

# We must wake up to devastating impact of nitrogen, say scientists

October 23 2019

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Testing of nitrogen flux measurement methods over rice in Odisha, India. Credit: Mark Sutton

More than 150 top international scientists are calling on the world to take urgent action on nitrogen pollution, to tackle the widespread harm it is causing to humans, wildlife and the planet.

The scientists highlight that "the present environmental crisis is much more than a carbon problem" and are asking all countries "to wake up to the challenge" of halving [nitrogen](#) waste from all sources globally by 2030.

Nitrogen, through its many forms—which include ammonia, nitrogen dioxide, [nitrous oxide](#) ('laughing gas', a greenhouse gas 300 times more powerful than carbon dioxide) and nitrate—is polluting our air, soil and water, posing a threat to [human health](#), biodiversity, economies and livelihoods.

A future focus on sustainable nitrogen management would help prevent millions of premature deaths, help ensure food security, and simultaneously help protect wildlife and the ozone layer.

Currently, 80 per cent of nitrogen used by humans—including through crop, meat and [dairy production](#), as well as via transport, energy, industrial and wastewater processes—is wasted and enters the environment as pollution. Nitrogen losses in UK are estimated at 1.4 million tonnes a year, at a market cost of US \$1.4 billion, globally this amounts to 200 million tonnes a year at cost of US \$200 billion.

UK scientists are leading global research efforts into the sustainable use of nitrogen in agriculture, transport and industry. Today [Oct 23] they have released a report outlining the problem and possible solutions, entitled 'Nitrogen: Grasping the Challenge', together with an [open letter](#) to António Guterres, Secretary General of the United Nations, asking him to mobilise global action.

The signatories of the letter are led by Professor Mark Sutton of the UK's Centre for Ecology & Hydrology (CEH), who is Director of the UN Environment Programme (UNEP) International Nitrogen Management System (INMS) and co-chair of the UN-ECE Task Force on Reactive Nitrogen. The letter includes more than 150 signatories from around 35 countries.

They stress to Mr Guterres: "If we want to beat climate change, air pollution, water pollution, biodiversity loss, soil degradation and stratospheric ozone depletion, then a new focus on nitrogen will be vital."

Nitrogen has many forms with multiple impacts in the environment:

- Gases such as ammonia (NH<sub>3</sub>) and nitrogen dioxide (NO<sub>2</sub>) are key components of particulate matter, thereby contributing to poor air quality which can aggravate respiratory and heart conditions, leading to premature deaths
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- Nitrate from chemical fertilisers, manure and industry pollutes rivers, seas and soils posing a health risk for humans, fish, coral and plant life
- Nitrous oxide (N<sub>2</sub>O) is a greenhouse gas that depletes the ozone layer and is 300 times more powerful than carbon dioxide.

The open letter comes as environment ministers attend the launch of a UN Global Campaign on Sustainable Nitrogen Management, being held in Colombo on October 23-24 under the lead of H.E. President Sirisena of Sri Lanka. The scientists have worked with Sri Lanka to develop a proposed Colombo Declaration to reduce nitrogen pollution, which

highlights the ambition to 'halve nitrogen waste' and paves the way to establish a new international agreement to work together on nitrogen pollution.

The Colombo event will also see the world premiere of a [Nitrogen Song](#) by Grammy Award-winning songwriter Ricky Kej.

The report 'Nitrogen: Grasping the Challenge' has been produced by INMS which includes contributions from more than 70 UK and international science institutes, government agencies and companies. It highlights possible ways of reducing [nitrogen pollution](#), including more efficient use and application of fertilisers and manure in agriculture; cutting food waste plus avoiding excessive meat and dairy consumption to reduce global production; and, new technology to recapture nitrogen oxide emissions from transport and fossil fuel burning.

Professor Sutton says: "It's vital we make the transition from a linear system of waste to a 'circular economy' for nitrogen to prevent large-scale losses that have an impact on human health, livelihoods and planet Earth."

Provided by Centre for Ecology & Hydrology

Citation: We must wake up to devastating impact of nitrogen, say scientists (2019, October 23) retrieved 4 May 2024 from

<https://phys.org/news/2019-10-devastating-impact-nitrogen-scientists.html>

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