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Global river water pollution: exploring current challenges and future prospects

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Human activities are threatening resilience of vital, interconnected components of our Earth system. Consequences for freshwaters are missing often from this debate. Yet, a functioning terrestrial water cycle is essential with healthy rivers essential for the sustainable provision of freshwater for humans and ecosystems alike. Major international reports released very recently have evidenced concerning trends in river water pollution, with poor water quality shown to be a global and persistent problem – still responsible for 2M deaths each year. Across Europe, 34% of the 130,000 waterway surveyed fail to meet “good” chemical status. In the most current national assessment for the USA, less than a third of rivers received a “good” grade. Deteriorating water quality is apparent for rivers across much of Asia, Africa and South America. Therefore, global river water pollution is a very timely and high profile topic for science and society.

Our contribution aims: (1) to explore current water quality challenges, which vary across regions and with economic development; and (2) to consider future prospects for moving from this crisis towards more sustainable solutions.

We propose a framework (based on distinct contaminant types and mitigation methods) that conceptualises the differences in experiences of upper-income countries versus lower- and middle-income countries. We consider the factors that have made the global water quality increasingly visible and impossible to ignore. Leveraging our framework and understanding of driving factors, we propose solutions to global water pollution challenges based on: latest scientific thinking and data sources; empowering decision makers across different levels of governance; regulating more smartly; and encouraging international cooperation and data/ knowledge sharing between places with varied status of economic development.