

Learning From Water Reuse in Israel

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Among the US delegation's many stops in Israel was the Volcani Institute for Agriculture Research.

In October 2022, the United States sent a delegation of water reuse experts to Israel to promote collaboration and knowledge-sharing about Israel's water recycling programs. The visit was part of a larger collaboration between the two countries on environmental issues and an action item in the National Water Reuse Action Plan (WRAP), which was developed by the US Environmental Protection Agency (EPA) in collaboration with partners across the water sector. The US delegation comprised 42 water professionals, with representatives from water utilities, research institutions, regulatory agencies, and nongovernmental organizations.

Israel is a global leader in developing water recycling practices to manage its limited freshwater resources. Taking an integrated water resources management approach, the country uses a combination of desalination, water recycling, and stormwater capture to meet potable and nonpotable demands. The country recycles nearly 90% of all wastewater effluent, using it to maintain a robust agricultural economy and industrial sector.

The US delegation's visit gave Israeli representatives an opportunity to share their experiences in integrating recycling into the country's water management system. Delegates spent an intense five days in the country, participating in site tours, lectures, and meetings to see how Israel implements its water recycling practices, learn about some of the country's innovative methods and technologies, and discuss policies that enable integrated management practices.

National Water Reuse Action Plan

WRAP launched in early 2020 as an EPA initiative to facilitate adoption of water reuse practices across the United States and improve water resilience, security, and sustainability (see "USEPA Develops National Water Reuse Action Plan," *Opflow*, July 2020, <https://doi.org/10.1002/opfl.1393>).

The plan was developed through a collaborative, multi-stakeholder process that included

- federal and state regulators,
- local elected officials,
- national and state associations representing the water utility sector, and
- water experts from academia and research institutions.

When the plan launched, it contained more than 80 action items focused on promoting water reuse through technology innovation, policy reforms, communications, and research. The plan is dynamic, and action items are added routinely by stakeholders engaged in the initiative.

In a time of rapid population growth and water scarcity, water reuse is becoming more prevalent in integrated water resource planning efforts. Increasing focus on environmental stewardship also drives the diversion of effluents from sensitive receiving waters to beneficial reuse in a variety of sectors.

Water recycling has been used throughout the United States sporadically over the past 50 years in places such

as Florida and the arid West. However, during the past two decades, communities and businesses have increasingly adopted water recycling practices to meet a variety of needs, including augmenting potable supplies. Several countries, such as Singapore, Australia, and Israel, have accelerated their use of water recycling to meet water supply needs. Around the world, water reuse is considered a safe, reliable supply option (Figure 1).

There is a vast amount of information available on past and ongoing water reuse efforts, and water professionals are advancing the practice by sharing knowledge and resources. WRAP supports these efforts, bringing together industry experts and thought leaders to make water reuse easier to understand and implement. WRAP opens doors for water professionals to collaborate, innovate, and celebrate together, replacing the days of siloed water reuse practices and private struggles.

Partnering With Israel

Geographically, Israel spans arid and semiarid climatic regions, and it faces threats such as water scarcity, rising sea levels, and climate change. These challenges motivated the Israeli government to institute proactive, centralized policies to ensure sustainable water supplies. Israel can provide useful lessons to water systems around the globe that are interested in pursuing recycling as part of an integrated water management system.

To meet its water demands, Israel relies on a highly integrated water management system that combines desalination, water recycling, and stormwater capture for aquifer recharge. Most of the country's demands for drinking and residential consumption are met by desalination facilities located along the Mediterranean Sea. Once this water is used, the effluent is recycled for nonpotable needs, including agricultural, irrigation and industrial operations.

Agricultural growers are the largest group using Israel's recycled water supplies, and there's a lot of collaboration among the Israel Water Authority, local water companies, and agricultural producers to ensure recycled water quality meets standards for food production and soil health. Israel maintains a robust agricultural export market to Europe, and water quality research is continuously conducted to meet stringent quality expectations for export to the European Union.

The Israel Water Authority regulates the country's national water policies as a one-stop shop through the Water Authority Board, which includes representatives from the Ministry of Water, Ministry of Environmental Protection, Ministry of Agriculture, Ministry of Finance, Ministry of Interior, and the general public. The Ministry of Health isn't a member of the Water Authority Board, but it can veto any policy that, in its view, doesn't protect public health and the environment. This provides an important institutional check on an otherwise streamlined and

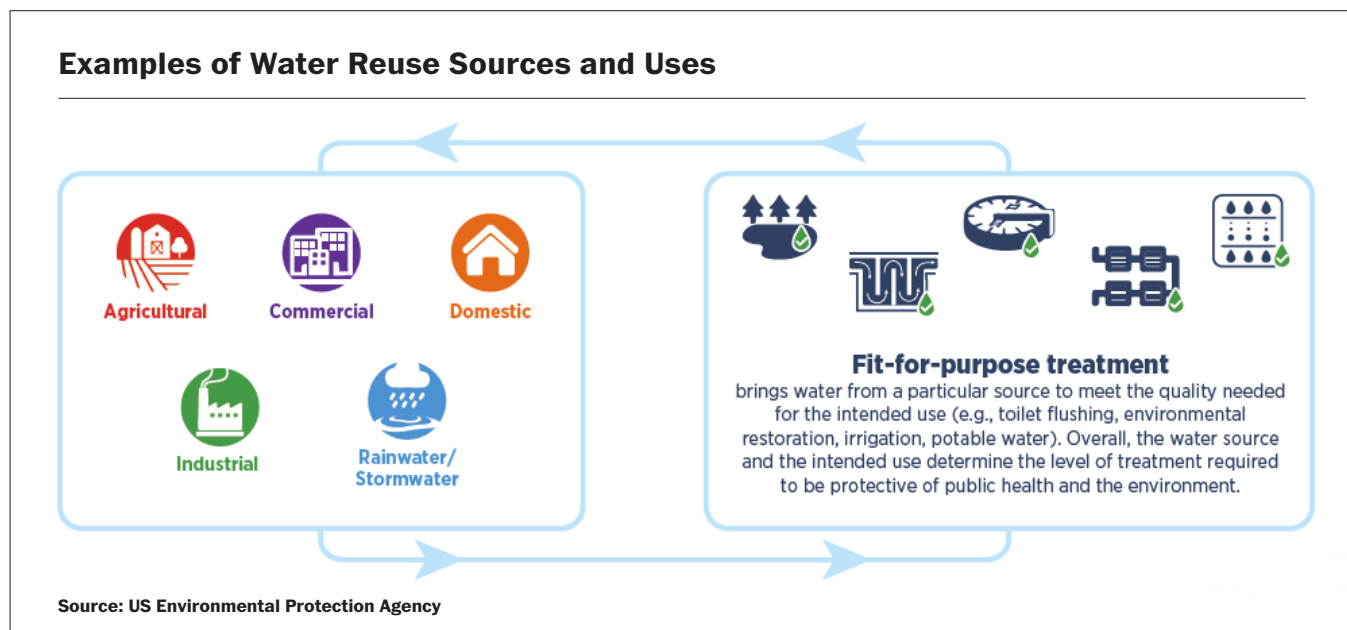
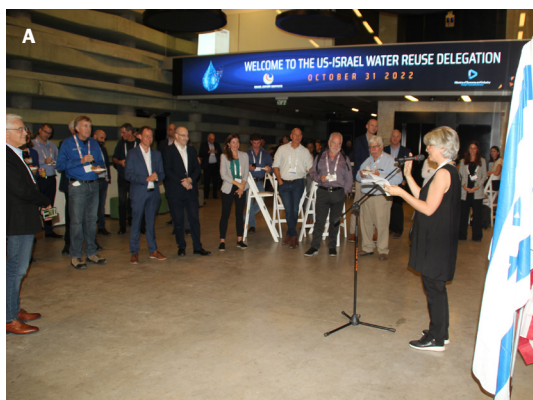


Figure 1



The delegation met with leading Israeli water technology providers at the Peres Center for Peace and Innovation (A), visited the Soreq wastewater treatment plant outside of Jerusalem (B), and saw purple piping for reclaimed water (C) at the Mekorot Shafdan Wastewater Treatment Plant near Tel Aviv.

Photo 1

coordinated system that drives efficient implementation of water reuse projects.

Israel has several unique characteristics that can pose challenges to replicating its water management approach. For example, the country is roughly the size of New Jersey—both in square footage and population—and has a long coastline ideal for supply from ocean desalination. Israel has centralized regulatory oversight, and its Water Authority oversees and enforces all water supply collection and distribution. Most critically, water is viewed as a public good in Israel, and it can't be owned by any private individual or entity.

Reuse Lessons for Water Professionals

Leaving aside geographic or regulatory differences, the following are some important lessons other countries can learn from Israel's decades of experience:

- Israeli recycled water supply providers collaborate closely with end users to provide fit-for-purpose water. Recycled water suppliers constantly communicate with users, forming true partnerships around water resource management.
- The Israeli government invests in continuous monitoring and research of recycled water quality to maintain soil, plant, and public health. These efforts result in a high degree of confidence in the safety of recycled water.
- Israel's integrated and adaptive water management approach creates a system designed to provide high-quality recycled water that meets supply needs in geographic regions experiencing more severe water resource challenges.
- Israel places a premium on innovation and system resilience, which motivates operators to seek ways to improve efficiency and outcomes by incorporating new monitoring and data management technology or novel management approaches. Emphasizing innovation creates a positive feedback loop that maintains and enhances overall water recycling system performance.

Israel's success with water recycling and integrated management has enabled it to even consider exporting water. Specifically, the country developed plans to export water to its neighbors, including the Kingdom of Jordan and the Palestinian Authority.

The US delegates were immersed in Israeli water policy and practice for five days through hands-on, field-level tours with Israeli leaders. The delegates toured water and wastewater treatment facilities, research facilities, and a technology installation (Photo 1). By learning firsthand how a desert nation became a net water exporter, delegates hope to bolster water resources and resilience in other water-scarce areas.

Water Reuse Is the Future

Water is no longer viewed as an unlimited resource in most parts of the world. US water professionals understand that transforming the way they manage this vital resource is imperative to maintaining the country's high standard of living.

Israel hasn't embarked on any significant potable reuse projects, focusing instead on nonpotable applications. In addition, the treatment processes employed at its plants are conventional (e.g., activated sludge-based facilities). Thus, potable reuse is an area of reciprocal exchange in which Israeli water managers can learn from US water professionals, along with regulatory frameworks and advanced water treatment technology.

The United States has the technology and know-how to produce safe, resilient, and reliable water supplies through water reuse. Lessons learned from Israel will inspire and guide the US water sector to a new future of water management. 💧

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