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Executive Report

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Fixing the future

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

IBM Institute for Business Value

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By Mary Keeling and Michael Sullivan

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 global water system is essential for the world economy

The ability to effectively manage the world's water supply impacts almost every aspect of human life, from health and nourishment, to business and commerce, to energy and transportation. But the world's water system is rife with problems, including stress, declining water quality and an aging and insufficient infrastructure. With deteriorating resources and exponential growth in water demand, an alarming percentage of the world's water is going to waste. For example, nearly 35 percent of all the water used each year in agriculture is frivoled away by poor resource management.[1] And water leaks account for billions of lost liters per day. Without smarter water management, the ability of the water system to meet the critical needs of people and business will be compromised in virtually every country of the world.

Water has a direct impact on health

Access to safe drinking water is essential for health and is fundamental to the quality and productivity of a workforce. Poor water quality can make workers unproductive or even take them out of the workforce completely. The link between water and health is significant – more than 50 percent of the world's hospital beds are occupied by people suffering from water-related diseases, and 80 percent of diseases in developing countries are attributed to poor quality water.[2] Fixing water-quality problems will help improve individual health and, as resources are freed through smarter management, improve the functionality of health care systems.

Water is a resource for which there is no alternative.

Water is key for food production

Irrigated agriculture accounts for 80 percent of global water use and 40 percent of the world's food production.[3] Food production yields are affected by declines in rainfall, and extreme wet and dry events can lead to crop failures.[4] In 2012, for example, agriculture in the United States experienced the worst drought in a half-century, severely impacting crop production and costing billions of dollars in lost revenue from corn and soybean exports.[5] As the world's population increases from today's 7 billion to an estimated 8 billion in 2025 and 9 billion by 2045, the demand for water will rise to satisfy increased demand for food, particularly as meat consumption in global diets increases – it takes 15,400 liters to produce a kilogram of beef compared to 1,300 liters for a kilogram of wheat.[6] Over the next few decades, water scarcity will be the major constraint on food production as agriculture competes with increases in demand for water from urban and industrial uses.[7] What happens in our food system also affects the water system – agriculture is a major source of water waste and pollution.[8]

Water is essential for producing goods and services

According to the Organisation for Economic Co-operation and Development (OECD), US$68 billion of the $121 billion of economic activity generated by the water industry is provided as inputs to other activities.[9] This underestimates the true value and importance of water in supporting economic activity as the price paid by users for water in many countries does not reflect the true cost of supply.[10] Water is needed to produce a host of goods and services (see Figure 1).

It takes...

10 liters of water to make one sheet of PAPER	**40 liters** of water to make one slice of BREAD	**80 liters** of water per dollar of industrial PRODUCT	**91 liters** of water to make one pound of PLASTIC
109 liters of water to make one glass of WINE	**125 liters** of water to make one APPLE	**130 liters** of water to make one cup of COFFEE	**290 liters** of water to make one kg of POTATOES
1,300 liters of water to make one kg of WHEAT	**1,700 liters** of water to make one bar of CHOCOLATE	**1,000-4,000 liters** of water to make one liter of DIESEL	**2,500 liters** of water to make one cotton SHIRT
5,990 liters of water to make one kg of PORK	**10,855 liters** of water to make one pair of JEANS	**15,400 liters** of water to make one kg of BEEF	**17,000 liters** of water to make one pair of leather SHOES
300,000 liters of water to produce one ton of STEEL	**400,000 liters** of water to build a CAR	**10m liters** of water to make a 100,000 sf STRUCTURE	**8-15m liters** of water daily in a microchip manufacutring PLANT

Source: waterfootprint.org.

Figure 1: **Water footprints: quantities of water used in the production of selected goods and services.**

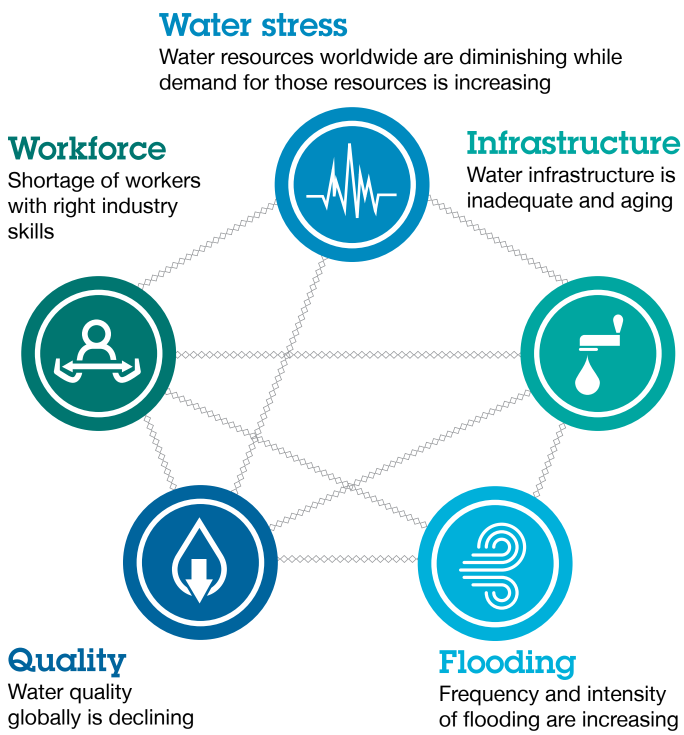
The average global water "footprint," reflecting how much water is consumed daily, is 3,800 liters, with wide variations due to differences in consumption patterns and how efficiently water is used in production. For example, levels are relatively high in Bolivia (10,000 liters), Niger (9,600 liters) and the United States (7,800 liters). Usage is relatively low in such nations as the Democratic Republic of the Congo (1,500 liters). China and India are below the world average at almost 3,000 liters.[11] As the world's population and incomes grow, so, too, will demand for the water to produce the goods and services needed to satisfy consumption and support economic activity and employment.

Energy and water are interdependent

The world's energy system is heavily reliant on water. Energy accounts for 49 percent of total water used in the United States and 44 percent in the European Union (EU).[12] As energy needs grow, water consumption will increase accordingly. Compared to usage in 2000, the United States will require 165 percent more water by 2025, and the EU will need 130 percent more by 2030.[13] Issues with water availability are already restricting energy production. Central and South China experienced severe drought in 2011 that resulted in power shortages.[14] The severe drought in 2012 in the United States led to reliability problems and price increases for electric power in California.[15] Energy also affects water quality. The U.S. oil and gas industry produces 60 million barrels of wastewater daily. In Africa, 260,000 barrels of oil spill into the Niger Delta every year.[16] Concerns over the impact on water quality from hydraulic fracturing ("fracking"), used for extracting oil and gas, has led to increased regulation concerning disclosures of chemicals used, as well as its ban in many places, including South Africa, Australia and France.[17] Considerable energy is required to extract, treat, distribute and heat water, as well as collect and treat wastewater.

Water affects transportation networks

Road and rail networks are becoming more vulnerable to flooding from storm surges, rainstorms and rising water tables. Transport infrastructure along coastal regions is at increasing risk from sea-level rises.[18] At the other end of the spectrum, drought is pushing roads to their design limits and causing cracking, as well as restricting navigation channels in rivers.[19] This damage to infrastructure leads to disruptions of services and higher transport costs, which have a significant negative impact on regional and national economies.[20]



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

Figure 2: **Interrelated challenges in the global water system are creating critical vulnerabilities.**

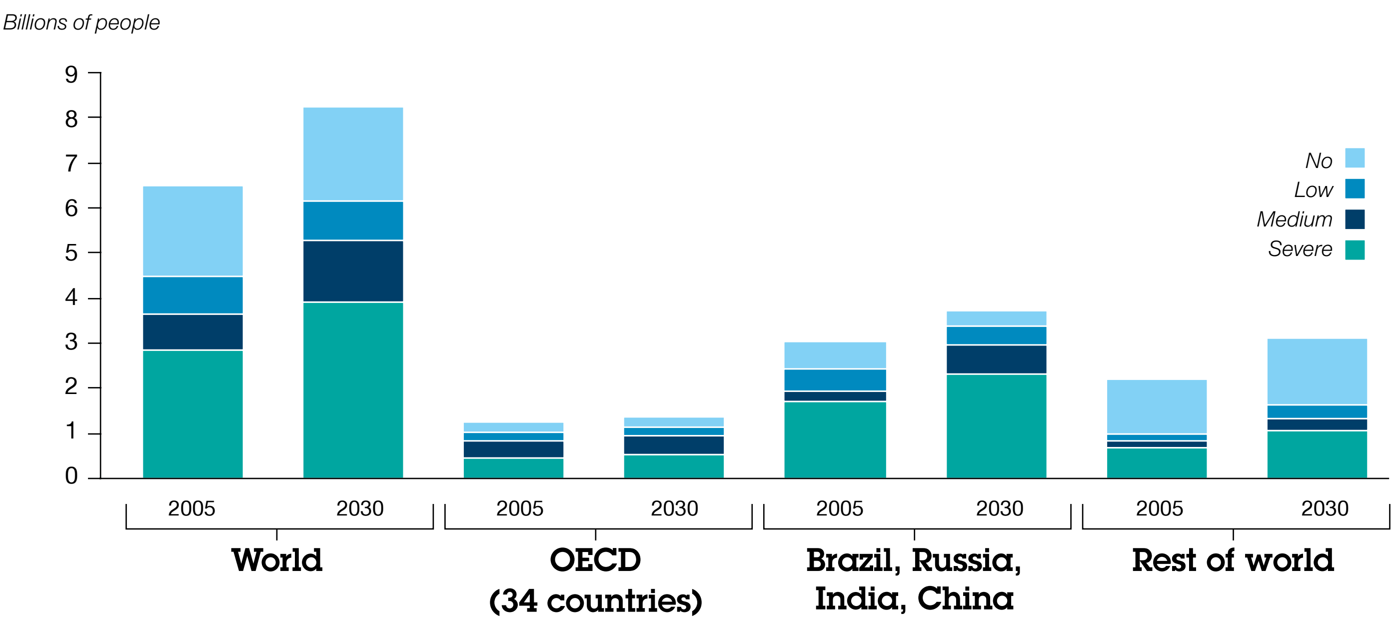
Interrelated challenges and critical vulnerabilities

More people are living where supplies do not meet demand

Population growth and urbanization are driving a significant increase in water usage, while water availability is decreasing. Declining quality is adversely affecting supplies in many parts of the world.[21] The intensity of water use is also rising – water use increased at twice the rate of population growth between 1900 and 1995.[22] Water stress – when demand exceeds water available – is a global issue that affects all regions (see Figure 3). Water stress creates further negative impacts on quantity and quality of water.[23] Water stress problems will become even more pervasive as the number of people living in areas of severe water stress increases. Between 2005 and 2030, this number is expected to have increased by almost 40 percent, from 2.8 billion people to 3.9 billion.[24]

Insufficient and aging water infrastructure is widespread

Issues with water infrastructure are almost universal. In the United Kingdom, 3.4 billion liters of water are lost daily through leakage.[25] In Mumbai, India, 700 million liters of water are lost daily through leakages and illegal connections. The average leakage rate in Latin American cities is 35 percent. An average leakage rate of over 20 percent has been reported in more than 400 cities in China.[26] Inadequate water and sewage treatment facilities put more than half of Brazil's cities at risk of water shortages by 2015.[27] Enhancing and expanding infrastructure is costly. It is estimated that between 2011 and 2025, US$1 trillion is required to fix aging water infrastructure problems in the United States, where, for example, 5,365 dams will have exceeded their design life by 2015.[28]



Note: Water stress is based on the ratio of water withdrawal to annual water availability and uses the following thresholds: <10 percent = low; 10-20 percent = moderate, 20-40 percent = medium, >40 percent = severe.
Source: OECD, OECD Environmental Outlook 2030, 2007.

Figure 3: **Population living in areas of water stress, 2005 and 2030.**

China is planning to invest $128 billion by 2015 to address inadequate water infrastructure. Financial constraints for many cities and regions mean massive investment on the scale required is not a viable option, and construction may not be able to keep pace with growth in emerging markets. Infrastructure issues impact water quality, as aging water or sewer pipes are more prone to failures that can contaminate water, and contribute to water stress through the inability to balance supply and demand, as well as worsening the impact of flooding.

Intense, frequent floods result in significant human and financial costs

Globally, between 1980 and mid-2012, more than 4,000 flood disasters affected 3.5 billion people, killed 6.9 million and caused US$559 billion of damage.[29] As the hydrological cycle continues to intensify, more frequent and intense episodes of precipitation are anticipated. These episodes are likely to increase flooding and storm-water runoff, causing further human and financial losses.[30] By 2025, over half of the population in developing countries will be highly vulnerable to floods and storms.[31] By 2050, the global population at risk from flooding will grow 33 percent, from 1.2 billion to 1.6 billion. By 2070, the value of flood-exposed economic assets in 136 major ports could reach 9 percent of global GDP.[32] Flooding impacts water quality as surface contaminants enter water supplies, aquifers and storm-water runoffs.

Water quality and wastewater problems are worsening

Two million tons of sewage and industrial and agricultural waste are discharged into the world's water every day.[33] In the United States alone, sewer overflows discharge up to 850 billion gallons of wastewater annually.[34] Over 780 million people worldwide do not have access to safe water.[35] Issues with water quality have resulted in an increase of over 600 percent in the number of people using bottled water in urban areas to meet drinking water needs, from 26 million in 1990 to 192 million in 2010.[36] These problems are worsening.

The number of people without access to safe water is expected to rise to 2 billion by 2025, and as the world's urban population rises from 52 percent in 2011 to over 67 percent in 2050, this will exacerbate existing challenges managing urban water and wastewater.[37] Worsening water quality increases problems with water stress as poor quality reduces effective water supplies available for use.

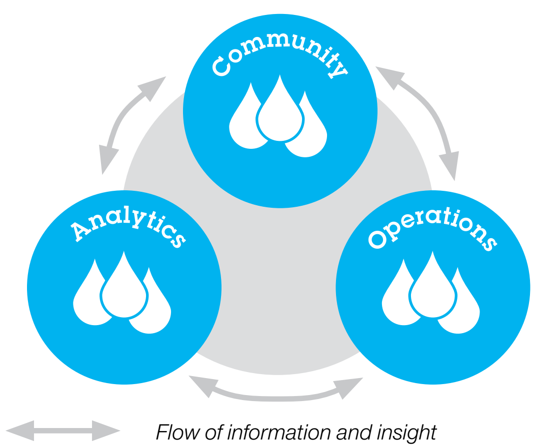
The water industry is facing a skills crisis

All of the challenges and problems in the water system are compounded by the looming skills crisis in the water industry. Large numbers of older workers are retiring, and the industry is struggling to attract and retain younger workers. In the United States, for example, the average water utility worker is 44.7 years old and will retire at age 56 with 24 years experience with the same utility. In terms of scale, this is anticipated to lead to a loss of between 30 and 50 percent of the workforce by 2020.[38] Similar challenges exist in Australia, where a Water Industry Skills Taskforce was founded in 2008 to address the water sector skills shortage. To replace retirees in the Australian industry, 40,000 workers will need to be recruited by 2019 – half of the current 80,000-person workforce.[39] And in the United Kingdom, the Science and Technology Council called as far back as 2009 for the skills shortages in the water industry to be urgently addressed.[40]

Financial constraints prohibit many cities and regions from making the necessary investment to maintain an aging water infrastructure.

Smarter water management is needed to address the challenges

Smarter water management is instrumented, interconnected and intelligent, using information and analytics to deliver improved outcomes across the water management lifecycle (Figure 4). Instrumented means fast, automated collation of information from varied sources to increase situational awareness. It also entails the merging of structured and unstructured data from multiple sources to create a holistic view of water systems at multiple scales. Interconnected means efficient information sharing to deliver a real-time common operating picture to drive more effective decision making and effective collaboration across services, agencies, suppliers and user communities. Intelligent means more comprehensive, timely information to improve planning, scheduling and tactical decision making, using predictive analytics and information mining to identify trends and hotspots, as well as specify preventative action.



Source: IBM Corporation.

Figure 4: **Smarter water management.**

Analyzing water usage data enables real-time insight into consumption and supply.

Smarter water strategies enable effective supply and demand management

To address the challenge with water stress and optimize the balance between supply and demand, water consumption needs to be managed more effectively by users and supplies need to be better managed by utilities. Smarter water management enables this optimization by collecting data on water demand and supply from sensors and smart meter systems across utilities or industrial users' infrastructure and networks. This data can be analyzed and visualized in real-time to generate insight on water consumption behavior and supply conditions. Users can then use this insight to more effectively manage their demand, while utilities can more effectively control supply through better decisions about what, when and how much water to store, treat and distribute. It also enables improved collaboration and more coordinated management across multiple stakeholders by enabling them to access and share data on a single platform (see case study, Dubuque, IA). In Sonoma County, CA, for example, a near real-time operating picture is generated from data from meters in the distribution network and customer plant sites. A pilot collaboration platform analyzes the data to enable more informed decisions about storage, treatment and distribution and helps avoid mismanagement.[41]

Case Study – Dubuque, IA.[42]

- **Real-time platform monitors water consumption every 15 minutes and securely transmits anonymous data to the cloud, where it analyzed with weather and other data.**
- **Quickly and automatically notifies households of potential leaks and anomalies and water usage information expressed in dollar, gallon and carbon savings to improve water conservation.**
- **Generates insight into water consumption trends for citizens, city policy makers and the city water department, to be used for short-term decisions and longer-term planning.**
- **Benefits generated included decreased water utilization by 6.6 percent during pilot and anticipated annual savings over 23,000 households of 64.9 million gallons, as well as increased water leak detection of 8 percent compared to 0.98 percent citywide, a 716 percent increase.**

> **"….Our citizens now have access to real-time data, enabling them to alter their patterns of behavior, which will save them money and conserve a precious resource."**
>
> *Roy D. Buol, Mayor of Dubuque*

Smarter water management helps utilities and businesses effectively manage infrastructure

Addressing issues with leakages and aging infrastructure requires greater visibility into what is happening across the water network. Sensors and devices continuously capture data on the age, location and condition of assets and water flows across utilities' and businesses' water infrastructure. The visualization and analysis of this data is used to generate alerts of actual or potential losses from leaks and aging equipment across the network.

Utilities can identify exactly where problems are occurring, quickly dispatch maintenance crews, understand how much work is required and what type of equipment is needed to save time and costs. This insight can also pinpoint where to target resources for preventative maintenance and repair to minimize serious and costly disruptions of service. Reducing leakage levels helps lower operating costs, such as for the energy used to pump, treat and pressurize water systems. It also reduces chemical treatment costs, and the need for costly construction projects. For example, Severn Trent Water, which provides services to 8.5 million people in the United Kingdom, has in place integrated asset management and human resources capabilities that have significantly increased first-time resolution rates for problems and lowered operating costs by predicting, planning and scheduling maintenance.[43]

Smarter water management improves preparedness and response to flooding

Flooding cannot be avoided. However, the human and financial costs of flood events can be mitigated if flood defenses are managed more effectively through accurate early warning systems and alerts. 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 be applied to this data to monitor and predict water flows and floods, monitor emerging threats from flooding, and pinpoint with greater accuracy potential areas at risk (see case study, "Rio de Janeiro, Brazil").

This insight helps to provide early warnings, enable more targeted focus for emergency or disaster response and improve the coordination of emergency and disaster response agencies to better manage and respond to risks. It also helps optimize use of limited financial resources by identifying weak points of existing infrastructure so that investment can be targeted where it is needed most.

Case Study – Rio de Janeiro, Brazil[44]

- Rio de Janeiro was the location of the biggest natural disaster in Brazil's history in 2010 when the city was devastated by severe floods and mudslides, which took hundreds of lives and left thousands homeless.
- Out of the need for improved emergency management and better weather prediction, the city established a state-of-the art operations center that applies analytical models to more effectively predict and coordinate reaction to emergency incidents.
- The center integrates information and processes from across 30 different city agencies into a single operations center that provides a holistic view of how the city is functioning on a constant basis.
- Implementation of a high-resolution weather-forecasting and hydrological modeling system can now predict heavy rains up to 48 hours in advance.
- An automated alert system is anticipated to drastically reduce the reaction times to emergency situations by using instantaneous mobile communications to reach emergency personnel and citizens, allowing for better management of emergency services and potentially saving lives.
- The center now has the capability to act as a nervous system for the entire city, managing traffic congestion, keeping a close eye on crime response and prevention, predicting brownouts in the power grid, and coordinating large-scale events to ensure public safety.

"In Rio de Janeiro, we are applying technology to benefit the population and effectively transitioning to a smarter city."

Mayor of Rio de Janeiro Eduardo Paes

Data visualization and scenario simulation tools can generate a reliable and actionable view of water resources and management systems in real-time.

Smarter water management enhances the ability of utilities and industrial users to monitor and control water quality

Vast volumes of data about the status of 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. Analysis of this data through data visualization and scenario simulation tools enhances monitoring of water quality by generating a single, reliable and actionable geospatial view of water resources and management systems in real-time. Automated alerts enable industrial users or utilities to detect and pinpoint issues for more effective and rapid response to quality problems. This helps prevent water contamination and provides insights for long-term planning. Early intervention can thus help to reduced disease outbreaks related to waterborne contaminants and help utilities and industrial users comply with water quality regulation. Being able to access and share data on a single platform can also help to support improved collaboration around a broad range of activities across multiple stakeholders and provide citizens with public access to water management data stakeholders (see case study, Marine Institute, Ireland).

Case Study – Marine Institute, Ireland[45]

- Ireland's Marine Institute uses real-time advanced analytics to improve the monitoring and control of water quality and to support marine and coastal research in Galway Bay.
- The Institute moved from manual to automated data gathering with real-time sensors monitoring and transmitting key data on water quality and ocean conditions. Open and scalable architecture enables integration of sensor data with other data such as geographical information systems.
- Data is processed, analyzed and displayed in new ways and the system delivers valuable insight quickly on water quality to various stakeholders such as public health agencies and laboratories.
- Public safety is improving by using alarms to notify when certain conditions arise, such as an increase in pollution or potential flooding.
- Information supports a broad range of activities by numerous stakeholders, including research on climate change, technology development, and support for commercial fishing interests.

"The immediate benefits of SmartBay, whether it's helping and supporting industrial development or promoting marine safety, are tangible, direct and worthwhile."

Paul Gaughan, project coordinator, SmartBay Ireland

Smarter water management can help address the skills crisis by improving organizational memory and attracting younger workers

The aging workforce and large number of retirees in the water industry are leading to large volumes of knowledge being lost that are not enshrined in corporate and organizational memory. A smarter approach to water management can help to address this problem by continuously capturing organizational memory through smarter data management, constructing and preserving organizational knowledge on processes and procedures, and consistently applying complex analytical models to data to generate insights to support decision making. Improving knowledge access and exchange can help make better use of existing skills and talent.

In addition, more intensive use of technology and greater collaboration can make it easier to attract young, tech-savvy workers into the industry to maintain the critical mass of workers necessary to keep water systems functioning effectively.

What should governments, cities utilities and businesses do?

Governments, cities, utilities and businesses all have key roles to play in achieving the significant potential of a smarter approach to address the world's water system challenges.

Governments need to develop a strategy for smarter water and help develop industry-standards for interoperability of devices

The first action governments need to take is to develop a strategy for smarter water and a roadmap for implementation, with clearly identified objectives, timelines and milestones (see case study "Holistic management of water in Singapore"). Governments should:

- Establish a national organization with overarching responsibility for water management, if one does not currently exist. The oversight organization should take ownership of the water strategy and roadmap and measure progress and outcomes.
- Ensure that key stakeholders are involved in developing the strategy and roadmap – for example, by creating a forum to bring stakeholders together.
- Leverage existing R&D or innovation funding to support demonstration projects that can help to prove the ROI on smarter water management solutions and accelerate adoption.

Governments need to take the lead in bringing utilities and manufacturers together to fill the gap and develop industry-standards for devices such as meters, water pumps and valves.

- Governments can learn from best practices in developing common industry platforms and protocols in many other areas – for example, in buildings and industrial automation and control networks.
- Research should be focused on identifying the gaps in standards so efforts can be applied to where the push for open standards needs to be made.

Governments also need to make sure that there is collaboration on water issues nationally and that the scale of collaboration is broadened to go beyond national boundaries.

- For example, there are nearly 53,000 water agencies in the United States alone.[46] But there is no coordination of these agencies, despite the fact that they are all managing a shared resource.[47]
- Collaboration could include, for example, proactively reaching out and expanding partnerships and coordination efforts with other governments, international water management organizations, the private sector, civil society and academia.

Governments need to make sure agencies coordinate on water management issues and approaches.

Case Study – Holistic management of water in Singapore[48]

- **In 2001, the Public Utility Board (PUB) was reconstituted to become the national water agency overseeing the holistic management of Singapore's water supply, wastewater and storm water.**
- **The agency devised a comprehensive plan for the management of water resources. This plan includes a supply strategy to ensure a diversified and sustainable supply of water for Singapore and water demand management through the engagement of multiple stakeholders.**
- **In 2004, the PUB launched the WaterHub as a center of excellence to provide a strategic platform for PUB and the Singapore water industry.**
- **WaterHub supports cluster development, capability development and internationalization of Singapore's water industry through a focus on three strategic areas:**
  - **An institute of advanced learning for water professionals (Academy@WaterHub)**
  - **A vibrant water R&D incubator center (R&D@WaterHub)**
  - **A global water knowledge and networking hub (Connect@WaterHub)**
- **Singapore is now recognized as a dynamic global hydro hub for its innovative water management, and has managed to turn the country's vulnerability into a key strength.**

Source: PUB

Cities can act as the "hub" for fostering openness and transparency in data sharing and for bringing key stakeholders together

Cities can be instrumental in laying the foundation for a smarter water management system by enabling data sharing at the city level. They can:

- Develop a charter for data sharing between key agencies involved in water management, such as utilities, flood or emergency management and environmental health agencies.
- Create a platform to facilitate the exchange of data and information among these agencies to foster openness and transparency and create a truly integrated, unified view of the water system. Such a platform could be part of existing open data initiatives and could also be shared publicly with citizens, businesses and researchers (see case study, "Water management across boundaries in Dublin.")

As water issues do not respect political or jurisdictional boundaries, cities need to take a trans-boundary approach to water management.

- Cities need to look across jurisdictional boundaries to collaborate, tackle their water challenges and exchange best practices on smarter water management techniques, solutions and approaches.
- They should create forums to bring utilities, flood management, water quality organizations and agencies from contiguous areas together.
- Forums can be used to collaborate, cooperate and manage water on a scale appropriate for the resource.

Cities need to also proactively reach out to other cities nationally and internationally.

- Use existing city networks and associations – such as the National League of Cities in the United States, and the Major Cities of Europe organization – to connect with other cities with the same priorities and challenges and to collaborate on a grander scale.

Case Study – Water management across boundaries in Dublin[49]

- **The four councils with responsibility for water management in Dublin started to formally cooperate in exchanging data through a single open data platform, Dublinked.**
- **This collaboration enabled amore coordinated effort and approach on water quality issues that crossed council boundaries and improved the ability of all councils to proactively tackle issues.**
- **The portal facilitates engagement with as many companies and individuals as possible and acts as a structured engagement mechanism with the Dublin authorities.**
- **It enables data-driven innovation and promotes Dublin as a world leader in developing and testing new urban solutions.**

Utilities can better use data and collaborate on strategic architecture

To unlock the tremendous potential value from all of the data that utilities already have, they need to:

- Take stock of the data existing data within the organization. This comprehensive inventory should use a well-defined framework to establish what data resides in which departments.
- Identify ways to bring all of this data together in a structured way to make it more readily available and usable within the organization. An operational dashboard, for example, could be used to integrate the data.

Once a full view of existing data is established, data and knowledge gaps within the organization should be identified.

- Develop a plan to plug these gaps to get a more complete view of the network and infrastructure. Sensors and other devices might be helpful in gathering any additional data needed to augment the existing stock of data.

Utilities need to break collaboration boundaries and get involved in helping to develop a strategic architecture for building a smarter water industry.

- While technology is a necessary component of a smarter approach to water management, it is not sufficient. Extracting full value from these solutions will require any such architecture to include the governance, operational and organizational changes needed to make smarter water a reality.
- Get involved in and take advantage of the collective knowledge of an industry association – such as the Smarter Water Analysis Network, the American Water Works Association or the International Water Association – to help develop this architecture and change the way you work.

Business can take action by assessing water use, improving efficiency and calculating the full cost of water

To get an indication of the risk for your business from water, start by taking stock of the water you are already using.

- Use sensors, instrumentation, meters and other existing solutions and toolkits to understand how much water you are using, where you are using it and when you are using it.

Use this insight as a basis for action to drive efficiency of water use for your business and help reduce water risk.

- The disaggregated view of the total quantity of water used can be compared to billed quantities as a starting point for identifying possible leakages, as well as where efficiency can be improved by comparing against industry benchmarks.
- To embed water management as a key strategic component of your business, develop and implement a plan of action with timelines for improving efficiency and regularly monitor and review the results of your plan.
- Get the buy-in of your employees so that they are fully engaged in organization-wide efforts to improve water use and develop a culture of improving water efficiency across your organization

Calculate the full cost of water to your business.

- The cost that businesses pay on their water bills is only a fraction of the full cost of water. To get an accurate view of the full cost, businesses also need to include additional costs, such as heating water and treating it after use. This can then be used to calculate the full benefits from improved efficiency in water use.

Utilities need to break collaboration boundaries and help develop a strategic architecture for smarter water.

Conclusion

Water is critical for life, health and commerce. Yet continued ineffective water management leads to massive waste every day. On top of this, increasing demand, an aging infrastructure, deteriorating quality, climatological changes, skills issues and more are contributing to a worldwide water crisis.

Given the scale of intensifying water management problems, effectively tackling them requires a shift in thinking and actions around how water is managed and used. A smarter approach to water management needs to be at the core of these changes.

Without smarter water management, large segments of the global population will be increasingly exposed to water shortages and water-related diseases. Business and industry will see costs go up and productivity go down. Transportation will be compromised as roadways deteriorate and rivers become unnavigable. There is no more time or room to vacillate. 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 the process of creating intelligent, instrumented and interconnected systems that preserve and protect our most valuable resource.

This study was written by the Center for Economic Analysis, which is part of the IBM Institute for Business Value. You can also browse a full catalog of our research at:

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