

## Submission to EAC inquiry on air pollution in the UK

**3 March 2026**

We are grateful for this opportunity to provide input to the Environmental Audit Committee's inquiry on air pollution in the UK. Our response covers the following questions in the terms of reference: 1, 2, 3, 4, 9, 10, with a specific focus on emissions from agriculture.

Foodrise is a UK-based charity transforming the food system for climate, nature and justice. We take bold action – from launching legal action to producing hard-hitting research - to uncover the root causes of injustice in our food system, exposing how corporate power exploits people and planet, whilst working directly with local communities to build just and resilient alternatives from the ground up.

As one of the leading organisations raising public awareness about the climate and health impacts of intensive livestock farming in the UK, we would like to commend the Committee on its decision to include air pollution linked to agriculture in the scope of its inquiry.

Agricultural emissions are a significant source of air pollution in the UK. Despite this, successive governments have failed to take effective measures to tackle them.

### Question 1: What are the main causes and sources of air pollution?

#### Agriculture is a major source of air pollution

As noted by the EAT-Lancet Commission in its landmark 2025 report, food systems are a major source of air pollutants, such as **ammonia** from fertiliser use and livestock production (37–47 Tg nitrogen per year; 86% of total ammonia [NH<sub>3</sub>] emissions); **airborne dust** from human-driven land system change (e.g., desertification and land management practices); and **primary emissions of particulate matter with a diameter less than 2.5 µm**, mostly from burning for clearing vegetation. Dominant sources of emissions vary regionally and between hemispheres. In parts of the northern hemisphere, nitrogen-based emissions from livestock and fertiliser are the dominant source of aerosol loading, accounting for more than 80% of NH<sub>3</sub> emissions forming secondary PM<sub>2.5</sub> particles.<sup>i</sup>

#### Agriculture is the main source of the UK's ammonia emissions and Europe's biggest cause of PM2.5 air pollution

Agriculture causes emissions of three greenhouse gases: nitrous oxide, methane and carbon dioxide. It is also responsible for **88% of UK emissions of ammonia (NH<sub>3</sub>)**, which is emitted during storage and spreading of manures and slurries and from the application of inorganic fertilisers. Ammonia damages sensitive natural habitats and

**Foodrise (formerly known as Feedback) is a charity transforming the food system for climate, nature and justice.**

foodrise.org.uk | hello@foodrise.org.uk | +44 (0) 7565 764 232 | Registered Charity No: 1155064 Office 518, The Archives, Unit 10 The High Cross Centre, Fountayne Road, London N15 4BE

**contributes to particulate pollution in urban areas.**<sup>ii</sup>

In the UK, cattle are the largest source of ammonia, accounting for 67 per cent of all emissions from livestock in 2024 and 44 per cent of total ammonia emissions. The fall in emissions from livestock other than cattle, especially from the pig and poultry sectors, is the main driver in the gradual fall of overall ammonia emissions since 1990. The spreading of inorganic fertilisers is a large source of ammonia emissions from agriculture (making up 14 per cent of total ammonia emissions in 2024).<sup>iii</sup>

In addition to direct ammonia emissions, in Europe, **agriculture is also estimated to be the biggest cause of fine particulate matter (PM<sub>2.5</sub>) air pollution** – responsible for an estimated 55% of total PM<sub>2.5</sub> linked to human activities, caused primarily by livestock manure and overapplication of fertilisers.<sup>iv</sup> Agriculture mainly causes fine particulate matter indirectly, through its ammonia emissions: Gaseous ammonia in the atmosphere leads to secondary inorganic aerosol formation, which are some of the main constituents of fine particulate matter (PM<sub>2.5</sub>) pollution caused by human activity – such that secondary particulate matter has been estimated to comprise 50% or more of PM<sub>2.5</sub> in Europe.<sup>v</sup>

Question 2: What evidence exists of the extent of air pollution directly or indirectly impacting the health of individuals or communities in England? /

Question 3: What are the wider environmental impacts of air pollution, and what are their cascading effects? What evidence exists of direct or indirect impact?

### Identifying agricultural emissions hotspots in the UK

In the UK, unchecked expansion of intensive livestock units in recent years has seen a 20% increase in megafarms since 2016.<sup>vi</sup> Sustain: the alliance for better food and farming has published a series of '[Muck Maps](#)'<sup>vii</sup> revealing where waste from factory farms is most concentrated and has the potential to cause most harm. Shockingly, these show that national planning rules allow factory farming to expand even in areas where people, wildlife and rivers are being harmed by pollution.

Ammonia pollution is covered by the Government's Clean Air Strategy. However, most farms in the UK are not monitored as a result of a significant loophole excluding all but the largest pig and poultry farms from the monitoring and permitting regime, **completely missing the biggest polluters — beef and dairy farms.** There are also significant weaknesses when it comes to enforcement. According to the Bureau of Investigative Journalism, regulated pig and poultry farms account for **only 4% of the UK's total ammonia emissions**, while many more livestock units keep animal numbers just below the threshold for regulation. The former environment secretary Michael Gove,

had pledged to close the loophole for intensive cattle “megafarms” by 2025.<sup>viii</sup>

In the UK, industrial livestock farming produces more than 50,000 tonnes of untreated excreta per day; every region in the UK now has more nitrogen than it can absorb<sup>ix</sup>. An estimated 74% of EU and UK agricultural land has excessive nitrogen inputs<sup>x</sup> – which can lead to nitrate run-off polluting water, and ammonia emissions released from the soils into the atmosphere.<sup>xi</sup> The authoritative *European Nitrogen Assessment* estimated that 80% of the nitrogen harvest in European crops is used to grow feed for livestock, and only 20% is used to grow crops directly for human consumption, concluding clearly that “Human use of livestock in Europe, and the consequent need for large amounts of animal feed, is therefore the dominant human driver altering the nitrogen cycle in Europe.”<sup>xii</sup>

## Air pollution from agriculture is a major public health threat linked to high mortality

According to the EAT-Lancet report (2025), **agriculture accounts for one-fifth of global mortality related to poor air quality, which is largely due to nitrogen pollution from fertilisers.**<sup>xiii</sup>

Public Health England attributed the 2014 smog in London, in part, to agricultural ammonia emissions.<sup>xiv</sup>

Ammonia (NH<sub>3</sub>) only remains in the atmosphere for a few hours once emitted. However, when it mixes with other gases in the atmosphere, such as nitrogen oxides and sulphur dioxide, it can form particulate matter (PM) which **can exist for several days and be transported large distances.**<sup>xv</sup>

Fine particulate matter pollution was estimated to cause **33,000 deaths per year in the UK in 2019**<sup>xvi</sup>. Approximately **60% of UK particulate air pollution comes from ammonia on UK farms**<sup>xvii</sup>, largely from livestock manure and fertiliser used to grow animal feed. **This pollution is not limited to the countryside** – UK agricultural emissions of ammonia were estimated to contribute 38% of air particle pollution in Leicester, 32% in Birmingham and 25% in London in 2019<sup>xviii</sup>.

According to the Healthy Air Coalition, a collective of leading health, environment and transport organisations, **PM2.5 has the highest cost to society and the NHS of any pollutant.** Short-term exposure can exacerbate asthma, cause breathing difficulties, and trigger heart attacks and strokes. Long-term exposure is linked to cognitive decline and increased risk of dementia, development of respiratory conditions and increased risk of premature death. Approximately one in ten cases of lung cancer in the UK can be linked to air pollution.<sup>xix</sup>

Alastair Lewis, a professor of atmospheric chemistry at the National Centre for Atmospheric Science estimates that PM2.5 is probably responsible for somewhere between half and three quarters of the total harm we derive as humans from air pollution.”<sup>xx</sup>

Reducing the volume of livestock manure, and reducing the need for fertilisers to grow animal feed, would help substantially reduce deaths from air pollution, and reduce associated costs to the health service.

Question 4: Are the current national targets and performance for air pollution, such as those in the Air Quality Environment Act target delivery plan and the 10-year Health Plan, adequate, ambitious and wide-ranging enough to provide adequate protection for public health and the environment, and how do they compare with WHO recommendations?

The UK has legally-binding commitments to reduce ammonia emissions but they are going down too slowly

To meet its obligations under the UNECE Gothenburg Protocol and National Emissions Ceilings Directive [implemented in UK legislation through the National Emission Ceilings Regulations (2018) (NECR)]<sup>xxi</sup>, the UK has a legally-binding commitment to reduce emissions of ammonia against the 2005 baseline by 8% by 2020 and 16% by 2030.<sup>xxii</sup>

While emissions of ammonia saw an increase between 2014 and 2023, overall they have decreased by 17 per cent since 1990, to 256,000 tonnes in 2024. According to Defra, **the majority of this reduction occurred between 1990 and 2008**. The UK was compliant in 2024 with both the National Emissions Ceiling Regulations (NECR) and the Convention on Long-range Transboundary Air Pollution (CLRTAP) 2020-2029 emission reduction commitments.<sup>xxiii</sup>

According to the Healthy Air Coalition, **in reality, emissions have flatlined since 2008 and the UK is currently projected to miss its 2030 emission reduction target for ammonia unless further action is taken.**<sup>xxiv</sup>

The Task Force on Reactive Nitrogen of the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution recommended that **halving European meat and dairy consumption is one of the best ways to reduce European nitrogen pollution.**<sup>xxv</sup> A 2014 study estimated that halving European meat and dairy consumption could lead to 40% lower nitrogen emissions.<sup>xxvi</sup> A 2022 study estimated that shift to the Planetary Health Diet would result in an estimated 23.4% reduction in EU and UK fertiliser use.<sup>xxvii</sup>

Question 9: What are the economic or freedom of choice arguments for or against further action on air pollution?

An obvious argument in favour of further action on air pollution is to correct the negative externalities described above, which carry huge costs for society. For example, higher particulate matter formation as a result of ammonia emissions leads to increased asthma

and heart disease, **lost productivity from sick days** and **places greater strain on the NHS**. When it comes to air pollution from agriculture in particular, taking action to curb emissions from the most polluting companies and activities would help **level the playing field for other players, e.g. horticulturalists and other producers supplying plant-based protein to the UK market**, where significant economic potential lies, representing a huge opportunity for British growers and farmers.

A shift to lower meat and dairy consumption has potential to create **numerous co-benefits for public health and the environment**. A recent study of UK diets found that low-meat diets have approximately half the emissions and land use of high meat diets, whilst vegan diets have around a quarter of the emissions and land use as a high meat diet<sup>xxviii</sup>. An Oxford University study found that reducing average meat consumption in the UK to two to three servings per person per week could prevent 45,000 premature deaths and **reduce NHS costs by £1.2 billion per year**<sup>xxix</sup>. A peer-reviewed study estimated that the Planetary Health Diet would be 17% cheaper than the UK's current average diet in 2017 – when also factoring in savings to health and climate change costs, and assuming food waste is halved, it would be 35% cheaper<sup>xxx</sup>. This could **help tackle the cost of living crisis and free up funding to improve NHS and school services**.

There are a number of policy levers that the UK can use to achieve dietary change:

- **Reform public procurement and the UK's dietary guidelines:** For recommendations on how the UK could reform its public procurement of food and dietary guidelines to support healthy sustainable diets, see [Foodrise's joint policy briefing 'Serving Up'](#) – co-signed by 25 health and sustainability organisations.
- **Reform farming subsidies and introduce a Plant Based Action Plan:** Foodrise explores strategies for how subsidies could be reformed to support a just transition to healthy sustainable diets in Foodrise's report 'CAP at the Crossroads' – which focuses on the EU context, but has many transferable lessons for the UK.
- **Introduce a moratorium on new factory farms**

Question 10. How does UK air quality regulation compare with international counterparts? What comparisons or best practice can be learned from other countries? Has the UK kept pace with its international counterparts?

Regarding emissions of PM<sub>2.5</sub>, England's current target is to reach a maximum concentration of PM<sub>2.5</sub> of 10µg/m<sup>3</sup> by 2040 and a 35 per cent reduction in population exposure by 2040 (compared to a base year of 2018)<sup>xxxi</sup>. This is less ambitious than the level recommended by the World Health Organization (WHO), whose updated 2021 air quality guidelines recommend more stringent health-based targets (annual PM<sub>2.5</sub>: 5 µg/m<sup>3</sup>). The UK also lags behind the EU: under the revised EU Ambient Air Quality Directive that entered into force in 2024<sup>xxxii</sup>, the European Union's legally binding annual limit value for PM<sub>2.5</sub> will be: 10 µg/m<sup>3</sup> by 1 January 2030, a full decade before England.

According to the Chartered Institute for Environmental Health, England's current PM2.5 targets do not take on board up-to-date evidence and modelling showing most of the country will achieve a more stringent standard.<sup>xxxiii</sup>

Foodrise therefore backs the call of the Healthy Air Coalition to strengthen the clean air regulatory framework by introducing a new Clean Air Act that sets ambitious targets for air quality, aligned with the latest World Health Organization air quality guidelines.<sup>xxxiv</sup>

**For questions or follow up enquiries, please contact:**

Natasha Hurley, Deputy Director, [natasha@foodrise.org.uk](mailto:natasha@foodrise.org.uk), 07585 663648

## References:

---

<sup>i</sup> The EAT–Lancet Commission on healthy, sustainable, and just food systems, Rockström, Johan et al. *The Lancet*, Volume 406, Issue 10512, 1625 - 1700

<sup>ii</sup> Department for Food, Environment and Rural Affairs (Defra), 2019, Clean Air Strategy <https://assets.publishing.service.gov.uk/media/5c3b9debe5274a70c19d905c/clean-air-strategy-2019.pdf>

<sup>iii</sup> Defra, Emissions of air pollutants in the UK – Ammonia (NH<sub>3</sub>), updated 12 February 2026 <https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-ammonia-nh3>

<sup>iv</sup> Fiona Harvey, 'Farming Is "single Biggest Cause" of Worst Air Pollution in Europe', Environment, *The Guardian*, 17 May 2016, <https://www.theguardian.com/environment/2016/may/17/farming-is-single-biggest-cause-of-worst-air-pollution-in-europe>; Susanne E. Bauer et al., 'Significant Atmospheric Aerosol Pollution Caused by World Food Cultivation', *Geophysical Research Letters* 43, no. 10 (2016): 5394–400, <https://doi.org/10.1002/2016GL068354>.

<sup>v</sup> Bauer et al., 'Significant Atmospheric Aerosol Pollution Caused by World Food Cultivation'.

<sup>vi</sup> Sustain, '20% increase in the number of factory farms since 2016', 13 February 2024 <https://www.sustainweb.org/news/feb24-compassion-in-world-farming-factory-farm-map/>

<sup>vii</sup> Sustain, 'Muck Maps: The rivers and constituencies with the most factory farm waste' <https://www.sustainweb.org/food-for-the-planet/muck-map/>

<sup>viii</sup> Bureau of Investigative Journalism, Deadly Gas: Cutting Farm Emissions in Half Could Save 3,000 Lives a Year, 13 June 2019 <https://www.thebureauinvestigates.com/stories/2019-06-13/deadly-gas-ammonia-cutting-farm-emissions-could-save-3000-lives-a-year>

<sup>ix</sup> Sustain, 'Alarming Levels of Industrial Animal Waste Poisoning UK Rivers', Sustain, 4 July 2023, <https://www.sustainweb.org/news/jun23-industrial-agriculture-toxic-waste/>.

<sup>x</sup> European Environment Agency et al., *The State of Soils in Europe: Fully Evidenced, Spatially Organised Assessment of the Pressures Driving Soil Degradation* (Publications Office of the European Union, 2024), 6, <https://data.europa.eu/doi/10.2760/7007291>.

<sup>xi</sup> European Environment Agency et al., *The State of Soils in Europe*, 27.

<sup>xii</sup> Mark A. Sutton et al., eds, *The European Nitrogen Assessment: Sources, Effects and Policy Perspectives* (Cambridge University Press, 2011), xxvii, <https://doi.org/10.1017/CBO9780511976988>.

<sup>xiii</sup> EAT–Lancet Commission, *Op. Cit.*

<sup>xiv</sup> Defra, 2019, Clean Air Strategy *Op. Cit.*

<sup>xv</sup> Defra, 2026, Emissions of air pollutants in the UK – Ammonia (NH<sub>3</sub>), *Op. Cit.*

<sup>xvi</sup> European Environmental Agency, 'Health Impacts of Air Pollution in Europe, 2021', Briefing, European Environmental Agency, 2021, <https://www.eea.europa.eu/publications/air-quality-in-europe-2021/health-impacts-of-air-pollution>.

<sup>xvii</sup> Damian Carrington, 'Ammonia from Farms behind 60% of UK Particulate Air Pollution – Study', Environment, *The Guardian*, 4 November 2021, <https://www.theguardian.com/environment/2021/nov/04/ammonia-from-farms-behind-60-of-uk-particulate-air-pollution-study>; Baojing Gu et al., 'Abating Ammonia Is More Cost-Effective than Nitrogen Oxides for Mitigating PM2.5 Air Pollution', *Science* 374, no. 6568 (2021): 758–62, <https://doi.org/10.1126/science.abf8623>.

- 
- <sup>xviii</sup> Jamie M. Kelly et al., ‘Diagnosing Domestic and Transboundary Sources of Fine Particulate Matter (PM2.5) in UK Cities Using GEOS-Chem’, *City and Environment Interactions* 18 (April 2023): 100100, <https://doi.org/10.1016/j.cacint.2023.100100>.
- <sup>xix</sup> Healthy Air Coalition, Making Britain’s air cleaner, healthier and better to breathe: A blueprint for government action on clean air, 2025 <https://www.healthyair.org.uk/wp-content/uploads/2025/06/HAC-Policy-Blueprint-Report.pdf>
- <sup>xx</sup> Bureau of Investigative Journalism, *Op. Cit.*
- <sup>xxi</sup> Defra, Code of Good Agricultural Practice (COGAP) for Reducing Ammonia Emissions, updated 1 January 2024 <https://www.gov.uk/government/publications/code-of-good-agricultural-practice-for-reducing-ammonia-emissions/code-of-good-agricultural-practice-cogap-for-reducing-ammonia-emissions>; Defra, Emissions of air pollutants in the UK – background, updated 12 February 2026 <https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-background>
- <sup>xxii</sup> Defra, 2019, Clean Air Strategy *Op. Cit.*
- <sup>xxiii</sup> Defra, 2026, Emissions of air pollutants in the UK – Ammonia (NH3), *Op. Cit.*
- <sup>xxiv</sup> Healthy Air Coalition, *Op. Cit.*
- <sup>xxv</sup> Adrian Leip et al., “Appetite for Change: Food System Options for Nitrogen, Environment & Health. 2nd European Nitrogen Assessment Special Report on Nitrogen & Food” (Task Force on Reactive Nitrogen of the UNECE Convention on Long-range Transboundary Air Pollution., December 20, 2023), <https://doi.org/10.5281/ZENODO.10406450>.
- <sup>xxvi</sup> Henk Westhoek et al., ‘Food Choices, Health and Environment: Effects of Cutting Europe’s Meat and Dairy Intake’, *Global Environmental Change* 26 (May 2014): 196–205, <https://doi.org/10.1016/j.gloenvcha.2014.02.004>.
- <sup>xxvii</sup> Zhongxiao Sun et al., ‘Adoption of Plant-Based Diets across Europe Can Improve Food Resilience against the Russia–Ukraine Conflict’, *Nature Food* 3, no. 11 (2022): 11, <https://doi.org/10.1038/s43016-022-00634-4>.
- <sup>xxviii</sup> Peter Scarborough et al., “Vegans, Vegetarians, Fish-Eaters and Meat-Eaters in the UK Show Discrepant Environmental Impacts,” *Nature Food* 4, no. 7 (July 2023): 565–74, <https://doi.org/10.1038/s43016-023-00795-w>.
- <sup>xxix</sup> Pete Scarborough et al., “Modelling the Health Impacts of the Diets Described in ‘Eating the Planet’ Published by Friends of the Earth and Compassion in World Farming,” 2010, 13.
- <sup>xxx</sup> Marco Springmann et al., “The Global and Regional Costs of Healthy and Sustainable Dietary Patterns: A Modelling Study,” *The Lancet Planetary Health* 5, no. 11 (November 1, 2021): e797–807, [https://doi.org/10.1016/S2542-5196\(21\)00251-5](https://doi.org/10.1016/S2542-5196(21)00251-5) Supplementary appendix 3 - GBR figures - flexitarian diet - market and market-waste figures in 2017.
- <sup>xxxi</sup> Defra, Development of the Environment Act Targets <https://uk-air.defra.gov.uk/pm25targets/targets-development>
- <sup>xxxii</sup> DIRECTIVE (EU) 2024/2881 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on ambient air quality and cleaner air for Europe [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L\\_202402881](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202402881)
- <sup>xxxiii</sup> British Safety Council, Improving air quality, now and in the future, 10 June 2024 <https://www.britsafe.org/safety-management/2024/improving-air-quality-now-and-in-the-future>
- <sup>xxxiv</sup> Healthy Air Coalition, *Op. Cit.*