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# Time to re-think agricultural phosphorus modelling for the 2020s

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Phosphorus (P) is critical to our food production systems with many crop systems dependent on continual inputs to meet yield demands. However, a consequence of the widespread application of P to agricultural soils in the past 60 years has led to concerns about the long-term sustainability of P fertiliser supply and to P being transferred from soil systems to watercourses, causing diffuse pollution. This highlights the multi-scaled and interdisciplinary nature of the past, present and future of P management.

The aim of this research is to define a starting framework to consider the best ways to develop a model that addresses the contemporary understanding of P processes, integrating the needs of the crop, with biogeochemical and hydrological modelling considerations, going beyond P transfer to the role of P in both food and water challenges.

So, this review explores some of the current P models and the future opportunities for expanding their representation of P processes in agricultural systems. This goes beyond nesting existing models and reshapes approaches to posing research and modelling questions to achieve P models that cross disciplinary boundaries and have meaning and usability in practice. As part of this contribution, we welcome modellers and P scientists to come forward and help drive this complex issue of P in agriculture.