

Risks associated with wastewater reuse in agriculture: investigating the effects of contaminants in soil, plants, and insects



Risks and Benefits of Wastewater Reuse in Agriculture: A PRIMA-SAFE Perspective

Description

MINI REVIEW article

Front. Environ. Sci., 02 May 2024 Sec. Toxicology, Pollution and the Environment Volume 12 - 2024 | https://doi.org/10.3389/fenvs.2024.1358842 This article is part of the Research Topic Diffuse Agricultural Water Pollution: Nutrient Capture, Recovery, and Recycling Systems

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Risks associated with wastewater reuse in agriculture: investigating the effects of contaminants in soil, plants, and insects







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As part of the work developed within the **PRIMA-SAFE** project, this review article published in *Frontiers in Environmental Science* offers a critical analysis of the **environmental and health risks**



associated with the **reuse of treated wastewater** in agriculture. It highlights both the **nutritional potential** of wastewater and the risks posed by contaminants to soil, plants, insects, and ultimately human health.

Key Findings

- Wastewater irrigation can improve **soil fertility** and **crop yield**, especially for short-cycle crops like lettuce and tomato, and reduce the need for chemical fertilizers.
- However, it may also introduce organic pollutants, heavy metals, pathogens, pesticides, and pharmaceuticals, many of which are not completely removed by conventional wastewater treatment.
- These contaminants can accumulate in the soil and crops, alter insect population dynamics, and potentially promote the spread of antibiotic resistance.
- The article emphasizes the presence of **N-nitrosamines**, a class of carcinogens, in wastewater and their potential impact on both ecosystems and human health.
- Strategies to mitigate risks include advanced tertiary treatments, biological filtration, and the adoption of precision irrigation systems such as drip irrigation to limit direct contact with edible plant parts.

Implications

The authors stress the importance of developing **interdisciplinary approaches** to manage the safe reuse of wastewater in agriculture, combining insights from **environmental science**, **agronomy**, **and public health**. Addressing regulatory gaps and investing in **targeted treatment technologies** are key to ensuring long-term sustainability in water-scarce regions.

Reference

Trotta V., Baaloudj O., Brienza M. (2024). *Risks associated with wastewater reuse in agriculture: Investigating the effects of contaminants in soil, plants, and insects. Frontiers in Environmental Science*, 12, 1358842. DOI: <u>10.3389/fenvs.2024.1358842</u>

Category

1. Publication

Date Created 2025/05/27 Author writer