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Press release

Issued by Dr Donal Murphy-Bokern

Nitrogen pollution, climate and land use: what we eat matters.

Lohne, Germany and Den Haag, Netherlands.

An international team of agricultural and environmental scientists, including Dr Donal Murphy-Bokern of Lohne, announced the findings of research that for the first time how much our food choices affect pollutant nitrogen emissions, climate change and land-use across Europe.

The production of our food and the nitrogen cycle upon which all life depends are very closely linked. However, our distortion of the nitrogen cycle to boost food production results in consequences that is now causing widespread concern: nitrates in water, ammonia emissions damaging sensitive ecosystems, and increased emissions of nitrous oxide which is a very potent greenhouse gas. About 80% of our nitrogen pollution is due to the production of meat, milk and eggs. A group of European scientists have just published the results of research that has examined the question: What would be the large-scale consequences for the environment and human health if consumers in an affluent world region such as Europe were to replace part of their consumption of meat, dairy produce and eggs with plant-based foods?

Report lead author Henk Westhoek, program manager for Agriculture and Food at PBL (the Netherlands Environmental Assessment Agency) said, "The report shows that if all people within the EU would halve their meat and dairy consumption, this would reduce greenhouse gas emissions from agriculture by 25 to 40%, and nitrogen emissions by 40%. The EU could become a major exporter of food products, instead of a major importer of for example soy beans."

Co-author of the report Prof Mark Sutton, an Environmental Physicist at the UK's Centre for Ecology and Hydrology, said, "Human's use of nitrogen is a major societal challenge that links environment, food security, and human health. There are many ways in which society could improve the way it uses nitrogen, and this includes

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actions by farmers and by ourselves. Our new study shows that adopting a demitarian* diet across Europe would reduce nitrogen pollution levels by about 40%.”

Co-author Dr Donal Murphy-Bokern who is an independent scientist from Lohne in Germany said , “Many parts of northern Europe in particular are struggling with nitrogen pollution of air and water. This study shows very clearly that the shift towards more sustainable diets could make a huge contribution to relieving these pressures, open up opportunities for other uses of our land, and would reduce risks to our health.”

Effects on the environment and land needs

The research team used a range of models of European farming and food production systems to examine the continental-scale effects of reducing meat and milk consumption. The research used scenarios to examine the large-scale consequences of replacing 25–50% of animal-derived foods with plant-based foods, assuming corresponding changes in production.

The research shows that if all people within the EU would halve their meat and dairy consumption, this would reduce greenhouse gas emissions from agriculture by 25 to 40%, and nitrogen emissions by 40%. The per-person area of agricultural land needed for our food is reduced by 23%. In these circumstances, the EU could become a large net exporter of cereals and the use of soy bean meal is reduced by 75%. They show that the recovery of nitrogen in our food increases from the current 18% to 41–47%, depending on choices made regarding land use.

Health

What are the effects of change for the consumer? The research team carefully examined the changes in relation to current official health guidelines. This shows that their test scenario of halving meat and dairy consumption reduces saturated fat intake to about the recommended levels. It also brings average red meat consumption in line with intake levels advised by the World Cancer Research Fund (a maximum of about 70 g per person, per day). The protein intake remains well above requirements. For most consumers, the tested scenarios mean better alignment with existing health guidelines and reduced risks to health.

Overall effects

This study is one of the first to examine, in detail, the relationships between diet-led changes in food production and continental-scale effects on land use, the N cycle, greenhouse gas emissions and the associated implications for human health. It demonstrates how dietary changes could produce a cascade of effects, through reduced production of livestock and manure, lower feed demand, resulting in lower N and greenhouse gas emissions, and freeing up agricultural land for other purposes. In Europe, the evidence of diet being an important factor in relation to environmental policy has already impacted the policy community. The European Commission's Roadmap to a Resource-Efficient Europe highlights the food sector as a priority area for developing incentives for a healthier and more sustainable production and consumption of food. These diet-led changes in food production patterns would have a large economic impact on livestock farmers and associated supply-chain actors such as the animal feed industry and meat processing sector. Even a small reduction, which is the current trend, could have a large effect in some regions.

Scenarios

The research used scenarios to examine the effect of change. These scenarios, for example a 50% reduction in the consumption of livestock products, are neither predictions nor recommendations in themselves. They are tools to examine the effects of change in a particular direction. The results show clearly that for the average consumer, reducing the consumption of meat, milk and eggs will reduce pressure on the environment and is in line with current health recommendations.

Background

The research was done within the Task Force for Reactive Nitrogen (TFRN) , which is a group of scientists linked to the United Nations Economic Commission for Europe and who advise on transboundary pollution such as ammonia emissions from livestock. The research will be published in the academic journal Global Environmental Change in May 2014. The TFRN is tasked with providing policy makers in the Convention on Long-range Transboundary Air Pollution with scientific evidence to support international decision making on environmental policies, especially as these link air pollution with water, soil, climate and biodiversity.

*The term 'demitarian' refers to half the normal consumption of meat (and by extension other animal products) compared with the normal local situation in

developed countries. The term was introduced by Prof. Sutton in 2009 as part of the “Barsac Declaration on Environmental Sustainability and the Demitarian Diet”. This document represents a commitment by scientists to reduce the environmental footprint of their own conferences. See <http://www.nine-esf.org/barsac-declaration>

Funding for the work:

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Further information

The press release on the CEH website
http://www.ceh.ac.uk/news/news_archive/nitrogen-pollution-why-what-we-eat-matters_2014_20.html

and an accompanying news story
<http://www.ceh.ac.uk/news/press/whywhatweeatmatters.asp>

Report Executive Summary on the TFRN site
http://www.clrtap-tfrn.org/webfm_send/555
and a news item.
<http://www.clrtap-tfrn.org/>

Westhoek, H., Lesschen, J., Rood, T., Wagner, S., De Marco, A., Murphy-Bokern, D., Leip, A., van Grinsven, H., Sutton, M., Oenema, O. (in press). Food choices, health and environment: effects of cutting Europe’s meat and dairy intake. Global Environmental Change. (in press, for publication May 2014)
<http://www.sciencedirect.com/science/article/pii/S0959378014000338>

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