Governance & Trust: Keys to Public Acceptability of Recycled Wastewater

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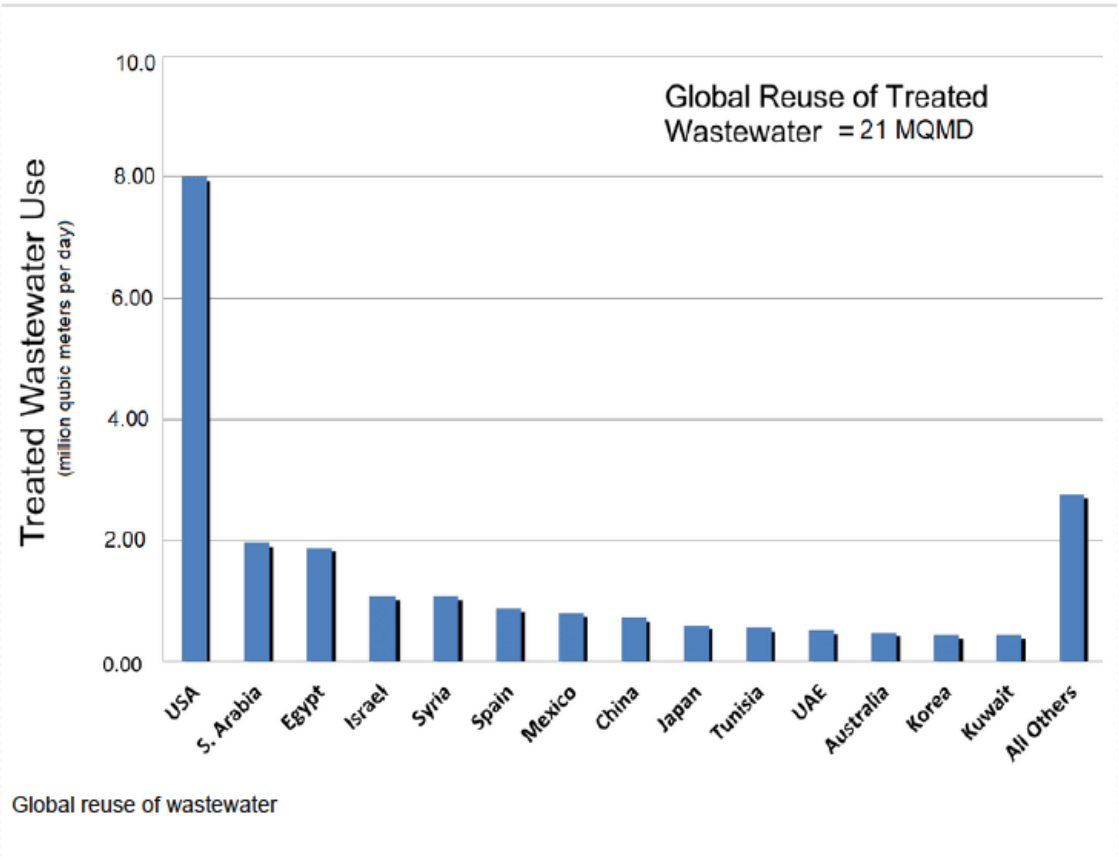
Overview

- **Recycling can address needs generated by climate change and growing demands, while also averting pollutant discharge into streams, rivers and estuaries.**
- **Human health concerns, questions regarding cost and deployment, and concerns with environmental equity *can* be barriers to adoption.**
- **Behavioral science research – and cases from across the globe – suggest a key to overcoming such barriers is effective *governance,* defined as management that:**
  - ***Affirms a safety-first culture***
  - ***Assures technocratic competence and political-independence***
  - ***Assuages public concerns***
  - ***Permits public oversight ensuring trust and confidence***

Re-cycling has been widely adopted



Global reuse of wastewater

Source: Galkina, Elena and Olesya Vasyutina. 2018. "Reuse of treated wastewater," IOP Conference Series: Materials Science and Engineering 365: 022047 doi:10.1088/1757-899X/365/2/022047

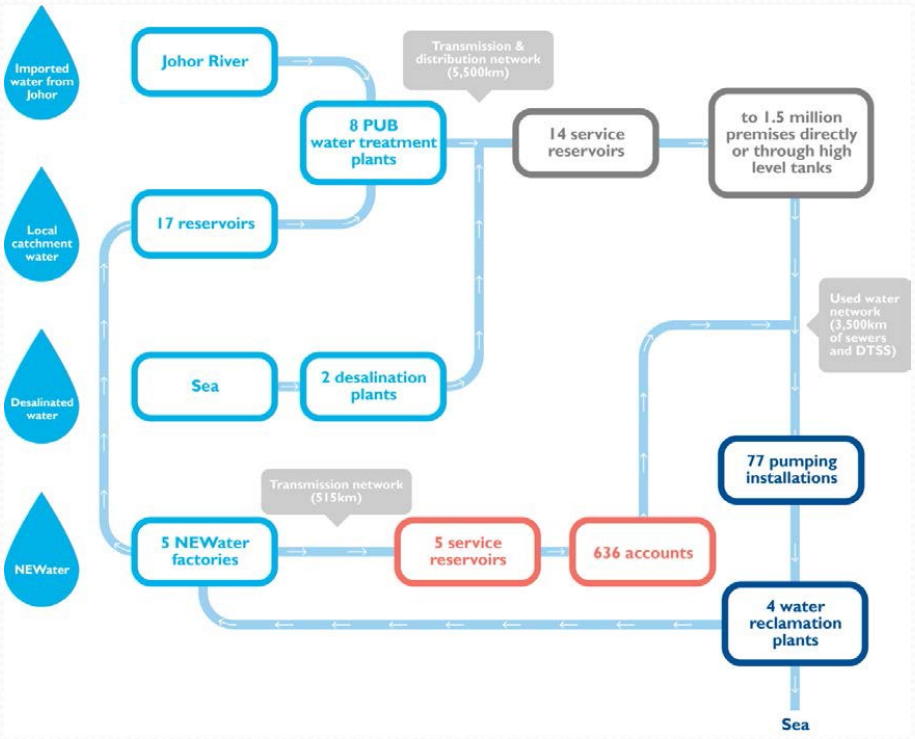
The Trust – Confidence – Governance Nexus

- **Recycling technologies and their impacts are dimly understood by lay audiences. This generates trust & confidence concerns that vary by degree of interaction:**
  - **End uses entailing direct bodily contact (e.g., drinking, bathing) generate anxiety.**
  - **Low- or no-contact uses (e.g., fire-fighting, crop irrigation) engender less concern.**
- **Overcoming concerns requires governance focused on risk management; i.e.,**
  - **Committed to interactive exchange of information and a culture of safety.**
  - **Committed to communicating risks & overseeing their alleviation.**
  - **Committed to providing public with opportunities to collaborate on reasonable, solution-oriented approaches to implementation.**

Efficacy of water technologies is multi-faceted

Criterion	Definition	Key stakeholders
Technical feasibility	Science and engineering assessments support the application of recycling in a given location	Engineers, water resource planners
Economic cost	Recycling is cost-effective relative to likely alternatives – and affordable for likely users	Economists, engineers, water resource planners
Environmental and health impact & risk	Potential adverse impacts to public health and environmental are mitigable	Public health and bio-medical experts; environmental scientists
Public acceptability and engagement	Community perceptions regarding the efficacy of recycling; public trust and confidence in its management; and assurance that public will have a voice in implementation are crucial	General public, civil society groups, elected decision-makers

Singapore – lessons



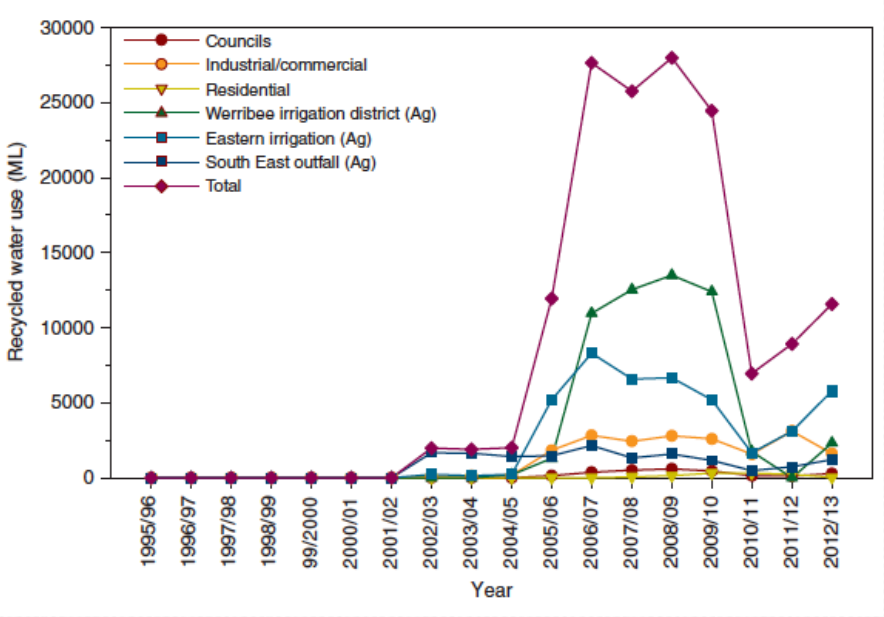
Source: Public Utilities Board of Singapore. 2021. NEWater. Singapore. https://www.pub.gov.sg/watersupply/fournationaltaps/newater

- **Preoccupation with *water security* (dependence on Malaysia) led to *Water Master Plan* and adoption of recycling, desalination, rainwater harvesting (1998).**
- **Recycled or "NEWater" used mostly by semi-conductor industry due to high-cost and purity.**
- **International review panel (2002) recommended indirect potable use – i.e., replenishing reservoirs.**
- ***Public Utility Board* (PUB) governs all aspects of water distribution; has built public confidence through education and outreach, visitor centers for public schools and general public.**
- **PUB embraces merit-based personnel appointments ; competitive remuneration of staff, high-level of training – viewed by public as honest, incorruptible.**
- **Adoption of recycling has generated an entire technology-export business – a source of income and national pride.**

Israel – lessons

- **Preoccupation with *water security* (shared surface and GW with West Bank, Jordan, Syria) led to pursuit of recycling for GW replenishment.**
- **More ambitious efforts began in 1970s for agriculture through *soil aquifer treatment* – accounts for 55% of total agricultural water.**
- **Other uses include industry, in-stream flow replenishment – but *not* as drinking water.**
- **Public support for recycling high due to water-savings, cost, and environmental benefit; however, direct consumption is frowned upon.**
- ***Water Law of 1959* provides strong centralized control of all water provision – allowed aggressive pursuit of recycling; high public confidence in managers as apolitical experts.**
- **Adoption of recycling fits Israel's philosophy of "fit-for-purpose" end use and integrated management: desalination provides urban supply; urban wastewater is then converted into agricultural water.**

Australia – lessons



- **Large-scale recycling prompted by Millennium drought of early 21st Century – a means of supplementing freshwater and reducing nutrient loading to Port Phillip Bay, Melbourne's estuary.**
- **Legal reforms encouraged reuse for agriculture/ non-potable household uses (2005). So-called *Class A* (suitable for home and agricultural irrigation).**
- **Recycled water for urban uses, including residential use (e.g., flushing toilets and outdoor use) increased, during drought ; after drought ended – recycling for potable uses declined.**
- **In Victoria especially, public buy-in facilitated by visioning process conduced by state that was inclusive of concerns, offered broad water options (Living Victoria & Next Generation Community Engagement program).**
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Source: Low, Kathleen G., D.L. Feldman, Stanley B. Grant, Andrew J. Hamilton, Kein Gan, Jean-Daniel Saphores, Meenakshi Arora. 2015. "Fighting Drought with Innovation: Melbourne's Response to the Millennium Drought in Southeast Australia," WIRES Water. doi: 10.1002/wat2.1087, p.

Encouraging public acceptability of recycling – overall lessons

Prescribed activity	Principal objective	How strengthen legitimacy?
Conduct planning and values-based decision-making at the community level	**Involve all key stakeholders; facilitate dialog, participatory technology development, social learning**	**Reuse is situated into larger discussion of water supply & quality, and health concerns of community**
Conduct opinion surveys of reuse and its sources of public support	**Demonstrate underlying fears of drought & water shortages, public confidence in technology**	**Demonstrate economic, environmental, and household security advantages of reuse**
Conduct dedicated public outreach program	**If focused on direct potable reuse can build and increase confidence and support**	**Gain experience in developing and maintaining effective outreach throughout project life-span**

- **Sources: Asano and Bahri, 2011; Mehan, 2019; Mosher and Vartanian, 2015**

Acceptability is socially constructed – how citizens view the causes and severity of water problems and, thus, what constitute appropriate remedies – is shaped by underlying values, attitudes and aspirations that must be met by recycling proponents.