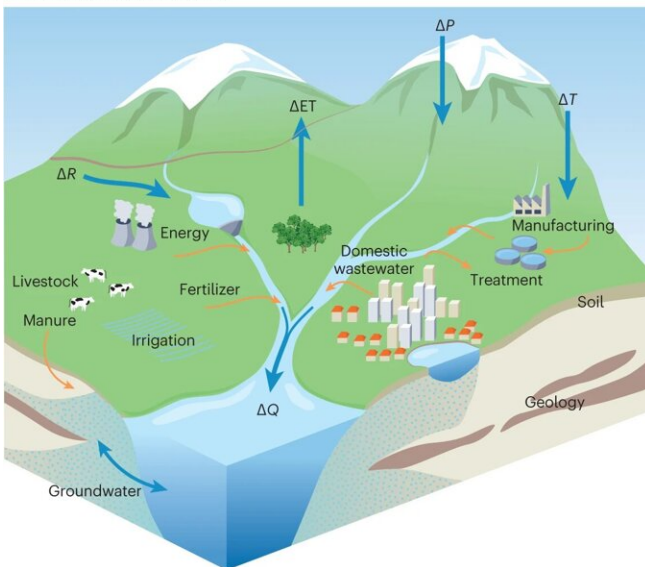


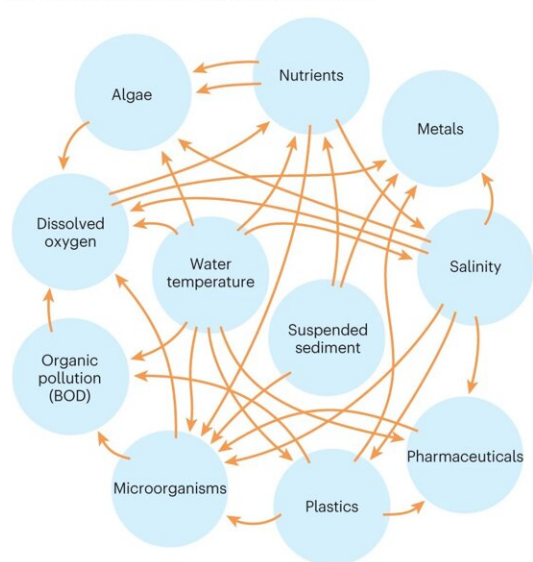
Water quality deteriorating in rivers worldwide due to climate change and increasing extreme weather events: Study

September 12 2023

a Main drivers of water quality



b Interactions between water quality constituents



Hydroclimatic drivers, geographic factors and human activities impacting river water quality. Credit: *Nature Reviews Earth & Environment* (2023). DOI: 10.1038/s43017-023-00472-3

Climate change and increases in drought and rainstorms pose serious challenges to our water management. Not only the availability of water is under pressure, but its quality is as well.

However, according to the most recent IPCC report, our current understanding of this issue is inadequate. To fill this gap, an international group of scientists has brought together a large body of research on water quality in rivers worldwide. The study published in *Nature Reviews Earth & Environment* shows that river water quality tends to deteriorate during extreme weather events. As these events become more frequent and severe due to [climate change](#), ecosystem health and human access to [safe water](#) may be increasingly under threat.

The research led by Dr. Michelle van Vliet of Utrecht University analyzed 965 cases of river water quality changes during extreme weather such as drought, heat waves, rainstorms, and flooding, as well as under long-term (multidecadal) changes in climate. "We looked at various water quality constituents such as [water temperature](#), dissolved oxygen, salinity and concentration of nutrients, metals, microorganisms, pharmaceuticals, and plastics," says van Vliet.

The analysis shows that in most cases water quality tends to deteriorate during droughts and [heat waves](#) (68%), rainstorms and floods (51%) and under long-term changes in climate (56%).

During droughts, less water is available to dilute contaminants, while rainstorms and floods generally result in more contaminants that run off from land to rivers and streams. Improvements or mixed responses in water quality are also reported for some cases owing to counteracting mechanisms, for example when increased transport of pollutants is offset by more dilution during flood events.

Water quality changes are strongly driven by changes in river discharge and water temperature. Land use and other human factors such as wastewater treatment also shape how this plays out.

"Understanding the complex interplay between climate, land use and

human drivers, which together influence the sources and transport of pollutants is crucial" says van Vliet. The research also calls for more [data collection](#) and studies of water quality in non-Western countries. "We need a better monitoring of water quality in Africa and Asia. Most water quality studies now focus on rivers and streams in North America and Europe."

The results of the study underline the urgent need for a better understanding of [water quality](#) changes during [extreme weather events](#), and the mechanisms underlying this. "Only then will we be able to develop effective [water management](#) strategies that can safeguard our access to clean water and ensure ecosystem health under climate change and increasing weather extremes."

More information: Michelle T. H. van Vliet et al, Global river water quality under climate change and hydroclimatic extremes, *Nature Reviews Earth & Environment* (2023). [DOI: 10.1038/s43017-023-00472-3](#)

Provided by Utrecht University

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