

# Dramatic changes needed in farming practices to keep pace with climate change

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Rural flooding in the North of England, UK. Credit: Phil Haygarth

Major changes in agricultural practices will be required to offset increases in nutrient losses due to climate change, according to research published by a Lancaster University-led team.

To combat repeated, damaging storm events, which strip agricultural land of soil and nutrients, farmers are already adopting measures to conserve these assets where they are needed.

But in a new paper in the journal *Nature Communications*, researchers investigating nutrients in runoff from agricultural land warn that phosphorus losses will increase, due to climate change, unless this is

mitigated by making major changes to [agricultural practices](#).

These changes could include a more judicious use of fertilizer including strategies to use soil phosphorus more efficiently, or physical measures to reduce the losses of nutrients from fields.

Professor Phil Haygarth of the Lancaster Environment Centre led the three-year, Natural Environment Research Council and DEFRA funded study.

He said: "The warmer, wetter winters predicted for the future will result in more phosphorus transferred from [agricultural land](#) into the rivers and ultimately the oceans. Although farmers are already doing what they can to prevent these losses, the currently adopted measures are not likely to be enough to offset the increase expected under climate change.

"This paper should alert policy makers and government to the help and support that farmers will need to achieve the scale of agricultural change that may be necessary to keep up with the increase in pollution due to [climate change](#)."

Nutrients, such as phosphorus and nitrogen are essential to crop and animal growth, but too many nutrients cause algal blooms in rivers and lakes. These suffocate fish and other organisms and require costly remediation by water supply companies.

Fertilisers and manures washed off in storms are a major source of nutrients, with more than 60 per cent of the nitrogen and 25 per cent of the phosphorus in our rivers coming from agriculture.

The research in the paper combined the latest climate predictions from the Met Office Hadley Centre, including a high resolution climate model for the UK, with two phosphorus transfer models of different

complexity. The predictions incorporated both the uncertainty in the data and the natural inter-annual variability in climate.

Dr Pete Falloon of the Met Office Hadley Centre, who led the climate modelling, said "State-of-the-art high resolution climate models were used in this project alongside the latest UKCP09 climate projections. While rainfall intensity was more realistically predicted by the high-resolution [climate](#) models, particularly for summer convective storms, these storms do not make a significant difference to summer [phosphorus](#) losses. Our study therefore showed that the main factor driving increased future [phosphorus losses](#) was the projected increase in winter rainfall."

**More information:** M. C. Ockenden et al, Major agricultural changes required to mitigate phosphorus losses under climate change, *Nature Communications* (2017). [DOI: 10.1038/s41467-017-00232-0](https://doi.org/10.1038/s41467-017-00232-0)

Provided by Lancaster University

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