

Meat-eating causes 75,000 Chinese deaths a year through pollution

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Dietary shifts towards eating more meat causes 75,000 premature deaths a year in China through air pollution, a study shows.

The study, published in the journal *Nature Food*, is the first to examine how changes in diets in China from 1980-2010 have increased emissions of agricultural ammonia (NH_3) from fertilizer and livestock manure and to quantify the subsequent impacts on human health.

Increases in [meat](#) production across the world over the past 50 years are most stark in East Asia, and particularly China.

While more meat and less grain in diets is known to be bad for human health, this study is the first to quantify the impact of Chinese dietary changes through changes in agricultural practices that lead to poorer air quality.

Fine particulate matter [air pollution](#) poses a serious environmental risk to human health and is associated with a range of adverse health conditions, including respiratory conditions, lung cancer and cardiovascular diseases.

Agricultural ammonia (NH_3) is emitted from nitrogen-based fertilizer and livestock manure that leaches off fields growing feed for livestock. This reacts with other airborne chemicals to form an important, toxic, component of fine particulate matter air pollution.

The research group was formed through the University of Exeter and the Chinese University of Hong Kong's Joint Centre for Environmental Sustainability and Resilience (ENSURE), established in 2018 to promote international, inter-disciplinary research addressing some of the most important environmental challenges facing societies across the world.

The researchers analyzed the changing patterns of food production and consumption in China and found that meat production over the period 1980-2010 increased 433% from 15 to 80 megatons.

A relatively small proportion was attributed to rising population levels

with the remaining 60 megatons a result of changing diets.

In the same time period, agricultural ammonia (NH_3) emissions were found to have almost doubled, and the researchers estimated dietary changes were responsible for 63% of the rise, with the main driver being meat consumption.

Based on this, they estimate that 5% of the 1.83 million Chinese deaths related to particle matter pollution in 2010 could be attributable to dietary changes, with the majority of that figure due to rising demand for meat.

If Chinese diets were less meat-intensive, it would reduce agricultural ammonia emissions and reduce the harmful effects of air pollution on health for the entire population, the study found.

It estimated that if the average Chinese diet was replaced by the less meat-intensive diet recommended by the 2016 Chinese Dietary Guideline, [ammonia emissions](#) would decrease by 2.1Tg (teragrams) and 74,805 deaths could be avoided.

Professor Xiaoyu Yan, Professor in Sustainable Energy Systems at the University of Exeter, said, "A top priority of China in the 1980s was to satisfy the people's basic food demand.

"But now, as the problem of undernourishment has substantially decreased, a more sustainable path for production and consumption of food is urgently needed. The current trajectory of food choices in China needs to be altered to reduce its effects on both human and environmental health domestically and worldwide."

Co-author Professor Gavin Shaddick, Chair of Data Science and Statistics at the University of Exeter and Co-Director of the Joint Centre

for Excellence in Environmental Intelligence, added, "We show that changing food consumption patterns can not only lead to improved health through more healthy diets but also has important co-benefits in terms of the environmental impacts of the agricultural sector and those additional effects on human health."

The researchers found there were great disparities between affluent and poorer members of society.

While the adverse health effects of eating more meat are largely experienced by those who can afford it, the effects due to increased levels of air pollution are experienced by those living on lower incomes in major agricultural regions such as Hebei and Henan.

"These inequalities demonstrate an ethical dimension of meat consumption that deserves attention when developing public policy," said Professor Yan.

More information: Xueying Liu et al, Dietary shifts can reduce premature deaths related to particulate matter pollution in China, *Nature Food* (2021). [DOI: 10.1038/s43016-021-00430-6](https://doi.org/10.1038/s43016-021-00430-6)

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