

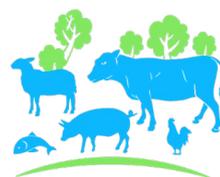


The Unpalatable Truth

Large-scale industrial animal agriculture cannot remain at current levels in the UK and still meet environmental targets

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Executive Summary

With the world's attention on COP26 in Glasgow, now is the time to be principled and pragmatic in our approach to intensive animal agriculture and the obviously detrimental impact it has on our environment.

The scientific evidence is clear that large scale intensive farming is a key source of greenhouse gases. Its impact both in the UK and worldwide stretches far beyond high emissions, into biodiversity loss and climate change.¹ Long supply chains, extensive land use change, and nitrate pollution are inherent to the industrial nature of intensive farming. Although greenhouse gases are shorter-lived than carbon dioxide (CO₂), they are about 28 times more potent at warming the atmosphere.²

This report therefore spotlights intensive farming in the UK and demonstrates the uncomfortable truth: that such practices can simply not continue if we are to meet our legally binding environmental commitments.

This is indeed uncomfortable reading. Most of us have grown up eating meat on a daily basis as the 'norm', paying little thought to the industrial practices that are necessary to cater such widespread demand. However, the evidence is clear that change is necessary if we are serious about meeting our climate targets.

We advocate for a multipronged approach entailing both a reduction in meat consumption and a shift in the way we use our land. The benefits of taking such an approach are far reaching – including wildlife restoration, soil health, reduced antibiotic resistance, lower mortality rates from heart disease, and increased resilience to future pandemics.

¹ Poore, J. and Nemecek, T. (2019) 'Reducing Food's Environmental Impacts through Producers and Consumers', *Science*.

² Yvon-Durocher, G. Allen A. Bastviken, D. Conrad, R. Gudas, C. St-Pierre, A. Thanh-Duc, N. Del Giorgio, P. (2014) 'Methane fluxes show consistent temperature dependence across microbial to ecosystem scales', *Nature*.



A relatively small change in diets could return enough land to forest to compensate for all the remaining emissions from livestock. For example, reducing animal agriculture (both the number of animals and the land usage) by 19% and converting this land to forest would allow the remaining methane emissions to be balanced by the carbon equivalent captured by the new forest. Of course, it is critical that any potential solutions put forward are accompanied by supportive measures and adequate incentives for food producers and landowners. As they have indicated in the Net Zero Strategy, the Government must ensure that the agriculture sector is supported in these changes while not shying away from the evidence that change must happen.

The UK can be a global leader in reducing intensive farming practices and adopting long term solutions to stem their damaging impact on the environment. Continuing the status quo is estimated to give the UK 12 years before we exceed our legally binding limits. It is, consequently, no longer an option to ignore the impact that intensive animal agriculture has on our planet.

Animal Agriculture and the Environment

It is widely acknowledged that large scale intensive farming models are a key source of environmental degradation, including biodiversity loss and climate change, both in the United Kingdom (UK) and worldwide.³

In looking at animal agriculture in the UK and indeed across the world it is clear that intensive farming is responsible for a great proportion of emissions. In the UK it is estimated that 70% of farm animals are now raised in this system.¹ The mass production and overconsumption of food animals in specific regions and populations have led to dramatic increases in food animals, and therefore greenhouse gas emissions.

¹ We use the [European Union definition](#) of intensive farming which incorporates the number of animals produced.

³ Poore, J. and Nemecek, T. (2019) 'Reducing Food's Environmental Impacts through Producers and Consumers', *Science*.



In this report, we have focused predominantly on large-scale industrial animal agriculture, because this accounts for almost three quarters of the UK's farmed animals. This industrial model, with long supply chains, has not only contributed to increased emissions due to land use change and non-CO2 emissions, but also to biodiversity loss, nitrate pollution, dead zones, the increase of zoonotic diseases and public health impacts such as antimicrobial resistance and cardiovascular diseases.⁴

In 2019 the UK set a global example by legislating to reduce greenhouse gas emissions to net zero by 2050, and earlier this year committed to the world's most ambitious climate change target of a 78% reduction on 1990 emissions levels by 2035.⁵ The Government's current Net Zero Strategy sets out several effective ways to support the realisation of these ambitions, but with only 11 of the 92 recommendations set out by the climate change committee in 2020 fully realised, bold changes are needed to get us back on track.⁶ It is estimated that meeting the Paris Agreement targets would give the UK 12 years of emissions at current levels.⁷

With the world's attention on COP26 in Glasgow, now is the time to be principled and pragmatic in our approach to intensive animal agriculture and the obviously detrimental impact it has on our environment. Reducing emissions is critical to address climate change and its associated risks. In pursuing such measures, the importance of conserving biodiversity and protecting ecosystems cannot be overlooked.⁸ The challenge of climate change must be considered within a broader context that includes wildlife and habitat protection, water usage, and soil degradation – all of which benefit when we reduce intensive farming.

⁴ Sharma, S. (2020) 'Time for the UNFCCC to get serious about industrial livestock's climate footprint'

⁵ UK Government press release, (2021) 'UK enshrines new target in law to slash emissions by 78% by 2035'.

⁶ Climate Change Committee, (2021) 'Progress in reducing emissions'.

⁷ Harwatt, H. and Hayek, M. (2019) 'Eating Away at Climate Change with Negative Emissions', *Harvard Law School*.

⁸ Convention on Biological Diversity, (2021) 'Climate Change and Biodiversity'.



Meat production is one of the largest contributors to global warming and environmental degradation. Over the last five years, animals farmed for human consumption -mainly on large-scale industrial farms- have been responsible for 14.5% of greenhouse gas emissions internationally,⁹ and around 10% of the UK's national emissions.¹⁰ 63% of agriculture emissions are methane from animal agriculture specifically.¹¹ In order to meet the Paris targets, non-CO2 emissions such as methane must be reduced 25% by 2030 to facilitate meeting the Paris targets. Cattle and sheep account for nearly 60% of the UK's non-CO2 agriculture emissions alone, creating a clear need to address this area of agriculture.¹² Animal agriculture cannot remain at current levels in the UK if we are serious about our global leadership in emissions reduction.

The large scale of intensive animal agriculture also drives deforestation and soil degradation.¹³ Globally, 70% of the world's deforestation results from the expansion of land used to grow animal feed and this is a significant driver of biodiversity loss and destroys vital carbon sinks around the world.¹⁴ Soil is vital for biomass production, storing and transforming nutrients, supporting biodiversity, and acting as a carbon sink.¹⁵ Soil degradation, largely as a consequence of intensive agriculture, has been calculated to cost the UK £1.2 billion every year, and has led to 40 to 60%, or 10 billion tonnes, of stored CO2 being emitted as a result of practices such as monocultures, use of fertilisers, and heavy machinery.¹⁶ Industrial livestock production can be a major source of water pollution too, due to fertilisers used to create animal feed soil loss from intensive land management.

⁹ Stoll-Kleemann, S. Schmidt, U.J. (2017) 'Reducing meat consumption in developed and transition countries to counter climate change and biodiversity loss: a review of influence factors', *Regional Environmental Change*.

¹⁰ Climate Change Committee, (2020) 'Agriculture and Land Use'

¹¹ Fitzpatrick, I. et al, (2019) 'The Hidden Cost of UK Food', *Sustainable Food Trust*.

¹² Climate Change Committee, (2018) 'Land use: Reducing emissions and preparing for climate change'.

¹³ Machovina, B. Feeley, KJ. Ripple, WJ. (2015) 'Biodiversity conservation: the key is reducing meat consumption'. *Sci Total Environ*.

¹⁴ Pacheco, P. et al (2021) *Deforestation fronts: Drivers and Responses in a Changing World*. Gland, Switzerland: WWF.

¹⁵ The Royal Society, (2020) 'Soil structure and its benefits: An evidence synthesis'

¹⁶ Environment Agency, (2019) 'The State of the Environment: Soil', *Environment Agency*.



The increased use of medicines, antibiotics and hormones which are particularly present in intensive animal farming environments, also pose pollution risks to soil, water, and livestock products.¹⁷ Costs resulting from pollution, emissions, soil degradation, and biodiversity loss are largely externalised, and consequently hidden from consumer prices. However, some estimates show that in 2015, hidden externality costs were proportionate in a 1:1 ratio with UK consumer spend. In other words, for every £1 spent by consumers on food, £1 was lost on natural capital degradation, biodiversity loss, health costs, imports, and regulatory support.¹⁸ The disproportionate impact of large-scale animal agriculture on the environment necessitates a serious shift in production and consumption if we are to meet environmental targets without putting serious pressure on other sectors. Thus, our recommendations also address biodiversity and conservation as key areas which are currently being destroyed at the hands of industrial-scale meat production.

In the UK, 72% of land is used for agriculture, 85% of which (or 61% of total land in the UK) is used for animal agriculture. This includes land used for growing feed as well as grazing. The inefficiency of livestock production, in terms of the ratio of inputs to outputs, is staggering. Whilst animal products provide only 32% of our diets, they occupy over 60% of our country's land and still require imported meat to supply 26% of our domestic consumption (or 35% of beef and veal).¹⁹ In 2020, the UK imported 1.6 million tonnes of meat, corresponding to an estimated 300 million individuals. This dependence on imports increases the UK's offshore environmental impact from production and transit and increases our vulnerability to food insecurity, as well as reducing our control over welfare, environmental, and quality standards.

These statistics evidence the need for serious attention to be paid to the main drivers of emissions and environmental damage, and bold action be taken to mitigate climate change and meet our legally binding targets.

¹⁷ FAO and ITPS, (2015) 'Status of the World's Soil Resources (SWSR) – Main Report'

¹⁸ Fitzpatrick, I. et al, (2017) 'The Hidden Cost of UK Food', *Sustainable Food Trust*.

¹⁹ BMPA, (2017) 'Imports and Exports' Available at: <https://britishmeatindustry.org/industry/imports-exports/>.



Consequences of Inaction

If we don't make bolder changes, what is a significant problem currently could become even larger. Parthia Dasgupta warns in his seminal overview of the economics of biodiversity that

“if ‘business’ were to continue as usual, consumption in high income countries – and emerging upper-middle and lower-middle income countries – is projected to remain the key factor in driving the world’s ecological footprint ever larger.”²⁰

The UK Committee on Climate Change has set a target for at least a 20% reduction in beef, lamb, and dairy consumption by 2050.²¹ However, this proposed reduction is modest and beef consumption in the UK has been estimated to need to decrease by 89% to stay within planetary boundaries.²² On our current trajectory, and accounting for population growth, we're only on track to reduce all meat consumption by 36% to 2050.²³ Despite the overall reduction in meat intake, reaching meat-consumption targets that align with sustainable diets will require a substantial acceleration of this trend.²⁴ The most efficient way to make these reductions is to address the largest-scale animal agriculture: intensive farming.

²⁰ The Economics of Biodiversity: The Dasgupta Review, (2021)

²¹ Climate Change Committee, (2020) 'Land use: policies for a net zero UK'

²² Springmann, M. Clark, M. Mason-D'Croz, D. et al. (2018) 'Options for keeping the food system within environmental limits', *Nature*.

²³ Pragmatix Advisory forecasts

²⁴ Stewart, C. Carmen, P. Cook, B. Jebb, S. (2021) 'Trends in UK meat consumption: analysis of data from years 1–11 (2008–09 to 2018–19) of the National Diet and Nutrition Survey', *The Lancet*.



The UK Government is making progress in addressing emissions from the agriculture sector as a whole. Recent announcements such as the Farming Investment Scheme which aims to support farmers to reduce their carbon footprint will reduce emissions to an extent.²⁵ The Net Zero strategy published in October 2021 also includes several commitments to reform the sector, including green energy and carbon storage technology.²⁶ However, the evidence shows that these changes alone will not allow us to meet the ambitious targets set out above.²⁷ The industry's emissions have not decreased over the last five years, suggesting that current policies are not having a strong enough impact.²⁸ While 61% of farmers in 2019 were taking action to reduce emissions, around 32% of those who were not felt they didn't have sufficient information on what they could do, and 35% didn't have clarity on the best actions.²⁹ Informational support, as suggested in the Net Zero plan, will be an important tool for UK farmers in this regard.

Many of the solutions outlined below entail potential opportunities for food producers, allowing them to diversify their produce and potentially profit from the growing trend towards plant-based foods. Owners of land restored to forest could diversify their business to include ecotourism and become eligible for compensation through rewilding and climate finance mechanisms to convert their land to a carbon sink.³⁰

As they have indicated in the Net Zero Strategy, the Government must therefore ensure that the agriculture sectors impacted are supported in these changes, while not shying away from the evidence that change must happen.

²⁵ Jones, G. (2021) 'The Farming Investment Fund: An Overview', *DEFRA*.

²⁶ UK Government (2021) 'Net Zero Strategy: Build Back Greener'

²⁷ Climate Change Committee, (2018) 'Reducing Emissions and Preparing for Climate Change'.

²⁸ Harwatt, H. and Hayek, M. (2019) 'Eating Away at Climate Change with Negative Emissions', *Harvard Law School*.

²⁹ DEFRA (2019) 'Agricultural Statistics and Climate Change'.

³⁰ Harwatt, H. and Hayek, M. (2019) 'Eating Away at Climate Change with Negative Emissions', *Harvard Law School*.



Mapping Solutions

Livestock takes up nearly 80% of global agricultural land (land used for growing feed as well as grazing) yet produces less than 20% of the world's supply of calories. This means that *what* we eat is more important than *how much* we eat in determining the amount of land required to produce our food.³¹

Dietary Shifts - Reducing Consumption

One important change needed which is already taking hold across Europe and the US is a reduction in meat consumption. Indeed, changes to our diet will be critical to reducing agricultural emissions.

We should be encouraged by the fact one in seven people globally (around one billion) are now vegetarian or vegan, and this is rising.³² A recent survey by Waitrose found that from a sample of representative respondents in the UK, there is evidence of a trend toward 'flexitarian' diets which are mostly plant-based with animal-sourced foods consumed occasionally, and much less frequently compared to a standard diet. Over 12% identified as either vegan or vegetarian, and 21% as flexitarian.

In addition, recent research by the Institute of Grocery Distribution found that from 2,055 respondents representing the UK, 15% expect to eat less meat in five years' time. Over 50% either now follow or would be interested in following more of a plant-based diet either as a flexitarian, vegetarian or vegan.

We call on the Government to accelerate the promotion of a shift away from meat consumption and towards healthier, more sustainable alternatives.

³¹ Ritchie, H. (2017) 'How much of the world's land would we need in order to feed the global population with the average diet of a given country?'

³² Stoll-Kleemann, S. Schmidt, U. 'Reducing meat consumption in developed and transition countries to counter climate change and biodiversity loss: a review of influence factors', *Regional Environment Change*.



Land Use Reform and Sustainable Farming

A reduction in meat consumption would allow for significant land use reform.³³ It is estimated that if the crops grown for animal feed and biofuel were instead directly consumed by humans, approximately 70% more calories would be available in the global food system.³⁴ As a result, four billion more people could be fed. To put this into perspective, this would feed the entire US population 12 times over and over half of the entire world's population.

This is mainly a result of the inefficiency of mass-produced livestock for consumption. In their research paper *Eating away at climate change with negative emissions*, Harwatt and Hayek show that to produce 1 calorie of beef requires 37 calories of plants, 1 calorie of pork requires 12 calories of plants, and 1 calorie of chicken requires 9 plant calories. Reforming land use to see crops produced for direct human consumption rather than for feeding livestock is therefore a more efficient, and healthier option compared to our current consumption model.³⁵

Harwatt and Hayek dive into this concept in more detail through analysing two possible scenarios. In their first scenario, all current pasturelands and feed croplands would be taken out of production and restored to their natural vegetation cover. Their second scenario would only see pasturelands taken out of production and restored to forest cover, and cropland presently used for feed would remain in production, repurposed to grow crops for human consumption. The reforestation in these scenarios would remove on average 149 megatonnes and 108 megatonnes of CO₂ from the atmosphere per year.

³³ Climate Change Committee, (2018) 'Reducing Emissions and Preparing for Climate Change'.

³⁴ Pimentel, D. and Pimentel, M, (2003) 'Sustainability of meat-based and plant-based diets and the environment', *The American Journal of Clinical Nutrition*.

³⁵ Stoll-Kleemann, S. Schmidt, U. 'Reducing meat consumption in developed and transition countries to counter climate change and biodiversity loss: a review of influence factors', *Regional Environment Change*.



Pragmatix Advisory has compared the carbon reduction from these scenarios with the methane emissions produced by livestock. Reducing livestock farming would reduce methane emissions as well as allowing for repurposing the land. If all the land repurposed in this way were restored to forest cover, it would only take a 19% reduction in animal agriculture (both the number of animals and the land usage) before the remaining methane emissions were balanced by the carbon captured by the new forest. To put figures on it, reducing methane emissions by 19% would leave 27.9 megatonnes of CO₂ equivalent being emitted annually, which would be balanced exactly by the newly forested land removing 27.9 megatonnes of CO₂ from the atmosphere.

If, instead, livestock farming was reduced by 24%, the methane emissions would fall to 26.1 megatonnes of CO₂ equivalent annually. Returning 24% of grazing land to forest and converting 24% of land current used for growing animal feed to growing plant crops for human consumption would remove 26.1 megatonnes of CO₂ from the atmosphere annually, balancing this out.

Thus, a relatively small change in diets could return enough land to forest to compensate for all the remaining emissions from livestock.

Benefits From Shifting Away From Animal Agriculture

The benefits from these measures (or similar) extend far beyond a reduction in greenhouse gas emissions. We can also expect better water filtration, flood buffering, soil health, habitats for wildlife, and enhanced resiliency to climate change impacts.³⁶ Repurposing land from animal agriculture to forest could also provide habitat for wild species reintroductions and help address the global wildlife crisis. Forests also provide opportunities for recreation and would help meet existing commitments for tree planting in the UK – such as the commitment to reforest ~2,000 hectares per year in England by 2022.³⁷

³⁶ Harwatt, H. and Hayek, M. (2019) 'Eating Away at Climate Change with Negative Emissions', *Harvard Law School*.

³⁷ Harwatt, H. and Hayek, M. (2019) 'Eating Away at Climate Change with Negative Emissions', *Harvard Law School*.



In addition, we can expect:

<p>Antibiotic resistance - Changing agricultural production could increase the UK's self-sufficiency to meet the populations' nutritional requirements. As farmed animals are a major user of antibiotics, reducing the number of farmed animals could help tackle antibiotic resistance. This is a growing issue globally and regarded by the World Health Organisation as one of the biggest threats to public health.</p>	<p>Protection against future pandemics – Cramped crowding in industrial factory farms can also provide breeding grounds for future pandemics, by cramming thousands of stressed animals together in constant contact with their own animal waste. Antibiotic-resistant bacterial pathogens and highly contagious zoonotic diseases have already emerged from industrial animal agriculture.</p>
<p>Dietary health – The second biggest risk factor for mortality in the UK is diet related health issues, linked to low consumption of fruit and vegetables and high consumption of red and processed meat. A global shift to plant-based diets has also been estimated to reduce healthcare costs by \$31 trillion.³⁸</p>	<p>Opportunities for food producers – Higher popular demand for plant-based foods could give food producers an opportunity to diversify the food they offer. Owners of land restored to forest could potentially diversify their business to include ecotourism and benefit from climate finance schemes to convert their land to a carbon sink.³⁹</p>

³⁸ Harwatt, H. and Hayek, M. (2019) 'Eating Away at Climate Change with Negative Emissions', *Harvard Law School*.

³⁹ Harwatt, H. and Hayek, M. (2019) 'Eating Away at Climate Change with Negative Emissions', *Harvard Law School*.



Conclusions

The evidence around the detrimental impact of intensive animal agriculture on greenhouse gas emissions is clear. It is now not a question of whether this impact exists, but the strength of the action we pursue in response. A continuation of our current status quo gives the UK 12 years before we exceed our legal emissions limits. This requires serious attention to be paid to the main drivers of emissions in the UK, and bold action be taken to mitigate against current forecasts and meet our legally binding targets.

There is, however, plenty to be optimistic about. Positive progress is being made and the UK has already set a global example by legislating to reduce greenhouse gas emissions to net zero by 2050. We have also set the world's most ambitious target by committing to reducing emissions by nearly 80% on 1990 levels by 2035. As a population we are already seeing trends towards the kind of dietary shifts necessary to transition away from high meat consumption and towards more plant-based diets. Our analysis shows that a relatively small change in diets could return enough land to forest to compensate for all the remaining emissions from livestock. Reducing animal agriculture by just 19% and converting this land to forest would allow the remaining methane emissions to be balanced by the carbon equivalent captured by the new forest.

We welcome the ambitious, world-leading environmental targets set by this Government. If successful, the UK could blaze a trail for the rest of the globe to follow in our footsteps. We must now work closely with the animal agriculture sector as we transition away from current levels of meat production towards a more sustainable future whereby land is used more efficiently. In doing so the UK will become more self-sufficient and less reliant on meat imports, while improving our national contribution to greenhouse gases.



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