



## **The role of pesticide fate modelling in a prevention-led approach to potable water quality management**

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Diffuse inputs from agriculture are commonly the main source of pesticide contamination in surface water and may have implications for the quality of treated drinking water.

After privatisation in 1991, UK water companies primarily focused on the provision of sufficient water treatment to reduce the risk of non-compliance with the European Drinking Water Directive (DWD), under which all pesticide concentrations must be below  $0.1\mu\text{g/l}$  and UK Water Supply Regulations for the potable water they supply.

Since 2000, Article 7 of the Water Framework Directive (WFD) has begun to drive a prevention-led approach to compliance with the DWD. As a consequence water companies are now more interested in the quality of 'raw' (untreated) water at the point of abstraction. Modelling (based upon best available estimates of cropping, pesticide use, weather conditions, pesticide characteristics, and catchment characteristics) and monitoring of raw water quality can both help to determine the compliance risks associated with the quality of this 'raw' water resource. This knowledge allows water companies to prioritise active substances for action in their catchments, and is currently used in many cases to support the design of monitoring programmes for pesticide active substances.

Additional value can be provided if models are able to help to identify the type and scale of catchment management interventions required to achieve DWD compliance for pesticide active substances through pollution prevention at source or along transport pathways.

These questions were explored using a simple catchment-scale pesticide fate and transport model. The model employs a daily time-step and is semi-lumped with calculations performed for soil type and crop combinations, weighted by their proportions within the catchment. Soil properties are derived from the national soil database and the model can, therefore, be applied to any catchment in England and Wales.

Various realistic catchment management intervention scenarios were explored (including changes to land use and pesticide usage) with the aim of providing a useful input to the debate between water companies, their regulators and pesticide users over the scale of catchment management required to support both DWD and WFD Article 7 compliance.