Air pollution caused by ground-level ozone will become a serious threat to human health and food security within the next century unless action is taken on a global scale, according to a recent report.

Ozone is a significant air pollutant and important greenhouse gas, third only to carbon dioxide and methane in terms of impact on the climate. It is a powerful oxidant that exacerbates conditions such as asthma and interferes with plant growth, which may have important implications for food security and biodiversity. Previous research has found that, at current concentrations, ozone has significant impacts on human health and the environment. In the EU, ozone is responsible for 21400 premature deaths per year, and losses associated with reduced yields of arable crops are estimated to be around 6.7 billion Euros.

Unlike other pollutants, ozone is not emitted directly. It is a secondary pollutant formed by sunlight-driven chemical reactions involving the gases carbon monoxide, methane, nitrogen oxides and volatile organic compounds, which are already present in the air. These gases arise from both natural activities and a broad range of human activities, such as the burning of fossil fuels, the burning of biomass (including wood and biofuels) and deforestation. Ozone produced in one country can be transported to other countries through weather systems, and as such, the report describes the situation as ‘a global problem, requiring a global solution’.

The report looks at possible changes in global and regional ozone concentrations over the next 50-100 years and evaluates the potential effects of ozone on human health, the natural environment, agriculture and the climate system. Emissions of the gases that lead to ozone production are expected to continue to rise as a result of economic and population growth.

The report concludes that the implementation of legislation and technologies currently adopted worldwide will be critical if further increases in ozone are to be avoided. In rapidly developing regions such as South East Asia, where emissions are expected to grow swiftly, ozone will increase with significant implications for food security and human health. Climate change will exacerbate these effects leading to poorer air quality in these regions.

Many sources of ozone pollution are not yet regulated, including international shipping and aviation, both of which are expected to grow rapidly over the next decade. In the EU, emissions of NOx from shipping are projected to exceed land based emissions by 2020. The report highlights the potential benefits of ozone control as a means of achieving climate change policy objectives and calls for better integration of energy, climate and ozone policies.

The authors recommend more research into how anthropogenic and natural emissions may change in the future, and better monitoring and reporting, particularly in developing countries. An improved understanding of the interactions between ozone and the climate is also needed, as well as studies that investigate impacts of ozone on non-European/North American crops and biodiversity.


Contact: Rachel.Garthwaite@royalsociety.org

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