IBM Institute for Business Value

Fixing the future

Why we need smarter water management for the world's most essential resource

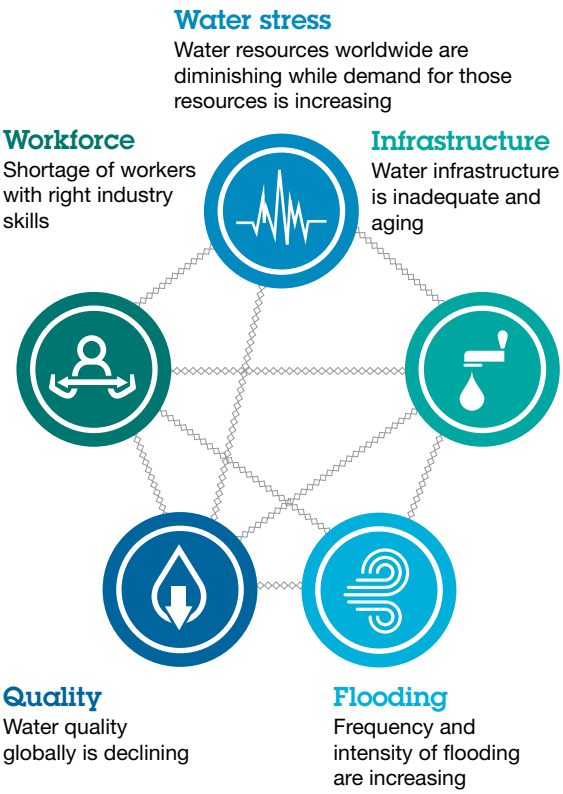
Overview

The world's water system is vulnerable. Essential for health, food, energy, manufacturing and transportation, the global water system is suffering from stress, deteriorating quality, aging and insufficient infrastructure. Managing this critical resource requires a smarter approach to deliver improved outcomes across the water management lifecycle. Using information and analytics, governments, cities, utilities and businesses must take immediate action to deploy a smarter approach to water management to solve the world's water crisis.

The ability to effectively manage the world's water supply impacts almost every aspect of human life. Access to safe drinking water is essential for health and fundamental to the quality and productivity of a workforce. Water is also key to food production and essential for producing goods and services. In addition, the world's energy system is heavily reliant on water, and transportation networks across the globe are affected by water – from the potential of flooding to deterioration due to drought.

Challenges and vulnerabilities

Despite its importance, the world's water system is rife with problems (see Figure 1). Population growth and urbanization are driving a significant increase in water usage, while water availability is decreasing, creating growing problems with water stress. Declining quality is adversely affecting supplies in many parts of the world. At the same time, insufficient and aging water infrastructure is widespread, but financial constraints for many regions mean massive investment on the scale required is not a viable option. All of these challenges are compounded by a looming industry skills crisis, as numerous older workers retire.



Source: Center for Economic Analysis, Institute for Business Value.

Figure 1: **Interrelated challenges in the global water system are creating critical vulnerabilities.**

Smarter water management is crucial

Smarter water management is instrumented, interconnected and intelligent, using information and analytics to deliver improved outcomes across the water management lifecycle:

Smarter water strategies enable effective supply and demand management: Water consumption needs to be managed more effectively by users, and supplies need to be better managed by utilities. This can be done by gaining insight from the analysis of data on water demand and supply that is collected from sensors and smart meter systems across utilities or industrial users' infrastructure and networks.

Smarter water management helps utilities and businesses effectively manage infrastructure: Addressing infrastructure issues requires greater visibility into what is happening across the water network. Sensors and devices can continuously capture data on the age, location and condition of assets and water flows across utilities' and businesses' water infrastructure.

Smarter water management improves preparedness and response to flooding: Smarter water management means data can be collected in real time from river systems, levees, sensors and weather systems; combined with historical data; and aggregated to generate a unified view of the physical infrastructure. Analytics and advanced weather simulation models can then be applied to make predictions, monitor threats and identify potential risk areas.

Smarter water management enhances the ability of utilities and industrial users to monitor and control water quality: Volumes of data about water quality can be gathered across industrial or utility networks from measuring instruments in the watershed, treatment plants and testing equipment. This data can then be integrated with geographic data representations of topography, community boundaries, public infrastructure and population data to identify water quality issues.

Smarter water management can help address the skills crisis by improving organizational memory and attracting younger workers: Capturing organizational memory through smarter data management, preserving organizational knowledge on processes and procedures, and consistently applying complex analytical models to help decision making can help combat the skills crisis. In addition, more intensive use of technology could help attract young, tech-savvy workers to the industry.

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What should governments, cities utilities and businesses do?

- ***Governments*** need to develop a strategy for smarter water, help develop industry-standards for interoperability of devices and support collaboration nationally – and even internationally.
- ***Cities*** can act as the "hub" for fostering transparency in data sharing and bringing key stakeholders together.
- ***Utilities*** need to unlock the tremendous potential value from all the data they already have and break collaboration boundaries to help develop a strategic architecture for building a smarter water industry.
- ***Businesses*** can take stock of the water they already use by utilizing sensors, instrumentation, meters and other solutions. They can then calculate the full cost of water by including additional costs, such as heating and treating water, and use this information to drive efficiency and help reduce water risk.

Conclusion

Water is critical for life, health and commerce. The world needs smarter water management, and it needs it now. By using information and analytics to deliver improved outcomes across the water management lifecycle, governments, utilities and businesses can take the critical steps necessary to begin creating intelligent, instrumented and interconnected systems that protect our most valuable resource.

How can IBM help?

- Combining advanced analytics with information management, technology services and business consulting capabilities, IBM strategic water management solutions can help governments, water utilities and companies monitor and manage water operations more effectively.
- IBM Intelligent Water is designed to optimize water operations and to create new opportunities for innovation and business value by delivering integrated insights into a utility's infrastructure, assets and operations. The solution uses advanced data management, visualization, correlation and collaboration technologies to transform the vast amounts of disparate data received from various devices (including metering systems), assets, systems and stakeholders into actionable information that can guide executive and operational decisions.

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