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URBAN WATER MANAGEMENT: A REVIEW OF SUSTAINABLE PRACTICES IN THE USA

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ABSTRACT

This comprehensive review explores the landscape of Urban Water Management in the United States, focusing on sustainable practices aimed at addressing the challenges posed by rapid urbanization and climate change. With urban areas facing increasing water stress, this study aims to identify, analyze, and evaluate a range of sustainable practices implemented across the country. The review encompasses diverse aspects of Urban Water Management, including water efficiency measures, green infrastructure initiatives, climate change resilience strategies, and pollution mitigation efforts. In examining water efficiency measures, the study investigates technological innovations and policy frameworks that have contributed to optimizing water use in urban settings. Additionally, the role of green infrastructure is explored, emphasizing its benefits and applications through case studies of successful implementations, shedding light on how nature-based solutions can enhance water sustainability. The review delves into the critical dimension of climate change resilience in urban water systems, analyzing the impacts of climate

change on water resources and exploring adaptation and mitigation strategies. Infrastructure improvements and integrated planning approaches are examined as essential components in building resilient urban water systems. Addressing pollution mitigation, the study focuses on stormwater management and wastewater treatment. Best management practices and regulatory measures are scrutinized to understand how urban areas are effectively managing and treating water to mitigate pollution and protect water quality. Furthermore, the review highlights the significance of integrated water resources management as a holistic approach to addressing water challenges in urban contexts. Stakeholder engagement and cross-sectoral coordination are emphasized as integral elements in implementing sustainable and comprehensive water management strategies. Through case studies of successful urban water management projects, the review extracts valuable lessons and insights for future implementations. The challenges and opportunities in the current landscape are explored, providing a nuanced understanding of the barriers to sustainable practices and identifying emerging opportunities. This review synthesizes key findings, implications, and recommendations for advancing sustainable urban water management practices in the United States. The insights generated contribute to the ongoing dialogue on effective water management strategies in the face of evolving urban and environmental dynamics.

Keywords: Urban Water Management, Sustainable Practices, Water Efficiency, Climate Change, Resilience, United States, Pollution Mitigation, Water Infrastructure.

INTRODUCTION

As the United States undergoes unprecedented urbanization, marked by rapid population growth, expanding metropolitan areas, and increased demand for resources, the intricate balance between urban development and sustainable resource management has become more critical than ever. This review embarks on a comprehensive exploration of Urban Water Management in the USA (Feingold et al., 2018), delving into the challenges and opportunities associated with managing water resources in urban environments (Boa, and Fang, 2012; Braga, 2001; Zevenbergen, et al., 2018).

The United States has experienced profound urbanization trends, with an ever-growing proportion of its population residing in urban areas. Cities and metropolitan regions have expanded exponentially, leading to increased stress on water resources. The spatial transformation and population density in urban centers necessitate a closer examination of water management practices to ensure the sustainable provision of this vital resource. Urban Water Management stands as a linchpin for the sustainable development and resilience of urban areas. Ensuring an adequate and high-quality water supply, managing stormwater effectively, and addressing wastewater challenges are imperative to the well-being of both urban populations and the environment. The significance of water management is heightened by the looming threats of climate change and the need to build resilient water systems that can withstand the impacts of evolving environmental conditions.

This review aims to systematically analyze the spectrum of sustainable practices implemented in Urban Water Management across the USA. By scrutinizing innovative technologies, policy frameworks, and management approaches, the goal is to provide insights into effective strategies that contribute to water sustainability in urban settings.

Another pivotal objective is to identify the challenges hindering the implementation of sustainable water practices in urban areas. By recognizing these barriers, the review aims to pave the way for informed recommendations and policy interventions. Simultaneously, the review seeks to highlight emerging opportunities, whether in terms of technological advancements, policy innovations, or collaborative initiatives, that can propel urban water management towards a more sustainable and resilient future.

Sustainable Water Practices in Urban Areas

Urban areas are at the forefront of water demand, and with the increasing strain on water resources, the implementation of sustainable water practices has become imperative. This section delves into two key aspects of sustainable water management in urban areas: Water Efficiency Measures and Green Infrastructure.

The advancement of technologies plays a pivotal role in optimizing water usage in urban settings (Evans, and Sadler, 2008; Bouramdane, 2023). Smart water meters, for instance, enable real-time monitoring of water consumption, empowering both utilities and consumers to identify and address inefficiencies promptly. Additionally, sensor technologies integrated into irrigation systems facilitate precise watering based on weather conditions and soil moisture levels, reducing water wastage (Işık, et al., 2017; El-Naggar et al., 2020). Innovations in plumbing fixtures, such as low-flow toilets and aerated faucets, contribute significantly to water conservation in households and commercial buildings. Greywater recycling systems further enhance efficiency by treating and reusing non-potable water from activities like laundry for landscape irrigation (Memon et al., 2007; Zadeh, et al., 2013; Leong et al., 2017; Birks, et al., 2003). The integration of artificial intelligence (AI) and data analytics in water management systems allows for predictive modeling, optimizing distribution networks and identifying potential leaks before they escalate (Kamyab et al., 2023; Jenny et al., 2020; Krishnan, et al., 2022). These technological innovations collectively form a robust foundation for enhancing water efficiency in urban areas.

Beyond technological solutions, the role of policy frameworks cannot be understated in fostering a culture of water efficiency. Incentives for water-efficient appliances, tiered pricing structures, and stringent building codes that mandate the incorporation of water-efficient technologies contribute to the overall reduction in water consumption.

Water conservation campaigns, both at the municipal and national levels, play a crucial role in raising awareness and promoting behavioral changes among residents. Some cities have implemented water-use efficiency standards for industries and businesses, encouraging the adoption of sustainable practices across sectors (Pluchinotta et al., 2021; Jones, et al., 2007; Poff, et al., 2016).

Green infrastructure involves the integration of natural elements into the urban environment to manage water sustainably. This approach leverages vegetation, permeable surfaces, and natural processes to mitigate the impacts of urbanization on water resources (Liu, and Jensen, 2018; Fisch, 2014). One of the primary benefits is the reduction of stormwater runoff, which helps prevent flooding and decreases the burden on traditional stormwater management systems. Green roofs, permeable pavements, and bioswales are examples of green infrastructure elements that contribute to water sustainability (Mell, 2009; Ellis, 2013; Chini et al., 2017). Green roofs, covered with vegetation, absorb rainwater, reduce runoff, and provide insulation for buildings, thereby lowering energy consumption. Permeable pavements allow rainwater to

infiltrate the ground, replenishing aquifers and reducing the load on drainage systems. Bioswales, vegetated channels that treat and slow stormwater, enhance water quality by filtering out pollutants. Numerous cities in the USA have successfully implemented green infrastructure projects, showcasing the efficacy of these practices. For instance, Portland, Oregon, has embraced green roofs and permeable pavements as part of its Sustainable Stormwater Management Plan, contributing to the city's overall water resilience. Philadelphia's Green City, Clean Waters program focuses on integrating green infrastructure to manage stormwater, with initiatives like rain gardens and tree trenches reducing runoff and improving water quality. These case studies highlight the versatility and adaptability of green infrastructure in diverse urban settings, demonstrating that a holistic approach to water management can be tailored to local needs and conditions.

In conclusion, sustainable water practices in urban areas are multifaceted, encompassing both technological innovations and nature-based solutions. The integration of water efficiency measures and green infrastructure not only addresses immediate water challenges but also contributes to the long-term resilience of urban water systems. As urbanization continues to accelerate, the adoption of these sustainable practices becomes increasingly crucial for ensuring a reliable and sustainable water supply for present and future generations.

Climate Change Resilience in Urban Water Systems

Urban water systems face unprecedented challenges in the wake of climate change, which is altering precipitation patterns, intensifying extreme weather events, and influencing the availability and quality of water resources. This section examines the impacts of climate change on water resources and explores adaptation and mitigation strategies, focusing on infrastructure improvements and integrated planning approaches (Feilberg, and Mark, 2016; Short et al., 2012).

Climate change poses a multitude of threats to water resources in urban areas. Changes in precipitation patterns, including more intense and irregular rainfall, contribute to increased flooding and strain on stormwater management systems. Conversely, prolonged droughts and shifts in temperature patterns exacerbate water scarcity issues, putting pressure on water supply infrastructure. Rising sea levels, particularly in coastal cities, can lead to saltwater intrusion, compromising freshwater sources. Additionally, changes in the frequency and intensity of extreme weather events, such as hurricanes and heatwaves, further stress urban water systems (Victor and Great, 2021; Blackmore, and Plant, 2008).

Addressing the impacts of climate change on urban water systems necessitates significant upgrades to existing infrastructure. Enhanced stormwater management systems, including the construction of larger and more resilient drainage networks, can mitigate the risks of flooding during intense rainfall events. Investment in water storage and distribution infrastructure is crucial to building resilience against prolonged droughts and ensuring a reliable water supply (Johnson et al., 2023; Mitchell, 2007).

In coastal areas, protective infrastructure, such as seawalls and storm surge barriers, becomes essential to defend against rising sea levels and prevent saltwater intrusion into freshwater sources. Furthermore, retrofitting existing wastewater treatment plants to withstand extreme weather conditions helps maintain the integrity of sanitation services.

A holistic and integrated approach to water management is vital for climate change resilience. Integrated water resources management (IWRM) considers the interconnectedness of water

supply (Al Radif, 1999; Jønrh-Clausen, 2004), wastewater treatment, stormwater management, and ecological health. By adopting IWRM principles, urban areas can optimize water use, prioritize conservation, and foster adaptive governance structures (Ako, et al., 2010).

Collaborative planning that involves various stakeholders, including local communities, government agencies, and environmental organizations, can lead to more effective and inclusive strategies. Green infrastructure, such as permeable pavements and green spaces, plays a dual role by not only managing stormwater but also providing additional resilience against the impacts of climate change. Water-sensitive urban design (WSUD) integrates water management into urban planning (Sharma, et al., 2016; Wong, 2006), emphasizing the importance of considering water as a valuable resource rather than a waste product. WSUD encourages the incorporation of sustainable drainage systems, water-efficient landscaping, and decentralized water treatment facilities to enhance resilience (Ashley et al., 2013; Kuller, et al., 2017).

In conclusion, climate change resilience in urban water systems demands a proactive and multifaceted approach. Infrastructure improvements must be coupled with integrated planning strategies that prioritize sustainability, community engagement, and adaptability to changing climatic conditions. As cities continue to face the challenges posed by a warming planet, resilient urban water systems are essential for ensuring the continued availability and quality of water resources in the face of an uncertain and dynamic climate future.

Pollution Mitigation in Urban Water

In the complex urban landscape, effective pollution mitigation strategies are vital to safeguard water quality and ensure the sustainable use of water resources (Hughes et al., 2014). This section examines two key components of pollution mitigation in urban water: Stormwater Management and Wastewater Treatment (Cooper, et al., 2019; Yang, et al., 2022).

Stormwater runoff poses a significant threat to urban water quality as it can carry pollutants such as sediments, nutrients, and chemicals into water bodies (Berland, et al., 2017; Wanielista, and Yousef, 1992; Jefferson et al., 2017). Best Management Practices (BMPs) encompass a range of techniques designed to minimize the impact of stormwater runoff. This includes the implementation of green infrastructure, such as permeable pavements, green roofs, and rain gardens, which help absorb and filter stormwater before it enters water bodies (Stuart, et al., 2018; Frimpong et al., 2014).

Other BMPs involve the use of sediment basins, detention ponds, and constructed wetlands that capture and treat stormwater, allowing pollutants to settle before the water is released. Public education and outreach programs also play a role in promoting responsible stormwater management practices among residents and businesses.

Regulatory frameworks are crucial for ensuring compliance with stormwater management standards. Municipalities often enact ordinances that require the implementation of specific stormwater management practices for new developments and redevelopment projects. These regulations may include the establishment of stormwater utilities, the enforcement of runoff reduction targets, and the implementation of erosion control measures during construction activities (Livesley, et al., 2016; Abdulkadir et al., 2022).

Additionally, stormwater permits, issued by environmental agencies, outline specific requirements for industrial and municipal dischargers, ensuring they adopt measures to minimize the impact of stormwater runoff on water quality. Regular monitoring and reporting

are integral components of these regulatory measures to track compliance and address any deviations promptly.

Wastewater treatment plays a crucial role in mitigating pollution by removing contaminants from urban discharges. Advanced treatment technologies have significantly improved the efficiency of wastewater treatment plants. Processes such as membrane filtration, ultraviolet (UV) disinfection, and advanced oxidation are employed to treat effluents more effectively, ensuring that harmful pollutants are minimized before discharge. Decentralized treatment systems, such as constructed wetlands and biofiltration, provide environmentally friendly alternatives for treating wastewater at the source. These decentralized approaches not only reduce the load on centralized treatment plants but also contribute to localized pollution mitigation.

To safeguard water quality, urban wastewater treatment facilities must adhere to stringent environmental standards. These standards, set by regulatory bodies, define acceptable limits for various pollutants in treated effluents. Compliance with these standards is crucial to prevent the release of harmful substances into receiving water bodies (Bernhardt, et al., 2008; Marsalek, 1998).

Regular monitoring and reporting are integral components of wastewater treatment plant operations, ensuring that any deviations from environmental standards are promptly identified and addressed. Public transparency and involvement in the regulatory process contribute to the accountability of wastewater treatment facilities and foster a culture of environmental stewardship.

In conclusion, pollution mitigation in urban water requires a multifaceted approach that encompasses both stormwater management and wastewater treatment. Best management practices, supported by regulatory measures, are essential for minimizing the impact of stormwater runoff, while advanced treatment technologies and adherence to environmental standards play a pivotal role in ensuring the quality of treated wastewater. As urban areas continue to grow, effective pollution mitigation strategies are imperative to protect water resources and sustain the health of aquatic ecosystems.

Integrated Water Resources Management

In the face of increasing water stress, population growth, and climate change, Integrated Water Resources Management (IWRM) emerges as a holistic and sustainable approach to address the complexities of water management. This section explores the key components of IWRM, focusing on stakeholder engagement and cross-sectoral coordination (Agarwal, et al., 2000).

Central to the success of IWRM is the active involvement of diverse stakeholders, including government agencies, local communities, non-governmental organizations, industries, and academia. Stakeholder engagement is not merely consultation but involves collaboration and participation in decision-making processes. By incorporating the perspectives and knowledge of different stakeholders, IWRM ensures that water management strategies are inclusive, reflective of local needs, and have a higher likelihood of success (Biswas, 2008.).

Public awareness campaigns, community forums, and participatory workshops are tools that facilitate stakeholder engagement in the water management process. Engaging with indigenous communities, environmental advocacy groups, and marginalized populations is particularly crucial, as their traditional knowledge and experiences contribute valuable insights to sustainable water management practices.

Water management is inherently linked to various sectors, including agriculture, industry, energy, and environment. Cross-sectoral coordination underpins the effectiveness of IWRM, ensuring that decisions made in one sector do not inadvertently compromise the sustainability of water resources in another. For example, coordination between water and agriculture sectors can lead to the implementation of water-efficient irrigation practices, reducing agricultural water demand and optimizing water use.

Integrated planning across sectors involves breaking down institutional silos and fostering collaboration between relevant government departments. Multi-disciplinary task forces, inter-agency committees, and joint research initiatives contribute to cohesive decision-making that considers the interconnectedness of water with other societal needs (Rahaman, and Varis, 2005; Saravanan, et al., 2009).

IWRM requires the integration of water considerations into broader national and regional policies. This involves aligning water policies with those related to agriculture, energy, land use, and environmental conservation. Policy integration ensures that water management strategies are coherent, avoid conflicts, and contribute to broader sustainable development goals. Adaptive governance structures are essential for IWRM, allowing for flexibility and responsiveness to changing conditions and new information. Decision-making processes need to be adaptive, incorporating feedback from stakeholders and responding to emerging challenges. Adaptive governance promotes resilience in the face of uncertainties such as climate change impacts or demographic shifts. Effective IWRM relies on accurate and timely data. Integrated data management systems facilitate the collection, analysis, and dissemination of information related to water quantity, quality, and usage patterns. Geographic Information System (GIS) technology and remote sensing play crucial roles in mapping and monitoring water resources, aiding informed decision-making.

Building the capacity of local institutions, communities, and governments is pivotal for the successful implementation of IWRM. This involves enhancing technical skills, fostering awareness about sustainable water practices, and creating mechanisms for continuous learning. Capacity building empowers stakeholders to actively participate in the planning and management of water resources.

In conclusion, Integrated Water Resources Management represents a paradigm shift towards a more comprehensive and inclusive approach to water governance. By emphasizing stakeholder engagement, cross-sectoral coordination, and adaptive governance, IWRM seeks to balance the competing demands on water resources, ensuring their sustainability for current and future generations. As water challenges intensify, the adoption of integrated approaches becomes increasingly critical for resilient and equitable water management (Grigg, 2008).

Challenges and Opportunities of Urban Water Management: A Review of Sustainable Practices in the USA

Urban water management in the United States faces a spectrum of challenges and opportunities as the nation navigates the complex intersection of urbanization, environmental sustainability, and climate change. This review critically examines the barriers hindering the adoption of sustainable practices and explores emerging opportunities that could shape the future of urban water management (Sapkota, et al., 2014; Vlachos, and Braga, 2001).

Regulatory frameworks play a pivotal role in shaping urban water management practices, but they can also pose challenges to the adoption of sustainable solutions. Stringent regulations,

while essential for protecting water quality, can sometimes create barriers for innovative and alternative approaches. Compliance with existing regulations may necessitate significant investments and bureaucratic processes, making it challenging for municipalities and industries to swiftly embrace sustainable practices.

Harmonizing regulations across jurisdictions and adapting them to encourage innovation while maintaining environmental standards is an ongoing challenge. Striking the right balance between regulatory stringency and flexibility is crucial for fostering a conducive environment for sustainable urban water management. The financial burden associated with implementing sustainable water management practices is a significant barrier. Municipalities often face budgetary constraints, limiting their capacity to invest in infrastructure upgrades, technology adoption, and research initiatives (Niemczynowicz, 1999; Sharma, and Vairavamoorthy, 2009). The high upfront costs of sustainable projects, such as green infrastructure implementation or advanced water treatment technologies, can act as a deterrent.

Public-private partnerships, innovative financing mechanisms, and dedicated funding streams are potential solutions to alleviate funding constraints. However, unlocking these opportunities requires creative approaches to financing and a concerted effort from government bodies and private stakeholders (Zevenbergen, et al., 2018).

Technological innovations present a promising avenue for overcoming traditional barriers in urban water management. Advanced sensors, real-time monitoring systems, and data analytics enable more precise and efficient water use. Smart water grids, equipped with Artificial Intelligence (AI) algorithms, can predict and respond to demand fluctuations, optimizing distribution networks and reducing wastage. Decentralized technologies, such as on-site water treatment systems and modular infrastructure, provide scalable solutions that can be adapted to the specific needs of urban areas. These innovations not only enhance water efficiency but also contribute to the overall resilience of urban water systems in the face of a changing climate (Herslund, and Mguni, 2019). The evolving landscape of urban water management is also shaped by policy innovations that prioritize sustainability. Flexible and adaptive regulatory frameworks can encourage experimentation with new technologies and approaches. Incentive-based policies, such as tax credits for sustainable infrastructure investments, can stimulate private sector engagement and innovation.

Integrated Water Resources Management (IWRM) frameworks, which consider water as a cross-cutting element in urban planning, offer a holistic approach that addresses multiple challenges simultaneously. Policy innovations that promote collaboration between government agencies, private entities, and communities can foster a more coordinated and effective response to urban water challenges (Brown, and Farrelly, 2009).

In conclusion, the review of sustainable practices in urban water management in the USA underscores the dual nature of the current landscape—marked by challenges and opportunities. Regulatory hurdles and funding constraints necessitate strategic interventions and policy adjustments. Simultaneously, technological advancements and policy innovations offer a pathway towards a more resilient, efficient, and sustainable urban water future. Navigating these challenges and seizing emerging opportunities requires a collaborative effort involving government bodies, private sectors, communities, and researchers to ensure the continued viability and health of urban water systems in the United States.

Future Directions of Urban Water Management: A Review of Sustainable Practices in the USA

As the challenges and opportunities of urban water management in the United States continue to evolve, a forward-looking perspective is crucial for shaping sustainable practices. This review explores future directions for urban water management, providing recommendations at the policy level and identifying key research priorities to guide the trajectory of this critical field (Cosgrove, and Loucks, 2015.).

Emphasize the need for regulatory frameworks that balance stringency with flexibility, allowing for innovation in urban water management (Adem and Suleiman, 2020). Policies should encourage experimentation with emerging technologies and approaches while maintaining robust environmental standards. Introduce and expand incentive-based programs to encourage sustainable practices. Tax credits, grants, and subsidies for the implementation of green infrastructure, water-efficient technologies, and stormwater management initiatives can stimulate widespread adoption. Advocate for the adoption and implementation of Integrated Water Resources Management (IWRM) frameworks at local, regional, and national levels. Emphasize the importance of considering water as a cross-cutting element in urban planning to promote coherence and collaboration among various stakeholders (Díaz, et al., 2016).

Develop and integrate climate-resilient policies that anticipate and adapt to changing climatic conditions. This includes investments in infrastructure that can withstand extreme weather events, proactive water conservation measures, and policies addressing sea-level rise and saltwater intrusion in coastal regions. Prioritize research into cutting-edge technologies that enhance water efficiency, treatment, and distribution. Explore the potential of emerging technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and blockchain in optimizing urban water systems. Expand research into the effectiveness of nature-based solutions for urban water management. Investigate the ecological and societal benefits of green infrastructure, such as urban wetlands, green roofs, and permeable pavements, in mitigating stormwater runoff and enhancing water quality. Research strategies for effective community engagement in water management processes. Examine the role of citizen science, public education campaigns, and participatory planning in fostering a sense of ownership and responsibility among urban residents. Conduct rigorous assessments of the impact of existing policies on urban water management. Evaluate the effectiveness of incentive programs, regulatory frameworks, and IWRM implementation to identify areas for improvement and refinement. Explore the intricate relationship between water and energy in urban areas. Research how improvements in water efficiency and treatment can contribute to energy savings, and vice versa, fostering a holistic understanding of the water-energy nexus.

In conclusion, the future of urban water management in the USA relies on proactive policymaking and innovative research. The recommendations provided, spanning flexible regulation, incentive-based programs, IWRM adoption, climate-resilient policies, and cutting-edge research priorities, offer a roadmap for ensuring sustainable water practices in the face of evolving challenges. By embracing these future directions, urban areas can pave the way for resilient, efficient, and equitable water management systems that cater to the needs of present and future generations.

RECOMMENDATION AND CONCLUSION

Urban water management in the United States stands at a critical juncture, requiring a holistic understanding of the challenges and opportunities that shape its trajectory. This review has explored sustainable practices, barriers, and future directions, shedding light on key findings that hold implications for the sustainable future of urban water management in the USA.

The review highlighted the multifaceted nature of sustainable practices in urban water management. It encompassed the adoption of water efficiency measures, green infrastructure initiatives, climate change resilience strategies, and pollution mitigation efforts. Technological innovations, policy frameworks, and community engagement emerged as essential components in the pursuit of sustainable urban water systems.

Barriers to sustainable practices, including regulatory challenges and funding constraints, were identified as significant hurdles. Regulatory frameworks were noted to be essential but required a delicate balance to encourage innovation. Financial constraints underscored the need for creative financing mechanisms and public-private collaborations to support sustainable water infrastructure development.

Emerging opportunities, driven by technological advancements and policy innovations, showcased the potential for transformative change. Advanced treatment technologies, smart water grids, and nature-based solutions presented promising avenues for enhancing water efficiency and resilience. Incentive-based programs, flexible regulations, and integrated water resources management (IWRM) frameworks emerged as policy innovations capable of fostering sustainable urban water practices.

The implications drawn from this review point towards a need for concerted efforts at multiple levels to advance sustainable urban water management in the USA. Firstly, policymakers must navigate the delicate balance between regulatory stringency and flexibility, fostering an environment that encourages innovation while maintaining high environmental standards. Institutional capacity-building is imperative to overcome financial constraints, with a focus on exploring innovative financing mechanisms and public-private partnerships. Additionally, the review underscores the importance of community engagement strategies and the integration of nature-based solutions into urban planning to enhance the resilience of water systems. The adoption of IWRM frameworks, supported by comprehensive policy assessments, represents a strategic approach to address urban water challenges. This involves integrating water considerations into broader policies, ensuring coherence between sectors, and fostering adaptive governance structures.

In conclusion, the sustainable future of urban water management in the USA hinges on collaborative efforts, informed policymaking, and innovative research. By embracing the recommendations outlined in this review, urban areas can chart a course towards resilient, efficient, and equitable water management systems that safeguard the well-being of both urban populations and the environment. In doing so, the USA can serve as a model for global best practices in sustainable urban water management.

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