Water INTERNATIONAL
IWRA

POLICY BRIEF
Water International
Number 18
October 2020

Wicked problems swamp water quality governance

■ *Johnstone River flood plumes in January 2010 from Great Barrier Reef hinterland. © C. Honchin.*

KEY POLICY MESSAGES

- Ease water scarcity by matching water quality to uses.
- Understand wastewater from the next users' perspective.
- Commit resources to routine monitoring and assessment; it is worth it.
- Find a shared legal understanding to reach cross-border solutions.

Water International Policy Briefs (blue series) are based on thematic special issues of IWRA's journal and published with the support of Routledge Press. They aim to provide high quality analysis and practical recommendations for policy makers on important development issues.

• Access Water International by becoming a member of IWRA: www.iwra.org

• or subscribe only to the journal at: www.tandfonline.com/toc/rwin20/current

Routledge
Taylor & Francis Group

As the world grows wealthier and more crowded, human activity has so pervasively degraded surface and groundwater that water quality is emerging as a more serious threat to water security than diminishing supply.

OPPORTUNITIES LIE IN WATER QUALITY THREATS

Massive untapped potential lies in matching different qualities to different uses. Using water of all qualities will help solve water scarcity. Realising the full benefits requires a shift in the focus on supplying freshwater for all purposes; in societal perceptions of reuse; in policy and regulation; and, in water management conventions.

ONE QUALITY DOES NOT FIT ALL PURPOSES

Water quality only takes on a practical meaning when it is associated with specific uses. The quality needed to flush toilets, irrigate crops or make bricks is not necessarily the same as the standard fit for humans to drink or trout to flourish in a river.

Defining the critical quality values for different uses is challenging. Water, the universal solvent, can contain more than 70,000 potentially harmful artificial substances and compounds, most of which have unknown health and environmental effects.

Typically, 40 to 70 parameters define drinking water standards, but authorities limit monitoring to the parameters linked to health issues and those that are technically and economically feasible. This often leaves out substances that may be harmful under specific conditions or over time, such as persistent organic compounds from pharmaceuticals and natural substances such as heavy metals.

At the same time, drinking water must always also contain certain compounds to assimilate the water and to function well. Purified water is not good for human health.

Salt flats on the Arabatska Beach, Black Sea, Ukraine. 2015
© Yuri Vergeles.

IF IT CAN'T BE MEASURED, IT CAN'T BE MANAGED

Defining the causes of deteriorating water quality requires routinely collecting data and assessing pollution sources. In the 1950s, difficulties in determining the pollutants and cause of Minamata disease in Japan compounded the environmental and social damage. Initially, industry and government hid relevant results, complicating liability and compensation determinations. (Kobayashi).

Data, regular monitoring and assessment do more than help authorities understand the problem – they can provide the justification to intervene and commit funding. Once pollutants can be identified and their flows traced, targeted reductions can then be pursued.

This was the case in the Danube River and Black Sea (Vystavna et al.), as well as Australia's Great Barrier Reef (Tan & Humphries) where scientific consensus on the key threats to water quality informed policies and directed funding. Improved data and water quality monitoring is especially key in developing regions and nations experiencing rapid economic growth such as China.

WATER QUALITY NEEDS A COMMON LANGUAGE

Ecosystems are connected from source to sea through water flows, sediments, pollutants, materials, biota and services. Water quality governance requires cross-border collaboration and a shared understanding of what is required.

Wastewater reuse can reduce demand for new freshwater resources.

Discrepancies in terminology and pollution concepts complicate the integration of States' national laws and standards to protect shared water resources. For example, in attempting to integrate into the European Union, Ukraine, Moldova and Georgia struggled to match terminology and concepts in their water legislation with the EU Water Framework Directive (Vystavna et al.).

GREAT SOLUTION! PITY ABOUT THE STIGMA

Wastewater reuse can reduce pressure on water supplies, and reduce demand for new freshwater resources. This can be especially useful for irrigated agriculture, which uses large amounts of water.

Yet the perceived acceptability of using treated wastewater to irrigate crops varies greatly across cultures and geographies. Attitudes are shaped by availability, climate, culture, social valuation of water, and religious beliefs. Stigma can stymy adoption of a useful policy practice.

The Middle East offers contrasting views, indicating that familiarity may be more important than embedded culture. Farmers on the West Bank, Palestine hold deep health concerns about using treated wastewater and feel it violated their personal or religious beliefs. In contrast, in Tunisia, where its use is more common, farmers are more concerned about practical issues such as whether the water is suitable for particular crops (Dare & Mohtar). Either way, stigma stymies adoption of a useful policy practice.

Educating farmers and the public on the risks and benefits, and how to use treated wastewater safely, will help improve the uptake of this underused resource. The stigma needs to be addressed from the perspective of the target population, rather than relying on technical assurances.

The environment's water quality needs are another consideration in water reuse (Bond).

CUSTOMERS HAVE THEIR REASONS FOR "IRRATIONAL" BEHAVIOUR

Perceived risk drives household behaviour. Even when the authorities deem tap water to be safe and acceptable, customers may still invest in devices to improve the aesthetics of water quality or to remove microbes, chemicals or hardness.

Flood irrigation, Tunisia. 2013 © Anne Dare.

In New Zealand, lower income households are more likely to treat water at home, despite incurring higher costs. This surprising finding points to social equity in water quality standards. Improving the taste, smell and appearance of water supply would improve perceived service quality and lower household expenditure (Robak & Bjornlund).

WATER QUALITY IS IN FOR THE LONG-HAUL

Improving water quality takes time. Eutrophication and hypoxia in the Black Sea took 15 years to decline following policy and regulatory reforms and substantial investment to clean up polluted rivers in its catchment (Vystavna et al.).

Minamata methyl mercury poisoning was identified half a century ago in Japan, yet the incremental and often hesitant government responses to compensation illustrate how symptoms can be delayed, or be partial but lasting, causing victims to suffer lingering toxic legacies that defy quick fixes (Kobayashi).

Sometimes ecosystems continue to decline, despite a comprehensive, national water quality management policy. Australia's Great Barrier Reef is a case in point, suffering diffuse

Leaders no longer have the luxury of overlooking water of different qualities to meet demand.

Averting behaviours practiced by a sample of 1917 households in New Zealand. (source- powerpoint from Webinar on Water Quality given by Anna Robak, 2018).

Farmers in middle eastern countries resist using recycled water on religious and cultural grounds. Lebanon 2020.
© Rabi Mohtar

water pollution from nutrient-rich farm run-off compounded by climate change effects.

Despite the obvious damage to the reef, an adversarial culture of interest group-led politics and a cumbersome, fragmented governance system frustrates streamlined and effective responses (Tan & Humphries).

GROWTH AND WATER QUALITY DANCE ON A TIGHTROPE

Economic growth and rapid urbanization almost invariably mean polluted industry and other discharges into rivers, lakes and oceans. Water quality management is all too often carried out by weak authorities and missing from regional planning.

Eventually, as with the Water Pollution Control Law in China, steps are taken to integrate water quantity and quality management, and to shift towards less polluting industries. Still, the legacy of past practices may take some time to overcome.

As the UN Sustainable Development Goals point out, actions must be interlinked to achieve sustainable food security, inclusive industrialisation and growth, along with reduced freshwater and marine pollution. Policymakers need to balance economic development and protecting water quality if they are to sustainably achieve both objectives.

WASTE NOT, WANT NOT: NEXT STEPS

Leaders and water managers no longer have the luxury of overlooking the potential of systematically and intelligently using water of different qualities to satisfy demand.

The challenges are as much political and legal as they are technical. The diversity of sources and types of pollutants, technologies involved, shareholders, and policies and regulations, render integrated water quality management both necessary and difficult.

Technical advances such as low-cost water quality sensors and automatic data transmitters improve monitoring, while recent studies highlight policy approaches to water reuse with a higher chance of success than in the past.

Defining the tools and criteria for specifying water quality targets is critical. These must then be made globally accessible to support all water-use applications (Bond).

As in so many other areas, management frameworks should be adaptive, innovative and responsive to new information, and geared to long-term solutions.

REFERENCES

From: *Water International*: Special Issue: *The Wicked Problems of Water Quality Governance*. Vol. 43, No. 3, April 2018, www.tandfonline.com/toc/rwin20/43/3

Henning Bjornlund, James E. Nickum & Raya Marina Stephan. Introduction: *The wicked problems of water quality governance.*

Heather Bond. IWRA Report: *IWRA's water quality project, including the report Developing a Global Compendium on Water Quality Guidelines.*

James E. Nickum, Henning Bjornlund & Raya Marina Stephan. *Expert Views: Wicked problems facing integrated water quality management: what IWRA experts tell us.*

Birgitta Liss Lymer, Joshua Weinberg & Torkil Jønch Clausen. *Research Articles: Water quality management from source to sea: from global commitments to coordinated implementation.*

Poh-Ling Tan & Fran Humphries. *Adaptive or aspirational? Governance of diffuse water pollution affecting Australia's Great Barrier Reef.*

Gillian Kerr & Henning Bjornlund. *The social discourses on market-based instruments to manage non-point-source water pollution in the Oldman River basin, southern Alberta.*

Hikaru Kobayashi. *Minamata: how a policy maker addressed a very wicked water quality policy problem.*

Yuliya Vystavna, Maryna Cherkashyna &Michael R. van der Valk. *Water laws of Georgia, Moldova and Ukraine: current problems and integration with EU legislation.*

Anna Robak & Henning Bjornlund. *Poor water service quality in developed countries may have a greater impact on lower income households.*

Anne Dare & Rabi H. Mohtar. *Communication: Farmer perceptions regarding irrigation with treated wastewater in the West Bank, Tunisia, and Qatar.*

Raya Marina Stephan, Rabi H. Mohtar, Bassel Daher, Antonio Embid Irujo, Astrid Hillers, J. Carl Ganter, Louise Karlberg, Liber Martin, Saeed Nairizi, Diego J. Rodriguez & Will Sarni. *IWRA XVI World Water Congress: Water–energy–food nexus: a platform for implementing the Sustainable Development Goals.*

ACKNOWLEDGEMENTS

WI Special Issue Editors: Henning Bjornlund, James E. Nickum and Raya Marina Stephan.

IWRA Policy Brief Editors: Claire Miller, Heather Bond and James E. Nickum

Layout: Nathalie Lyon-Caen