

Targeting pollution could save millions of lives

Planet Earth Online

Limiting how much soot and methane reaches the atmosphere using existing technologies could save nearly five million lives every year, and vastly boost global crop yields, scientists report.



Planting rice in the paddy field.

Controlling atmospheric levels of these pollutants could also slow global warming by around half a degree by 2050.

'Measures to control methane and black carbon emissions would have multiple, large benefits to global and regional climate, human health and agriculture,' write the report's authors.

The findings suggest that all countries would ultimately benefit from less soot and methane in the atmosphere. But the biggest effects would be felt by central and northern Asia, southern Africa, and the Mediterranean. Most lives would be saved in Asia and Africa; the researchers estimate that between 700,000 and 4.7 million premature deaths could be prevented.

Crop yields in China, India, the US, Pakistan and Brazil could increase by between 30 million and 135 million tonnes every year.

An international team of researchers led by Drew Shindell from NASA's Goddard Institute for Space Studies used sophisticated emissions, air quality and climate models to estimate the potential benefits of emissions reductions.

After screening around 400 different emissions control measures, they identified 14 strategies that rely on current technologies, and – if implemented immediately – would slow the pace of global warming. Seven of the measures target soot emissions, while the others deal with methane. All of them have been successfully applied in different parts of the world.

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Measures based on existing technologies

'All 14 measures are based on existing technologies and can be implemented immediately, so do not require long development processes. The measures maximise climate benefits but would also have important 'win-win' benefits for human health and agriculture,' says Dr Johan Kuylenstierna from the University of York, a co-author of the report.

Methods to cut damaging methane emissions include capturing gas that would normally escape from coal mines and oil rigs, reducing leakage from long-distance gas pipelines, and limiting emissions from manure on farms.

Schemes to limit how much soot makes it to the atmosphere include installing particle filters on diesel vehicles, keeping high-emitting vehicles off the road, and banning burning agricultural waste.

Soot, or black carbon, comes from the incomplete combustion of fossil fuels – mostly from diesel engines, and burning biomass like wood or agricultural residues. It warms the atmosphere by absorbing radiation from the sun, and reduces the reflectivity of snow and ice when particles fall to the Earth's surface.

Methane emissions come from such sources as belching cattle, manure, and rice paddies. The compound is a precursor to ground-level or lower-atmosphere ozone. While ozone in the upper atmosphere protects us from harmful rays, ground-level ozone is an ingredient of smog, which can cause health problems. This type of low-level ozone also damages plants, reducing agricultural yields.

'Measures taken now to reduce carbon dioxide emissions will not have any effect on the global climate for another 40 or 50 years. We have shown that there are things we can do to begin to mitigate the temperature increases already being seen,' says Professor Martin Williams from King's College London, another co-author.

The report highlights other benefits of cutting emissions. They include less indoor pollution from inefficient cooking stoves, a slowdown in ice melting in the Arctic and the Himalayas, and less disruption to traditional rainfall patterns.

The findings are reported in *Science*.

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