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Water Reuse from a Circular Economy Perspective and Potential Risks from an Unregulated Approach

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Abstract

Considerations including water scarcity in arid and semi-arid regions, water security concerns in areas where water demand exceeds water availability, and rigorous and costly requirements to remove nutrients and emerging contaminants from effluent discharge to surface waters have driven water reuse as an alternate water supply in some parts of the world. However, the potential of reusing treated wastewater has not yet been exploited in many areas. A transition to a circular economy could create significant synergies for the wide adoption of water reuse as an alternate water supply. This paper therefore examines opportunities and risks with the transition to such an economy. Findings show that although many of the barriers water reuse is facing, ranging from public perception to pricing and regulatory challenges, could be addressed more effectively through a wider circular economy perspective, care must be taken with regulating and monitoring levels of contaminants in the recycled water according to its use. A review of existing reuse schemes and regulations across the world, found variation, demonstrating the need for assessing benefits and risks on a case by case basis. Recycling and reuse are central to a circular economy approach and offer a strategy to improve water supply by managing wastewater better. Such strategy should also ensure the safety of water reuse, and therefore apply water quality standards appropriate to the specific use, but also ensure adequate and reliable operation of water reuse systems and appropriate regulatory enforcement.

Keywords:

Circular economy; wastewater treatment and reuse; water scarcity; emerging contaminants