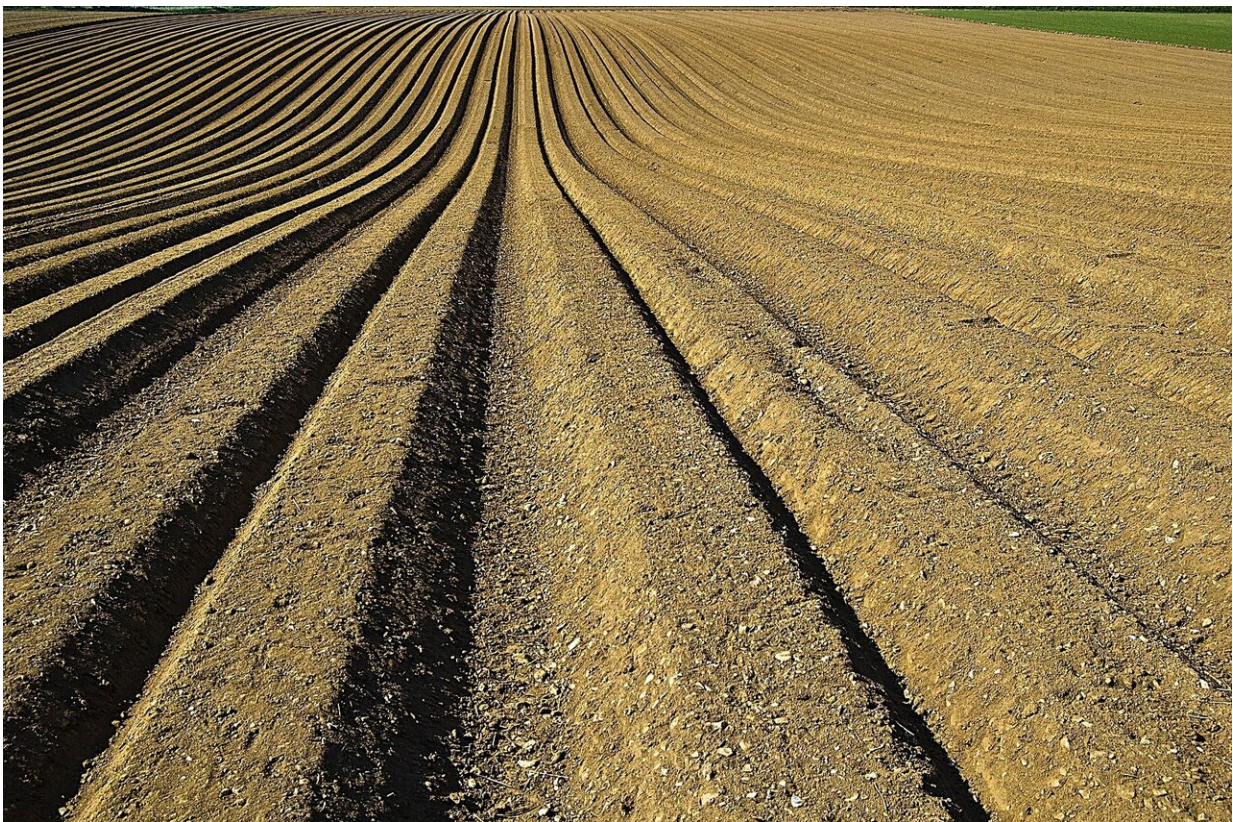


Scientists release UK roadmap for managing phosphorus—key ingredient behind all the food we eat

December 15 2022



Credit: CC0 Public Domain

As phosphate fertilizer prices remain at very high levels after spiking this year, scientists are calling for urgent measures to manage

phosphorus, a vital element essential for food production, but which is also behind environmental pollution in our rivers and lakes.

In launching the UK's first comprehensive national transformation strategy into phosphorus, researchers say they are providing a roadmap for how the nation can better manage this important resource.

The strategy outlines a pressing need for new solutions and scaling-up of existing phosphorus innovations to prevent future damage to aquatic biodiversity and habitat, reduce reliance on risky import markets and to unlock new opportunities for agriculture.

Phosphorus is a lynchpin of our [food](#) system—plants cannot grow without it and has no substitute.

Crop and [livestock production](#) in the UK is almost entirely dependent on imported phosphorus in feeds and fertilizers—the UK imports around 174,000 metric tons of phosphorus annually. Much of these imports derive from phosphate rock from countries including Russia, Morocco and China. The price of phosphate fertilizer quadrupled between mid 2020 and mid 2022 due to supply disruptions and market concentration in China. The ongoing war in Ukraine is serving to highlight the food security risks associated with reliance on imports of critical farm inputs like phosphorus.

Despite volatile prices and supply disruptions, phosphorus use in the UK is still highly inefficient, with less than half of imported phosphorus used productively to grow food. Mismanagement of phosphorus over decades has led to it being a major contributor to environmental problems. Wastewater discharges, along with excess phosphorus accumulating in agricultural soils and leaching into our rivers, lakes and other waterways, are contributing to issues such as algal blooms.

The 'UK Phosphorus Transformation Strategy'—a major output from the RePhoKUs project, led by Lancaster University and involving the University of Technology Sydney, University of Leeds, AFBI, UK CEH and funded under the UK's Global Food Security research program—sets out the challenges and key steps needed for the UK to adopt resilient, efficient and sustainable management of phosphorus.

Professor Paul Withers, of Lancaster University and lead investigator of the RePhoKUs project, said, "At present the UK does not have a coherent plan for managing phosphorus across the food system, either nationally, regionally or within catchments. This needs to change urgently.

"Transforming the way phosphorus is used in the UK food system is essential. Getting it right provides huge benefits to food and water security, tourism opportunities, and to maintain a clean healthy environment to boost biodiversity and the natural world for generations to come—but it requires all sectors to come on board."

The strategy's recommendations, co-developed with national stakeholders through extensive consultation with farmers, regulators, [policy-makers](#), food producers, wastewater companies, and environmental managers, highlight a number of priorities to enable the UK to transition towards using phosphorus more sustainably:

- Develop and deploy at scale new technologies and innovations that can recover phosphorus from [animal manure](#), wastewater and food waste, and redistribute as viable, cost-effective and renewable fertilizers.
- Provide incentives that encourage investment in technologies and lower barriers to create new markets for a renewable phosphorus fertilizer sector.
- Improve, align and make coherent policies and governance that

recognise and manage phosphorus as a scarce resource, as well as a pollutant.

- Provide tailored knowledge, research and advice for farmers on tapping soil legacy phosphorus, and using recycled phosphorus.
- Better engage stakeholders across the whole phosphorus value chain to set strategic direction and support implementation via bespoke and diverse local phosphorus solutions.
- The creation of nutrient stakeholder platform and UK nutrient data sharing dashboards to help inform phosphorus management

Aside from the phosphorus sources in wastewater treatment plants servicing towns and cities, the report highlights that phosphorus is unevenly concentrated across the UK. Where [livestock farming](#) is most intensive, predominantly in the west of England and Northern Ireland, then surpluses of phosphorus (largely in manure) are higher. The excess phosphorus applied in England's North West region alone is equivalent to nearly £30 million of fertilizer.

In areas where arable crops are grown, which tends to be predominantly in the east of the country, there is a deficit and the need to use phosphorus-based fertilizers because crops are taking up more than is applied.

However, the logistics of moving bulky manure from one part of the country to another are impractical. Finding new innovative ways to extract and relocate phosphorus from manure will be key in addressing these regional imbalances.

There is currently billions of pounds of phosphorus locked in UK top soil from decades of applications of fertilizer and manure—accessing and managing this legacy phosphorus 'bank' is central to improving efficiency and reducing imports, the team of scientists behind the new strategy argue.

One of the report's lead authors, Associate Professor Brent Jacobs said, "The good news is there are many pockets of innovation and initiatives already under way in different sectors in the UK. These can be learned from, scaled-up and integrated to help overcome some of the challenges associated with phosphorus use.

"Theoretically there is enough phosphorus circulating in the food system and in our soils. One of the pathways to achieving sustainable phosphorus use will involve developing and deploying new technologies that can extract legacy phosphorus from soils and manures and develop new renewable fertilizer markets."

The authors highlight the need for all of the different actors and sectors involved in food production, across catchment areas and government departments, which are currently operating in a fragmented manner, to work more closely and to adopt innovative solutions to transition towards using [phosphorus](#) more sustainably.

Professor Julia Martin-Ortega of the University of Leeds and co-author of the report said, "As the UK food system is undergoing fundamental policy change, our report provides a timely opportunity to integrate urgently needed actions across all sectors of the food chain into regional and national policy and governance, tapping into huge potential wins for the environment and the economy."

For the full UK Phosphorus Transformation Strategy report please visit: <http://wp.lancs.ac.uk/rephokus/publications/>

Provided by Lancaster University

Citation: Scientists release UK roadmap for managing phosphorus—key ingredient behind all the food we eat (2022, December 15) retrieved 26 April 2024 from

<https://phys.org/news/2022-12-scientists-uk-roadmap-phosphoruskey-ingredient.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.