Assessing Mitigation Pathways to Realise Public Health Benefits of Air Pollutant Emission Reductions from Agriculture (AMPHoRA)

London Smog event in 2014 - http://www.thetimes.co.uk/tto/environment/article4053987.ece

TFIAM 2020, Edinburgh (Virtual)

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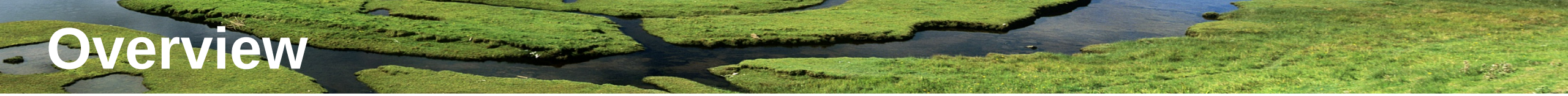


Overview

- National Institute for Health Research (NIHR) Public Health Research funding call 18/148 - Air pollution: non-road traffic-related outdoor air pollution and health launched in Fall 2018
- 2-Stage process, funding decision June 2019
- 2 projects funded on agricultural emissions, AIM-Health (led by Institute of Occupational Health) and AMPHoRA
- Volume £875k over 30 years, started 1 April 2020

Team

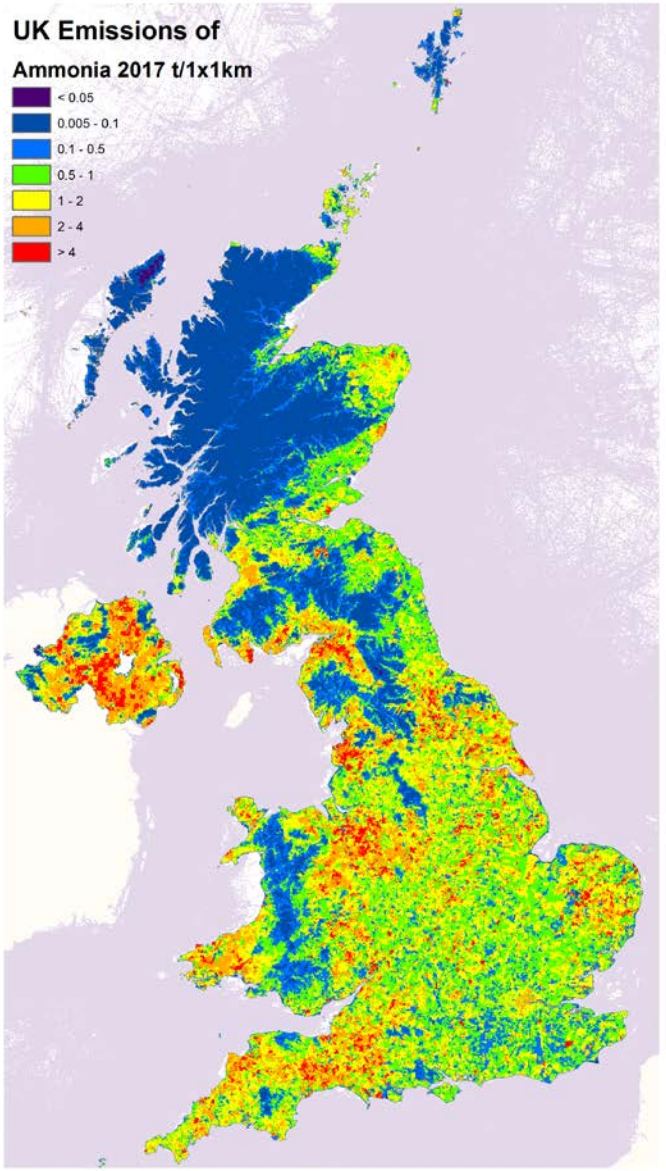
LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

THE UNIVERSITY OF EDINBURGH

mindthe:gap

EMRC

ROTHAMSTED RESEARCH



Key questions to address

- Contribution of **agricultural emissions of NH_3** and other air pollutants to the **exposure of UK population to harmful levels of $PM_{2.5}$**
- Effectiveness of **existing and planned policy interven**tions to **mitigate emissions and reduce exposure**.
- **Public health benefits** in terms of **cost savings** and **improving well-being** of vulnerable population groups, patients and the general public.
- Impacts of **interventions in terms of socio-economic and environmental aspects**, accounting for **co-benefits and unintended consequences**, with a focus on **regional and distributional effects**.
- Potential **co-benefits of emission and dietary changes** for greenhouse gas (GHG) emissions, biodiversity and non-communicable disease prevention.

Research question & aims

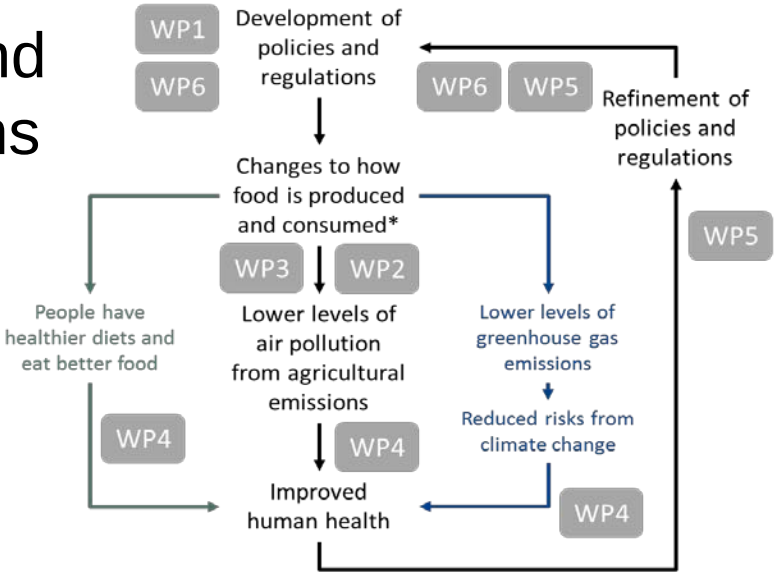
Research Question: *"What contribution can emission reductions from agricultural production make to improving public health in the UK?"*

- Aims: To evaluate the **health impact of food and agriculture strategies** in the UK aimed at **improving outdoor air pollution**, and how to align them with **strategies for reducing chronic disease and improving environmental sustainability**, including **reductions of GHG emissions**, and to understand barriers and opportunities for rapid implementation of policies at scale.

Approach (1)

- To convene a multi-stakeholder group - comprising **government departments/agencies, food and agriculture industry experts, the public, 3rd sector organizations and academics** - to delineate existing and potential future policies with potential to reduce emissions of air pollutants and GHGs through changes to (i) **agricultural technology and land-use management**, and (ii) factors influencing **dietary patterns [WP1];**
- To quantify the **impact in terms of key nutritional constituents and fulfilment of nutritional n**eeds of interventions aimed at altering patterns of food consumption and UK production that both help to reduce air pollutant emissions and improve diets for health and sustainability **[WP2]**;

Integration of Work Packages into AMPHoRA's holistic model of links between agricultural air pollution and human health

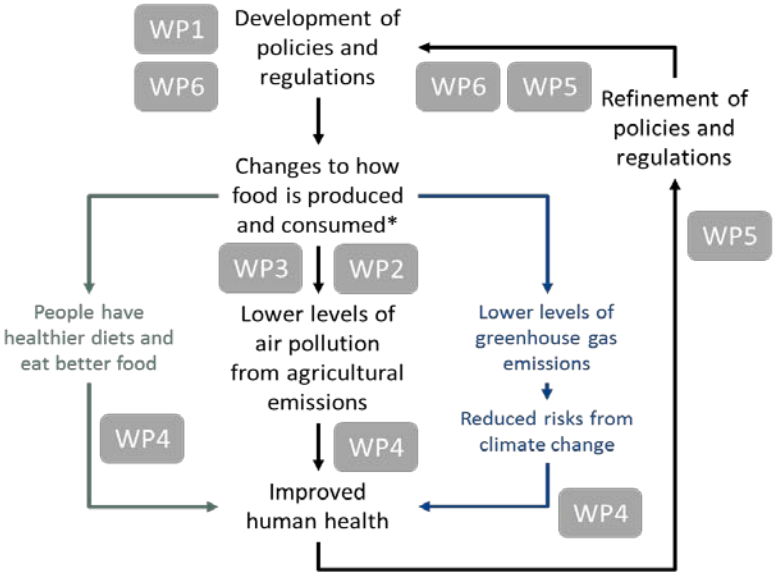


*Such as more fruits, vegetables, and cereals, and fewer animal-based and processed foods

Approach (2)

- To quantify the impact of such policies on **air pollutants (AP), GHG emissions, and on population-weighted ambient concentrations of PM, NO_2, and ozone**, now and in future, under policy scenarios defined in (1) **[WP3]**;
- To **develop and apply models of health i**mpact capturing the **mortality and morbidity** benefits/harms of changes in air quality of food/agriculture interventions (including both **existing and potential future policies**), and of the associated dietary changes and environmental impacts where relevant **[WP4]**;

Integration of Work Packages into AMPHoRA's holistic model of links between agricultural air pollution and human health



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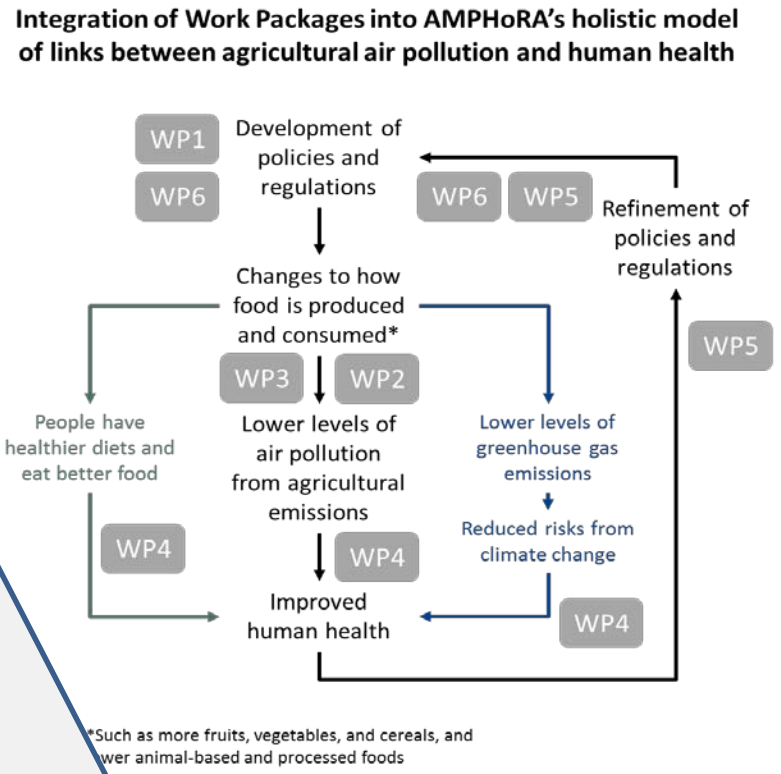
Including a systematic review on the health impacts of different $PM_{2.5}$ components

Approach (3)

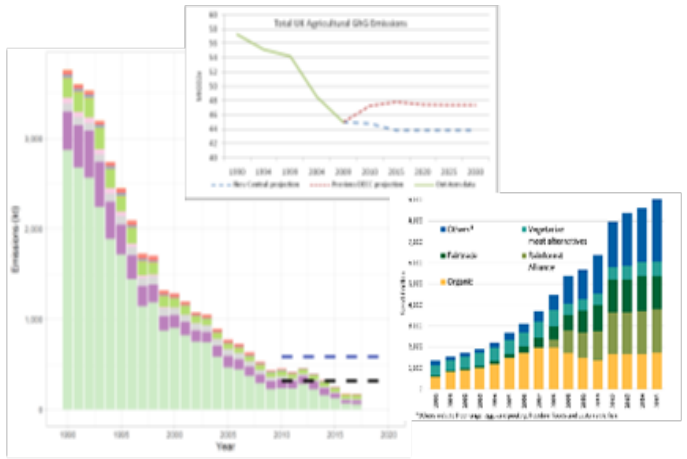
- To **compare policies over time horizons up to 2050** using a multi-criteria assessment framework with assessment criteria developed with the multi-stakeholder group (and to include the fulfilment of AP goals, health, health differentials, GHG emissions targets, economic costs) **[WP5]**;
- To assess the **implications of these analyses for policy development and implementation**, patients and the wider public, taking account of real-world constraints and opportunities, including with the aid of an iterative cycle of stakeholder engagements **[WP6]**.

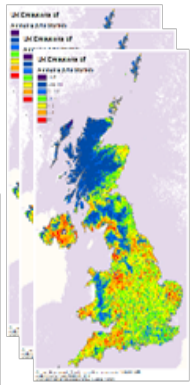


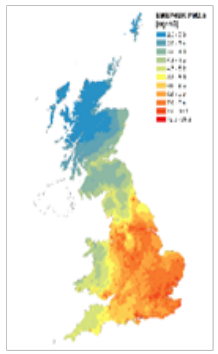
CEA/CBA and MCDA

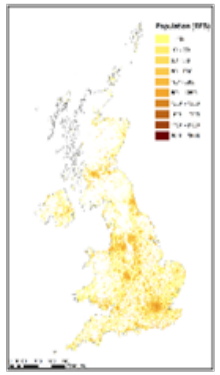
Data flow

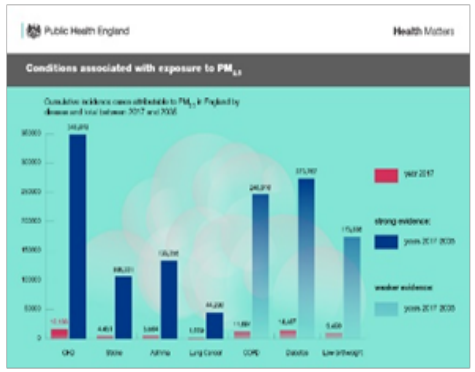
Data and information flow in AMPHoRA

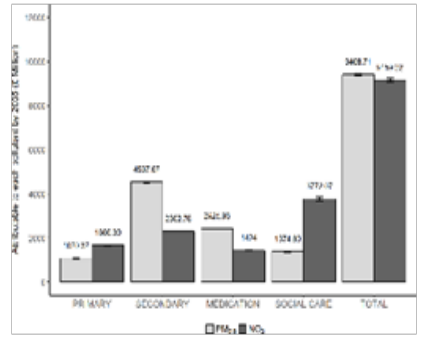












Emission projections incl. interventions → Emission maps, modelled concentrations and population-weighted exposure → Health impacts due to exposure to $PM_{2.5}$ and other air pollutants → Costs and benefits of interventions

PPIE Activities – Stakeholder events, Focus Groups, review and consultation

Engagement activities


Department for Environment Food & Rural Affairs

Guidance

Code of Good Agricultural Practice (COGAP) for Reducing Ammonia Emissions

Published 27 July 2018

Contents

Executive summary

About this Code

Where to get support to reduce your ammonia emissions

1. Introduction
2. Store and cover your organic manures
3. Apply organic manures effectively and efficiently
4. Use manufactured nitrogen fertilisers effectively and efficiently
5. Dairy and beef sector-specific measures
6. Pig sector-specific measures
7. Poultry sector-specific measures
8. References

Executive summary

This Code of Good Agricultural Practice (COGAP) for reducing ammonia emissions is a guidance document produced by Defra in collaboration with the farming industry. It explains the practical steps farmers, growers, land managers, advisors and contractors in England can take to minimise ammonia emissions from the storage and application of organic manures, the application of manufactured fertiliser, and through modifications to livestock diet and housing.

Ammonia (NH_3) is a key air pollutant that can have significant effects on both human health and the environment. The government has agreed to reduce ammonia emissions by 8% in 2020 and 16% in 2030, compared to 2005 levels. Around 88% of ammonia emissions in the UK come from agriculture. These targets can be achieved through widespread adoption of the measures in this Code.

Nitrogen, in the form of ammonia, is lost from organic manures (such as slurry, solid manure and litter, digestate, sludge and compost) when they come into contact with air, particularly on warm or windy days. Nitrogen is also lost from manufactured fertilisers during spreading. The more that this occurs, the more nitrogen is lost as ammonia, meaning the material is a less effective fertiliser and loses value. Therefore, measures to reduce ammonia emissions and improve overall nutrient management practices could reduce the amount of manufactured fertiliser that farmers need.

A summary of key points is provided of support are provided in each cha

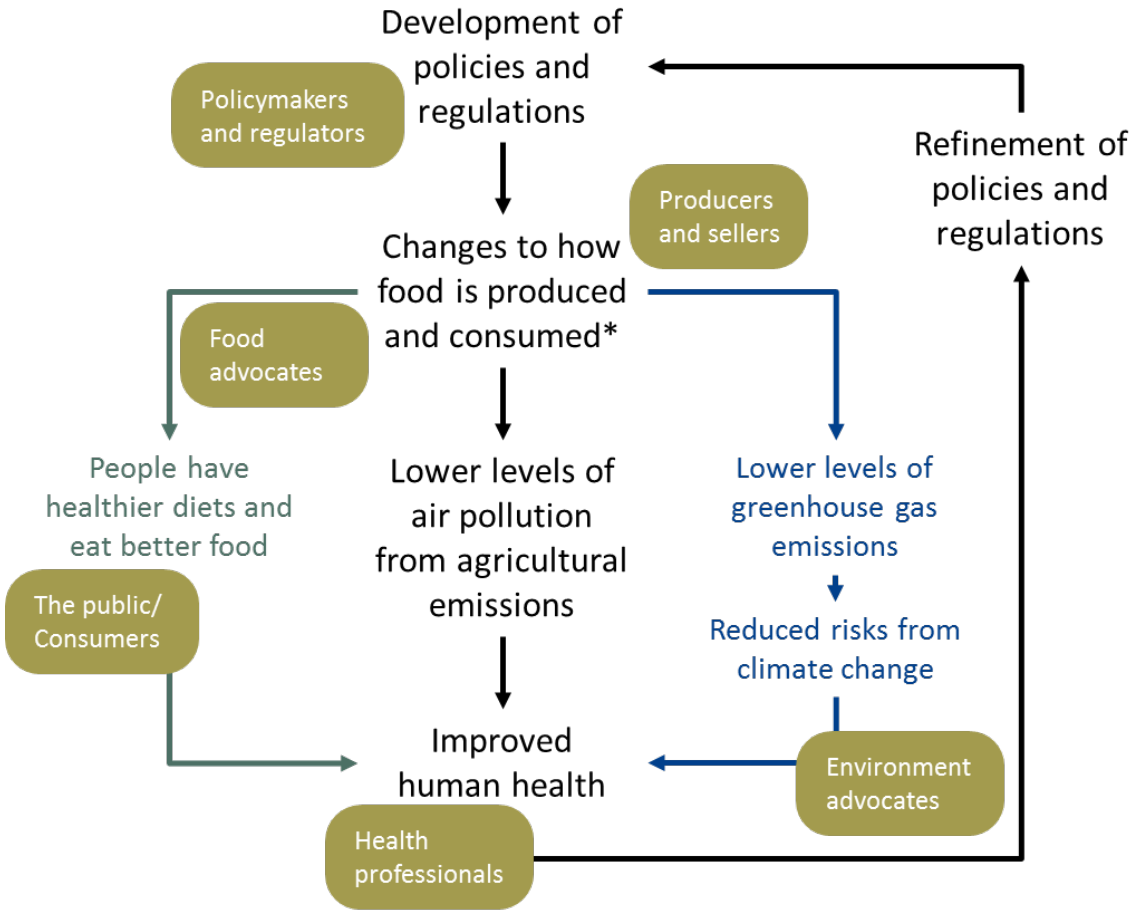
British Heart

NFU

NATIONAL FOOD STRATEGY
The first major review of our food system in 75 years

aic agricultural industries confederation

Stakeholder Engagement in AMPHoRA's holistic model of links between agricultural air pollution and human health



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