Water Pollution

1-A triple increase in global river basins with water scarcity due to future pollution

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Abstract

Water security is at stake today. While climate changes influence water availability, urbanization and agricultural activities have led to increasing water demand as well as pollution, limiting safe water use. We conducted a global assessment of future clean-water scarcity for 2050s by adding the water pollution aspect to the classical water quantity-induced scarcity assessments. This was done for >10,000 sub-basins focusing on nitrogen pollution in rivers by integrating land-system, hydrological and water quality models. We found that water pollution aggravates water scarcity in >2000 sub-basins worldwide. The number of sub-basins with water scarcity triples due to future nitrogen pollution worldwide. In 2010, 984 sub-basins are classified as water scarce when considering only quantity-induced scarcity, while 2517 sub-basins are affected by quantity & quality-induced scarcity. This number even increases to 3061 sub-basins in the worst case scenario in 2050. This aggravation means an extra 40 million km2 of basin area and 3 billion more people that may potentially face water scarcity in 2050. Our results stress the urgent need to address water quality in future water management policies for the Sustainable Development Goals.

Keywords

Keywords Plus

SUSTAINABLE DEVELOPMENT GOALSMULTIMODEL ASSESSMENTCLIMATE-CHANGEFOOD SECURITYNITROGENAVAILABILITYQUALITYMODELCHALLENGES21ST-CENTURY

Water Pollution

2-Water Quality, Air Pollution, and Climate Change: Investigating the Environmental Impacts of Industrialization and Urbanization

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By Saxena, V (Saxena, Vivek) [1] (provided by Clarivate) Source WATER AIR AND SOIL POLLUTION Volume 236 Issue 2 DOI 10.1007/s11270-024-07702-4 Article Number 73 Published FEB 2025 Indexed 2025-01-09 Document Type Review

Abstract

Human activities profoundly impact both biotic and abiotic components of ecosystems. Pollution, defined as the introduction of harmful substances into the environment, poses a significant threat to all living organisms. Even minimal concentrations of pollutants-whether in gaseous, liquid, or solid form-can disrupt ecosystem health. The advent of the Industrial Revolution marked the beginning of large-scale pollutant emissions, leading to severe repercussions for both human health and the environment. While the Industrial Revolution facilitated numerous advancements in services, science, and societal progress, it also introduced substantial environmental challenges. Today, the unprecedented levels of industrialization and urbanization have amplified global environmental concerns. Human-induced air pollution alone accounts for approximately 9 million deaths annually, presenting a critical public health threat. This research examines the environmental contamination arising from human activities, with a focus on water quality, air quality, and climate change. It aims to provide a comprehensive understanding of the environmental impacts of human actions, highlighting the pressing global issue of water pollution, particularly in developing countries. The study underscores the crucial role of effective wastewater treatment in achieving sustainable development and explores how such measures can mitigate the impacts of climate change.

Keywords
Author Keywords
Air QualityAtmosphereHuman HealthPollutionWater Quality

Keywords Plus
HEALTHOPPORTUNITIESEXPOSURE

Water Pollution

3-Horizontal ecological compensation policy and water pollution governance: Evidence from cross-border cooperation in China

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Abstract

Cross-border cooperation can overcome the administrative boundaries of water pollution governance, and the two-way ecological compensation model emerges as a solution to transforming government-financed payments into locally-driven development initiatives. This study presents a tripartite evolutionary game model for two-way ecological compensation, incorporating city-level data, and employs time-varying difference-in-differences to estimate the incentive impact of China's cross-border horizontal ecological compensation policy on water pollution governance during 2006-2018. Furthermore, this study aligns state-controlled monitoring stations with their respective administrative districts and enhances water pollution indicators obtained from these stations for a more comprehensive policy assessment. The results show that horizontal ecological compensation effectively reduces the prevalence of industrial wastewater discharges and associated water pollution; this effect is more pronounced upstream (20.94%) compared to downstream (16.01%). However, it does not significantly impact urban sewage treatment, agricultural non-point source pollution, or lake water quality and eutropHication. In addition to promoting horizontal coordination between upstream and downstream regions, vertical central governmental inspections are crucial for effectively stimulating and guaranteeing horizontal collaborative governance between upstream and downstream local governments. These results provide strong empirical evidence in favor of expanding horizontal ecological compensation initiatives throughout the entire river basins, as well as in other countries or regions.

Keywords

Author Keywords

Horizontal ecological compensationWater pollution governanceTwo-way ecological compensationCross-border cooperation

Keywords Plus

ECO-COMPENSATIONBASIN