options where possible. Look for MSC certified fish, Organic, the Red Tractor Label, Free-Range, Fair Trade and Rainforest Alliance Certified products.

Source locally where possible to reduce food miles, or even better, if you have space then grow your own! Somerset House, in central London, grows organic mushrooms fed on old coffee grounds in their basement and rhubarb on their roof which they use in their onsite restaurants; a brilliant example of how food can be grown on-site even without any extensive green space.

Working closely with caterers and suppliers can help you to understand and improve the supply chain impacts of your food offering.

Ask questions about each stage of the life cycle, for example, how and where the food was grown, how it was transported etc. Review the policies of suppliers and financial institutions, look for those who have policies on deforestation in place and divest from companies that have stakes in industrial meat and dairy e.g. pension funds.

5.2 Understanding the impacts of your food offering: Measuring emissions

Understanding the carbon impacts and environmental impacts of the food you offer to audiences is one of the most important actions you can take on food sustainability. There isn't one clear cut method to do this, but a number of tools and different methods exist:

1. Ask your caterer or food vendors to calculate the carbon footprint of their food offerings. This is an approach which has been adopted by festivals such as Roskilde, who since 2018 have worked with Carbon Cloud to carbon footprint their entire food offering, and since 2017 have had a 90% organic offering. The Brit Awards are another example; they worked with their caterers Payne and Gunter to find innovative local food suppliers, and Carbon Cloud, to ensure the average CO2 per meal was 0.5kg- the 'low carbon' standard of the One Planet Plate campaign.

2. Measure per ingredient/snack/beverage using available tools such as the WRI's Cool Food Pledge Calculator or the US EPA's waste reduction model WARM15 has a section on food categories.

3. Calculate the average weight per meal and number of meals then use the Defra emission conversion factors

⁴² Parkin and Attwood, 2022, Menu Design approaches to promote sustainable vegetarian food choices when dining out, *Journal of Environmental Psychology*, Vol.79.



5.3 Influencing, Information and Communication

Well designed and effective communication on the impacts of your food and drink offerings can be used to demonstrate to audiences your policies and approach to providing a sustainable food offering. Ecolabelling, for example using a traffic light system could be applied to menus to guide people towards choosing lower impact meals. This is an approach currently being trialled by supermarkets and [Foundation Earth](#), who are using 'Ecoscores' to understand how environmental labelling may impact on consumer choice, and drive change in the food industry, with the aim of rolling out the scheme across Europe. Nudge Theory outlines how to nudge people into making one choice over another using one of seven techniques; prompting,

sizing, proximity, presentation, priming, labelling or functional design.⁴³ For example, placing vegetarian choices in larger font at the top of a menu may be enough to entice consumers into opting for a lower impact option.

5.4 Innovation: Food for Thought

A number of new and creative responses to food sustainability are gaining traction. Eating insects (entomophagy) as an alternative source of protein is one solution which also has potential ecological benefits. Lab grown produce is another growing solution – whilst currently more investment is needed to make it plausible at scale, lab grown meat can avoid animal cruelty and reduce the use of antibiotics.

Start-up company [Atomo Coffee](#) have created the world's first molecular coffee, which has 93% less carbon emissions and 94% less water use and no deforestation footprint, compared to conventional coffee. However, uptake of lab grown produce will need to be accepted by consumers and moving all production to labs in the longer term will inevitably detrimentally impact the livelihoods of farmers across the world.

Algae are another potential source of sustainable food; algae plants such as seaweed tend to be fast growing, don't need land or fresh water and also absorb CO₂ as they grow. One example is the eelgrass *Zostera marina*, a recent discovery by Spanish chef Ángel León who has found the grains within eelgrass contain 50% more protein per grain than rice, they can absorb carbon 35 times faster than tropical rainforests as well as creating a rich ecological habitat for marine species.

OF THE 150 FINANCIAL INSTITUTIONS WITH THE GREATEST INFLUENCE ON TROPICAL DEFORESTATION, 95 ARE STILL WITHOUT A SINGLE DEFORESTATION POLICY⁴⁴

⁴³ Wee et al, 2021, Can "Nudging" Play a Role to Promote Pro-Environmental Behaviour? *Environmental Challenges*, Vol 5, 100364

⁴⁴ Global Canopy, Forest 500: Time for Change, Delivering Deforestation-free supply chains, online: https://forest500.org/sites/default/files/forest500_2021report.pdf, accessed 10/02/22

6. CASE STUDIES FROM THE SECTOR

6.1 Spotlight on: Regenerative and Agroecological Farming

Regenerative agriculture aims to have a positive impact on land, biodiversity and the climate by using techniques and technologies which rebuild soil organic matter and soil biodiversity, improving carbon sequestration and the water cycle in the process. Modern agricultural practices (such as monocropping and fertiliser use) have been degrading the quality and fertility of soils for decades, if these continue, yields and the quality of our food will also decline. In countries such as Kenya, for example, it's estimated that the productivity of cropland has declined by around 40% between 1981 and 2003, whilst the population doubled. Musician, DJ and Producer Andy Cato, has set up his own regenerative farming project in Naroques, in France. His website [The Real Food Fight](#) tells the story of his journey into Regenerative Farming.

“A LIFE WITHOUT GROWING MY OWN FOOD QUICKLY BECAME AS IMPOSSIBLE TO IMAGINE AS A LIFE WITHOUT MUSIC. IT GOES BEYOND THE TASTE, THE SIMPLE PLEASURE OF BEING IN THE GARDEN OR OF WATCHING THINGS GROW. LIKE MUSIC, IT'S AN EMOTIONAL PULL. THE RITUALS OF FOOD AND MUSIC, WITH US SINCE THE BEGINNINGS OF HUMANITY.”

Extract from Return to Earth, The Real Food Fight

6.2 Sustainable Wine Solutions

Sustainable Wine Solutions began its journey in 2002 as Borough Wines in the world famous Borough Market with its I WILL REFILL wine on tap concept. Since then, Sustainable Wine Solutions has become a true champion of sustainability within the drinks industry, with their fully circular business model.

Their new investment in a bottling and keg facility in East London, allows them to take control of the bottling process. Their bottles are the lightest available on the market and are reused again and again. Sustainable Wine Solutions now provides four circular wine systems that deliver options that prioritise reuse and dramatically extend the life cycle of resources: relieving the hospitality industry of both a single-use attitude and a reliance on recycling as the only real sustainability measure – [Wine-on-Tap](#), [VinoTap™](#), the [Bottle Return scheme](#) and [Rebottling sampling service](#).

Reducing carbon footprint in the wine Industry is important to safeguard the future of winemakers. In 2021, France lost almost one third of sales or a 40% yield loss in wine production due to a seasonal wave of bitter frost devastating the French vineyards.

Recent research has projected that half the current global winegrowing regions would become unviable for viticulture if average temperatures rise by more than 2°C from pre-industrial levels. Sustainable Wine Solutions works with European winemakers to provide a variety of sustainable,

organic, biodynamic and vegan wines to clients. Winemakers working with Sustainable Wine Solutions take part in the regenerative agricultural movement to do their part in fighting the ecological and climate crisis. Organic farming has been shown to reduce emissions from vineyard soil, and eliminates the use of nitrous oxide found in chemical fertilisers, which has a 300 times greater warming impact compared with CO₂. Sustainable Wine Solutions supply everyone from small scale zero waste shops to festivals, restaurants and bars, theatres and cinemas.

Environmental, Economic and Practicality/Convenience – Their years of experience have shown that these three factors must come into play at the same time for the smooth adoption of circular solutions by customers and the savings that comes with this makes it a very attractive proposition across all areas of hospitality.

6.3 Kitchen Cultures

Kitchen Cultures is a food and art research project led by artist, designer and researcher Kaajal Modi in collaboration with zero-waste chef Fatima Tarkleman. The project was funded as part of a remote residency with the Eden Project's Invisible Worlds exhibition. Eight women and non-binary people from migrant backgrounds explored how to creatively minimise food waste through producing new recipes. The aim was also to build on a creative methodology for knowledge production and storytelling in regards to sustainability, climate change and ecology. The top 10



most wasted foods – usually imported fruit and veg – were used to develop the recipes. The participants were paired intergenerationally and culturally to develop these recipes.

Many communities across the world are taught to make the most out of the food they have, as such, how to avoid food waste is taught within many migrant communities and families in the UK. To share the work done in the project, tasting workshops were a key way to share the results of the new recipes. Most of the sessions were hosted online, due to the lockdown and social distancing measures, therefore participants' care packages were sent to the attendees of the tasting workshops. The workshops created a space to share stories and their views whilst attendees had a “taste along” from their houses.



These tasting sessions were held online with Grandmothers Garden, a learning network for climate activists from the Global South, and in-person with Artsadmin as part of their climate arts festival 'What Shall We Build Here'. To capture the outcomes of the project, Kitchen Cultures collaborated with the poet Asmaa Jama to produce a series of poems, which were used to create a soundscape to listen to while cooking, and a recipe book that contains recipes featuring poems, stories and communal/family activities for readers to enjoy.

6.4 DGTL – The world's first circular food court

DGTL festival in Amsterdam has been fully meat free since 2016. In 2018, they went one step further to make their food offering entirely circular, as part of their commitment to become a circular festival by 2020. To avoid packaging and food waste they removed rubbish bins and replaced them with a composting machine in the centre of the food court, where all food and packaging was composted by festival goers. This was given to urban farmers to grow new food crops, dramatically reducing the impact of the 10,000 meals sold over the course of the festival.



6.5 Future Yard, Birkenhead

Future Yard is a new 300-person capacity music based cultural and community venue in Birkenhead. Starting out in 2020 sustainability was central to their ethos from the very beginning where they started working with Liverpool John Moore's University on the energy efficiency of their venue, using 3D modelling to scope their emissions. They are aiming to be the first carbon neutral grassroots venue in the UK. They've taken a rigorous approach to analysing their produce and products, with their onsite cafe serving entirely vegetarian and vegan supplied by the caterer Hardy's. Their focus is on local sustainable produce, using local bakeries and breweries with beer brewed just half a mile from the venue. They take a bold approach to artist engagement, amending their dressing rooms requests to fit within the venue's in-house sustainable, vegetarian and local offer. Artist reactions have been positive, as any alternatives to artist requests are high quality substitutes with a local feel. In addition, the venue is single use plastic free.

6.6 NOQ

NOQ is a self-service ordering solution used at events and festivals and across various sectors of the hospitality industry. The NOQ app allows customers to place their orders digitally either in advance or from anywhere within the event, as opposed to queuing physically. Pre-ordering helps vendors to mitigate the issue of excess supplies which are usually thrown away if unused, helping them to know exactly what and how much to purchase.

7. FURTHER READING AND RESOURCES:

- Science Museum Group, 2021:
Sustainable Food: Public Attitudes and Engagement in the UK, Brazil and India
- Just Food: Insecurity vs Sovereignty:
A Climate in Colour online course grounded in the exploration of the inequity produced by our current global food system
- Julie's Bicycle Creative Food Culture:
A Webinar with Guest Speakers Royal Court Theatre and Sustainable Wine Solutions
- Green Alliance, 2019,
Cutting The Climate Impact of Land Use
- Friends of the Earth, 2021,
Meat Atlas: Facts and Figures about the Animals We Eat.

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