International Water Resources Association

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Water Reuse in a Circular Economy Context

THEME I

Governance for Water Reuse in a Circular Economy

KEY POLICY MESSAGES

- A circular economy requires reusing water from households, industry or agriculture.
- Technology alone will not drive water reuse at the levels required to meet all needs.
- A holistic approach to governance is the key to unlock this new water 'source'.

This policy brief captures the key messages from: UNESCO and UNESCO i-WSSM. 2020. Water Reuse within a Circular Economy Context (Series II). Global Water Security Issues (GWSI) Series- No.2, UN ESCO Publishing, Paris, 2020. unesdoc.unesco.org/ark:/48223/pf0000374715.locale=en

Waste Water Treatment

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International Centre for Water Security and Sustainable Management under the auspices of UNESCO

Reusing water from households, industry and agriculture is fundamental in a circular economy. Reuse offers water security for growing populations and economies. Technologies to increase reuse are necessary but not enough on their own to meet the needs of cities, and food, fibre and industrial production. Good governance across diverse facets is the catalyst.

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TAKE WATER FULL CIRCLE

In a circular economy, resources are used in a way that allows their reuse, often with co-benefits such as using recovered energy, water, biosolids and other resources to meet operating costs. A circular economy challenges the accepted linear waste generation trajectory from product-to-use-to-disposal.

Transitioning from the traditional linear waste model will require technologies, good policy and governance, and community acceptance. It also requires particular focus on water because of the innumerable roles water plays throughout the economy.

GO BEYOND ONE DIMENSION

Decision-making for water reuse must take into account many variables. For instance, to understand water availability, it is not enough to know only the volume of water available. A case study in Brazil highlights the importance of integrating quantity, quality and purpose to assess water availability and inform municipal and industrial decisions on water reuse investment.

Analysis using triple bottom line (TBL) or Life Cycle Assessment (LCA) captures the full advantages of water recycling in a circular economy. These techniques properly account for energy costs and sources, and degraded water quality reducing downstream economic opportunities in watersheds.

This type of comprehensive accounting needs to inform government policy. Resource depletion, pollution, maldistribution and carbon footprints can no longer be ignored.

THE GOVERNANCE DIMENSIONS FOR A CIRCULAR ECONOMY INCLUDE:

- **a vision and related plans;**
- **information systems;**
- **stakeholder engagement and raising awareness;**
- **regulatory systems, standards and codes of practice;**
- **research development and deployment for technologies, techniques and approaches; and,**
- **secondary product markets (e.g. fertilizers recovered from wastewater treatment).**

GENERATE TRUST

A circular economy reduces pressure on freshwater resources, but public acceptance of wastewater reuse remains fraught with mistrust. Effective governance builds trust among stakeholders. Trust fosters uptake of existing options and the development of additional approaches.

Public education, acceptance and engagement are keys to water reuse and recovery. Examples abound around the world. In Morocco, wastewater can provide a significant boost to crop irrigation, but scientists and policy makers must collaborate on laws and policies to mitigate potential soil contamination and human health risks.

In Nigeria, wastewater reuse is commonly accepted, but low-income Nigerians are exposed to environmental and health risks. The need for organizational and regulatory frameworks to ensure appropriate wastewater treatment is urgent.

Iran and Gulf Cooperation Council countries have a clear need to appropriately identify, analyze, treat and deliver water that must then be accepted by end-users and society. In the Spanish Andalusia region, challenges and barriers include acceptance among food-chain agents and the general public, and the higher cost of reclaimed water for irrigators.

These tasks are not impossible. Singapore is a world leader in establishing advanced water reuse practices within a broader framework for a circular economy.

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TALK TO THE PEOPLE

Stakeholder surveys provide insights to attitudes and barriers, thereby informing policies to address specific needs. Surveys of water tanker suppliers and end users in a peri-urban ward in India indicated some potential for tankers to supply reused water to meet non-potable needs. The next step is to scale up the pilot to test public acceptance city-wide.

A survey of government officials, technical experts and greywater users in a municipal suburb in Kenya indicates promising potential for grey and wastewater recycling to reduce freshwater demands and to improve environmental health by reducing untreated wastewater discharges. However, government regulation and standardisation are needed, and community knowledge and attitudes towards recycled water and the associated technologies remain a barrier.

FOCUS ON THE THREE P'S

The circular economy is transformative. It requires rethinking business models and service provision (e.g. decentralised systems). It is systemic because it takes into account water in connection with other sectors such as waste, energy and construction. It is functional, as it connects cities and their surroundings.

Focusing on the "3Ps"– people, policies and places – can help identify key governance components to enable circularity in the water sector:

People: The circular economy is a shared responsibility across government and stakeholders. Water operators can determine the shift towards new business models. Citizens can make choices on water consumption and waste prevention.

Policies: The circular economy requires a holistic approach. That means fostering policy coherence, for example, between water and energy (e.g. energy recovery from sludge sewage treatment); or, water and agriculture (e.g. wastewater sludge used as organic fertiliser). The lack of a systemic approach might lead to fragmented projects over the short to medium term, rather than sustainable policies in the long run.

Places: Cities and regions are not isolated ecosystems. Rather, materials and resources flow into, within and out of them. Therefore, a functional approach is important, where the hydrological basin (i.e. watershed or aquifer) represents the functional area. When a basin's hydrological boundaries do not correspond to city administrative boundaries, this mismatch adds complexity to managing water resources efficiently.

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Similarly, linkages across urban and rural areas such as the bio-economy, agriculture and forests are keys to recycling organic residuals for use near where they are produced, reducing transportation costs. Wastewater sludge generated in cities could provide compost and organic fertiliser to peri-urban farms and contribute to closing local nutrient cycles.

Place-based solutions are required to overcome territorial mismatches and to promote cooperation between cities and their surroundings.

TAKEAWAY POINTS

- **The potential of the circular economy can be unlocked only if the necessary economic and governance conditions are in place.**
- **Cities are laboratories for innovation, where experiments and pilot projects can take place. Under the right governance conditions, the circular economy can provide technically innovative solutions for facing and overcoming water risks.**
- **Rather than being a burden, marginal water resources can provide socio-economic opportunities that close the resource use loop while providing essential resources on local and regional scales. But this requires planning on a water basin or aquifer scale, and appropriate place-based governance practices.**

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