



Water reuse to address water security

In the water sector, it is increasingly discussed that water reuse, or recycled wastewater, has become an essential part of the water cycle with an enormous potential to increase the amount of clean water that can be used for potable and non-potable purposes. Together with holistic management of water resources, which includes water conservation and efficiency measures, centralized and on-site water reuse programmes have contributed to diversify water portfolios for numerous uses, increasing water security.

Water reuse for potable and non-potable purposes is implemented in a growing number of cities all over the world. Its main objective is to provide reliable sources of clean water while protecting human and environmental health (Environmental Protection Agency (EPA), 2017; World Health Organization, 2017). Its main drivers are water scarcity and pollution; and the actual threat of not having enough clean water for all uses.

At present, one of the most important initiatives on water reuse is the National Water Reuse Action Plan (WRAP) of the US EPA (2020a). On 16 September 2019, the EPA announced a collaborative call for action that led to the development of the draft WRAP (EPA, 2019). The draft plan aimed at building on science, research, policy, technology, and national and international experiences for the enhanced consideration of water reuse all over the country. It included the contributions of federal, state and tribal partners as well as stakeholders of the water sector with the objective to form partnerships and prepare and implement the plan.

The draft WRAP acknowledges that the main challenges related to water reuse are in relation to the protection of public health and the environment, the cost of infrastructure upgrades, system assessment, installation and operation, and the protection of end-use quality needs (EPA, 2019). It encourages the collaboration of stakeholders on technical improvements; regulatory/policy aspects; financial initiatives; fit for purpose; water information use and availability; and public outreach. Source water can include municipal wastewater, industry process and cooling water, stormwater, agriculture runoff and return flows, and oil and gas-produced water. They all can be treated and reused for the specific purposes.

Improving outreach and communication on water reuse is an important component of the draft WRAP. The plan highlights the importance of public acceptance and user confidence for the successful implementation of water reuse programmes across applications. Four main themes on potable reuse recur regarding public acceptance and concerns: water quality and safety, education, emotional response, and trust (EPA, 2019). The draft plan suggests the compilation and development of water reuse programme outreach and communication materials (Action 2.8.1), the development of a community of practice around the water reuse (Action 2.8.2), and pursuing a national branding campaign for water reuse (Action 2.8.3).

Since potable water reuse is a new concept in many communities, the early engagement of stakeholders is emphasized as a significant success factor in programme

implementation. Education and outreach are essential to learn the concerns of the public and address them, and also to keep communities informed about and advance their understanding of water reuse and the roles it can play as a reliable source of clean water in a framework of growing water scarcity and pollution.

For water agencies, examples to learn from include experiences from Orange County and San Diego in California and El Paso and Wichita Falls in Texas, among others. Singapore is an important case because of the very comprehensive work the city-state did, and continues doing, aiming at public acceptance.

After a formal comment period on which numerous responses were received, the WRAP was finalized. Version 1 was released in February 2020 (EPA, 2020a, 2020b).

One year later, the WRAP has indeed advanced the knowledge about and understanding of water reuse, as well as collaborative work among all stakeholders.

As mentioned during the draft stage of the plan, professional and academic communities in the country are embracing a 'One Water' approach. This means that water sources that were once considered to be unfit for consumption can be potentially made safe for human consumption with appropriate treatment technologies.

The principles that have guided the WRAP are not unique to the United States. They are needed for any water reuse initiative: protection of public health, environment and ecosystems; promoting action-based on leadership, partnerships and collaboration; building on past progress and experiences; identifying the most impactful actions; recognizing the distinct challenges posed by water reuse; considering water reuse in an integrated resources management framework; and recognizing and addressing state and local considerations.

Given water scarcity and pollution all over the world, increasing needs by all sectors, and impacts of climate change that are resulting in changing rainfall patterns and more frequent droughts and floods, the One Water approach is a feasible alternative that can be considered elsewhere.

The paradigm on water is changing. From being part of a lineal water cycle, it has become part of the circular economy. More work is necessary in terms of innovative governance, regulatory support, technological breakthroughs and community involvement (WaterReuse Association, 2021). However, within these constraints, the water and development communities will do well to implement water reuse in the context of comprehensive water resources management planning and implementation, while prioritizing human and environmental health protection.

In this issue we include papers on the impacts of farming practices on water resources in Abu Dhabi, United Arab Emirates (UAE) (Al Tenaiji et al., 2019); engagement with indigenous communities in Ontario, Canada (Lukawiecki et al., 2019); improved water management to address the energy–food dilemma in Lao PRD (McCartney & Brunner, 2020); water stress vulnerability in the Andes (Moncada et al., 2020); multilevel governance mechanisms and lessons learned from water, forestry and migration policies (Shivakoti et al., 2019); water resources and textile maquilas in Puebla, Mexico (Trinidad Requena et al., 2019); 25 years of water projects in the West Bank (Trottier et al., 2019); and river basin institutions and governance in the Mekong River (Williams, 2020). We trust you will find ideas that are thought-provoking.

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