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## Conflict and political confrontation threaten to drown co-operation





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WATER FOOTPRINT

# Taking steps to cut water consumption

Measuring water consumption in manufacturing and the supply chain is fundamental to introducing more sustainable practices

JIM McCLELLAND

Water count and numeracy in pints and litres is fast becoming a core sustainability skill for responsible and resilient business.

“Water is firmly on the corporate agenda,” says Cate Lamb, head of water at CDP (Carbon Disclosure Project). It is a matter of risk and reward. She explains: “Many businesses are already experiencing detrimental impacts. In 2016, companies engaging with CDP reported a total of \$14 billion in costs from water-related events, such as stranded assets due to loss of licence to operate.

“On the flip side, 66 per cent see opportunities in water from cost-savings to brand value and shareholder confidence.”

Economic drivers are strong in themselves, but only if you factor in energy spend, argues managing director of business services at the Carbon Trust, Hugh Jones. “The biggest financial motivation to address water consumption is concern around energy costs and carbon emissions,” he says. “In most regions, water is comparatively cheap, even where not necessarily abundant. The big costs come from energy needed for heating, cooling, pumping or treating water.”

The connection between water and energy is actually getting deeper, says Craig Simmons, chief technology and metrics officer at global sustainability consultancy Anthesis Group. “As water supplies dry up and sources become more polluted, there is a drift towards more energy-intensive technologies to address the shortfall,” he says. “The link between carbon and water is getting stronger – the cost of water evermore closely aligned with the cost of energy.”

Unlike energy and carbon, however, water is a very site-specific commodity as you can work smart with what you have, but cannot easily generate more supply onsite or offset excessive impacts elsewhere. The secret to water in three words appears to be “location, location, location”.

Where you do what you do often mandates water efficiency for some firms, says Benedict Orchard, environmental sustainability manager at Adnams, one of the only UK breweries to complete full life-cycle assessments for water and carbon. “It’s a simple case of business resilience. In one of the driest parts of the country and restricted on how much we can use, we believe water



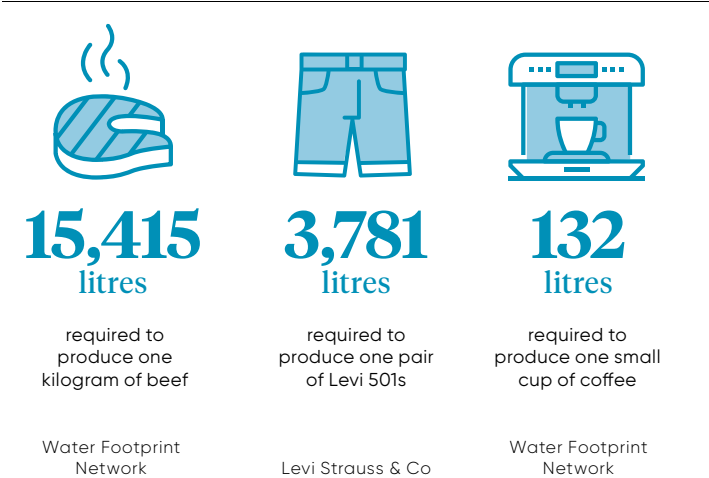
is currently undervalued financially,” he says.

At just 2.8 pints of water for every pint of beer, Adnams has one of the lowest water ratios for a UK cask brewery. For Mr Orchard, benefits of footprinting are obvious: “It will immediately highlight potential efficiencies and water-saving opportunities, for example reusing wort [unfermented beer] cooler water as hot brewing liquor.”

Given water quality and availability are so location specific, footprinting helps identify priorities, agrees Michael Kobori, vice president, sustainability, at Levi Strauss & Co. “According to product life-cycle assessment, there are 3,781 litres of water embedded in one pair of Levi 501s. Two thirds is used in growing cotton and nearly a quarter by consumers,” he says.

Focusing time and resources on cotton and consumers, which make up 91 per cent of water use, the company has made great progress innovating in denim manufacturing with its Waterless Collection, as well as implementing the apparel industry’s first water recycle/reuse standard.

Collaboration has been key. “It is crucial when the stage in the life cycle is several steps removed from our direct influence, as with cotton cultivation, or water quality and availability are impacted by other commercial, agricultural or governmental actors, which is practically everywhere,” says Mr Kobori. “For these reasons, we work with the Better Cotton Initiative, WWF, NRDC, CEO Water Mandate and Project Wet Foundation to address shared water issues and raise awareness.”



Water stewardship is also a major priority at Ford Motor Company. Not content with 72 per cent water reduction per vehicle since 2000, the automaker aims to reduce usage by an additional 30 per cent by 2020, with a long-term goal of zero drinking water in manufacturing.

Ford has also been busy collaborating with the United Nations, Business Alliance for Water and Climate, CDP, World Business Council for Sustainable Development, SUEZ, Nalco and others.

This outreach brings more awareness to efforts involving a variety of stakeholders, says Ford’s John Cangany. “Transparency is critical to continued progress with water stewardship, as well as with broader corporate social responsibility efforts,” he says. “Working with leading NGOs and water experts has greatly aided the company’s public goal-setting.”

In addition to companies and brands showing leadership on water, sectors too are in the vanguard, says Mr Simmons. “There is no doubt agriculture, as the biggest consumer globally, is leading on water management,” he says. “And given the huge water footprint of many foods we eat – it is quite common for the mass of water needed to bring the product to market to exceed the finished weight by a factor of several hundred – efficiencies can pay huge dividends.”

Amanda Curtis, senior environment manager for Plan A foods at Marks & Spencer, is acutely aware of the issues. “At M&S, water is critical to our business,” she says. “We’ve often said that if climate change is the wolf, water is its teeth.”

For M&S, better understanding of usage is key, with more than 90 per cent in the supply chain. Ms Curtis adds: “Quick wins are often through water-efficiency measures at farm level, such as drip irrigation, rain-water harvesting, removal of alien water-thirsty plant species and smart agriculture.”

Sustainability scorecards encourage suppliers to embed water stewardship and cut usage. Despite this laser focus, though, progress can still prove slow and solutions complex.

Ms Curtis concludes: “Moving from efficiency to stewardship requires farmers to go beyond their farm gate, and work with different organisations and neighbouring businesses to address the wider issue.

“Often, positive outcomes can only be seen over the longer term, across a wide area and link to social and biodiversity elements requiring investment into resource for many years.” ●



# Meeting the fluid challenge of water

Most people don't think about water too often. It arrives on demand through taps and waste is flushed away via plugs and U-bends. But this apparently simple set-up is held in balance by a complex system that requires constant management, assessment and upgrades

**D**elivering resilient water and wastewater services is no simple task. In the UK we like to joke about our rainy weather, but in reality rainfall is patchy, too much in some areas and not enough in others.

The biggest challenge in some parts of the country is meeting high demand from large populations, while in others, periodically, it can be dealing with oversupply in the form of flooding. Farming, urban development and freak weather events all contribute to the challenge.

For United Utilities, the UK's largest listed water company providing services in the North West of England, the job involves a constant programme of building resilient systems, managing large catchments of land and joining together processes to deliver an efficient service that works for everyone.

"Our business provides water for consumption, deals with waste and produces energy," says chief executive Steve Mogford. "Today we view this as all part of one big system; it's a way of thinking that has created a lot of fresh ideas to meet the needs of our customers and the environment."

United Utilities runs nearly 100 water treatment works in the North West. New technology allows it to act in real time to respond to the fall-out from a storm or contamination incident that puts supplies at risk for example, whereas previously this would have taken a matter of days.

"Sensors and analytics help us manage information more efficiently," says Mr Mogford. "We now know a lot more about the impact of weather on sewer systems and can mitigate the ill-effects. We can predict issues before they arise, whereas historically companies like ours relied on customers to tell them when a problem occurred."

In 2013, United Utilities completed the West-East Link, an aqueduct running between Manchester and Liverpool, which can transport water from one city to the other depending on need. Meanwhile, at the other end of the process, it has invested in a production control system capable of handling large-scale sludge waste and converting it into energy.

"It all comes down to how we can best use our assets," says Mr Mogford. "We think like a manufacturer and we pay close attention to what other industries do, so we can apply best practice to our business. We benefit



01

enormously from bringing in people with experience of other sectors."

In this new era of innovative thinking, partnership is essential. United Utilities must meet strict rules from the Environment Agency on river water quality, while at the same time managing flood risk and protecting water resources. It's a challenge best met via a collaborative approach.

"Within a large river geography, no single plan really covers all of these needs, so we trialled a new approach," explains Jo Harrison, director of asset management. "We took a catchment area in Cumbria and brought together a range of data from several third-party sources to create a model."

"It has revealed a range of issues that hadn't been seen before. It will allow us to optimise the level of investment at treatment works and consider other interventions to improve water quality, working in partnership with Lancaster University, the Rivers Trust and Carlisle City Council. Working with local farms, we can heighten river quality, while protecting our water sourcing. What we learn here can be rolled out to new areas."

Applying systems-thinking to water catchments enables United Utilities to move beyond focusing exclusively on upgrading its own assets to work with others and arrive at better, more holistic solutions with wide-ranging benefits.

Another example is its programme of tree planting in urban areas to



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prevent large amounts of rainwater flooding sewers. It partnered with Salford-based organisation City of Trees, as well as Salford City Council, Urban Vision and others, to plant trees in specially designed paving.

During a storm, the trees slow the torrent of water flowing directly into drains. Initial results of the pilot scheme revealed that tree pit systems "soaked up" the rainfall and reduced peak storm flow by up to 50 per cent. It has been hailed as a natural solution to urban flooding that could be rolled out across the country.

"This has a range of wider benefits that go beyond water, including environmental, health and wellbeing. At the heart of this is the principle that working with others can maximise the efficacy of our investments in the area," says Ms Harrison.

All of this work is brought together in the business's new Integrated Control Centre (ICC), located in Warrington. It collates information streaming in from plants, customers and remote teams. The ICC is fuelled by technology and acts as a central point for directing operations.

"If you walk through the centre, you'll see how much data we have at our fingertips. We know how many people are contacting us with problems to solve; we have access to rainfall data and can monitor the performance of our energy-gener-

“Joining together processes to deliver an efficient service that works for everyone



02

**01** Sensors and analytics help manage information flow through systems-thinking

**02** Inside the West-East Link aqueduct running between Liverpool and Manchester

**03** Working with farmers to reduce the risk to river water quality

ating operations," says Mr Mogford.

"There's a huge amount of information that tells us how we are performing as a business. Understanding how water is moving in the environment around us helps us build resilience to make sure water is available to all our customers."

Alongside this large-scale investment in technology, people and processes, continuous engagement with its customers ensures their concerns are taken on board; for instance, the impact of new housing and transport infrastructure, which adds pressure to existing sewage systems, as well as the ongoing need for safe drinking water.

To help manage future incidents, United Utilities created what it calls Priority Services, an extensive support network for people in vulnerable circumstances such as health issues or financial constraints. As well as helping customers finding it difficult to pay their bill, the scheme, developed with input from the charity sector, provides additional assistance to customers during a severe weather event or a system failure.

"The feedback we have had from people has been really positive," says Mr Mogford. "This involves daily visits and an additional layer of support to vulnerable people. It's something we're extremely proud of and we're keen to progress it further."

The job of keeping water systems flowing to keep the North West moving is one that never finishes, but by working smarter in a high-tech, collaborative environment, United Utilities aims to deliver on its promises to its customers, partners and to the environment.

For more information please visit [www.unitedutilities.com](http://www.unitedutilities.com)



TECHNOLOGY

LAURA OLIVER

Fog-catcher nets help some of the poorest people in Peru’s capital Lima harvest water from the moist air for cooking and irrigation. In the desert landscape of Arizona, a solar-powered device can successfully extract fresh water from the arid atmosphere.

Elsewhere smart metering and sensors provide water utilities with more real-time data on how water systems are working in cities and towns.

Do we now have the technology to end the plight of two billion people who, according to the United Nations, live in areas of water scarcity?

“Though there are always ways of improving and making things cheaper, fundamentally we already have everything we need,” says Giulio Boccaletti, chief strategy officer and managing director, water, at the Nature Conservancy. “But water is rarely an issue of technology.”

Universal metering in the UK could reduce household water consumption by as much as 10 to 15 per cent, says Dragan Savic, professor of hydroinformatics at the University of Exeter, but expanding this simple technology requires significant investment by water companies that may then face public resistance.

The relationship with water often found in developed nations needs to change. Consumers are unwilling to pay more and are unaware of the situation with water resources in their country, impeding an already fairly invisible water industry.

Technology could help change this; smart metering can provide consumers with more instant feedback on water consumption, for example.

To encourage wider adoption of emerging water technologies that involve big data and analytics, different industry roles and skills are needed.

“The water industry has to have people who understand these new devices; people who understand sensors and how information can be converted into knowledge,” says Professor Savic, who is also director of the Water Informatics Science Engineering Centre for Doctoral Training.

“In the UK we have just two professional training centres. We have to move much faster with larger numbers of young people who can lead the water industry into the 21st century.”

Scaling technology and changing water systems in most countries is not possible without input from properly equipped local government. “They are responsible for making sure people have access to water services. They need to be invested and have the capacity to do the work,” says Marieke Adank, programme officer at IRC.

Smart technology cannot work in isolation; a response to the data is

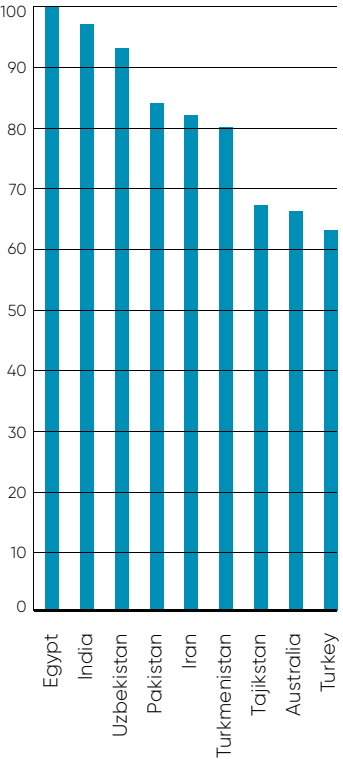
“The story of water is often that the underlying costs of the infrastructure or technology can’t be borne solely by the products we get from it



AFP / Stringer / Getty Images

WATER SCARCITY

SHARE OF POPULATION AFFECTED BY SEVERE WATER SCARCITY FOR AT LEAST ONE MONTH A YEAR (%)



Water Footprint Network 2016

# Tapping technology to quench world thirst

Smart technology can assist in the preservation, economical use and efficient distribution of scarce water supplies

capacity to previously, and possibly poorly, publicly managed water systems. This is already happening in places such as Ghana, where a company manages the reporting of broken hand pumps and ordering new parts by SMS. Technology is a small part of this, and such partnerships will only work if the public sector has the capacity and ability to engage the private sector, says Ms Adank.

Ultimately, water is not a high-tech business, Mr Boccaletti concludes: “This is not Tesla. The story of water has been the same for 2,000 years – the marginal value we place on the stuff is not enough to pay for the infrastructure in the first place.” ●

ABOVE  
A fog-catcher net drawing humidity from low clouds to deliver water to a shantytown in Lima, Peru

needed. It is possible, for example, for hand pumps in communities in Africa to communicate when they are broken thanks to the installation of sensors, but this information must go to someone who is capable of fixing the broken pump.

Scaling all types of water technology requires a tandem financial and institutional response and by far the biggest barrier to technology adoption in the water industry and water-intensive industries is cost, whether that’s the money involved in upgrading an entire network of water pipes or in setting up a drip irrigation system for acres of crops.

If the agriculture sector bore the full cost of irrigation or efficient irrigation, for example, food prices would go up, says Mr Boccaletti.

“The story of water is often that the underlying costs of the infrastructure or technology can’t be borne solely by the products we get from it,” he says.

Public-private partnerships can help, bringing private capital and

CASE STUDY  
ISRAEL



Christian Science Monitor / Contributor

Sorek Desalination Plant

After years of shortage and government campaigns urging conservation, Israel has used technology successfully to manage many of its water problems. The country relies on desalination, which removes salt and impurities from seawater, to satisfy its water demands.

There are five desalination plants on Israel’s coastline, which meet as much as an estimated 60 per cent of the country’s water needs. All were built and are operated by private companies in partnership with the country’s water authority under a Build Operate Transfer model, whereby the state is their primary customer and ownership will eventually be transferred to the public sector.

The desalinated product is sold to Israel’s water authority, which then sells it on to the public. One of the world’s largest plants at Sorek, which handles 624,000m³ of water a day and cost some \$500 million to build, is operated by IDE Technologies. The company

has confidently claimed that now no one in Israel suffers from water scarcity because of desalination.

Thanks to the engineering and infrastructure employed in Israel’s plants, the high energy costs usually associated with desalination have been lowered. The water produced is, therefore, cheaper than is typical of desalination projects elsewhere in the world. Four further coastal plants are planned with a fifth to be located on the Sea of Galilee.

Desalination technology and expertise is now an Israeli export with the nation’s leading businesses in this sector advising and running projects as far afield as California and Tianjin, China.



# Sustainability through collaboration

With the world facing its biggest water crisis, businesses have the power to transform and innovate through collaborative partnerships, says **Earthwatch**



Nearly three quarters of our planet's surface is water, yet only 2.5 per cent is freshwater and less than 1 per cent is readily available for human consumption. Under severe strain from an expanding population, urbanisation and climate change, water scarcity threatens food production, energy supply and the livelihoods of people around the world. In a world home to 7.6 billion, the socio-economic impact is staggering.

This looming crisis requires a global strategy with local solutions, according to international environmental NGO Earthwatch. Businesses have a vital role to play, working with communities, NGOs and governments, in protecting and transforming our ecosystems.

Earthwatch has witnessed firsthand the huge impact a company's sustainability approach can have on their own development and the wider community. The NGO has a track record of transforming how companies think, through innovative field-based employee engagement programmes, rooted in science. By creating projects addressing key environmental business issues, Earthwatch has enabled companies around the world to make a difference.

Dr Steven Loiselle, senior research manager at Earthwatch, describes



the research projects as a unique opportunity to engage entire companies with science, and broaden the understanding and knowledge of key global issues. At the heart of the projects is the Citizen Science model, the collection of data by non-scientists, encouraging employees, business leaders and wider stakeholders to connect with environmental priorities and use a scientific approach to problem-solving.

He says: "Earthwatch's projects are able to change attitudes and drive new behaviours across all levels of the business. Transformational, hands-on research not only educates and informs employees, but allows them to personally contribute to pioneering scientific research and in doing so align with the sustainability goals of the business."

"They can generate the information needed for groundbreaking research that not only supports management action, but has the power to influence policy."

A shining example of a successful collaborative corporate partnership is the HSBC Water Programme. Launched in 2012 as a five-year global initiative with Earthwatch, WaterAid and WWF, the international project was designed to manage and protect water sources better, while informing and educating local communities, enabling them to prosper and drive economic development.

By the end of 2016, Earthwatch's FreshWater Watch Programme saw more than 8,000 HSBC employees engage with the Citizen Science initiative, helping to study 2,500 ecosystems, ultimately influencing policy and contributing to environmental management planning. Following its success, HSBC has extended the programme for a further three years, looking more widely at the interconnectivity between urbanisation, cli-

mate change and sustainability.

Maria Pontes, HSBC programme manager, Earthwatch, says: "Over the past five years, the HSBC Water Programme has provided critical data to fill knowledge gaps in freshwater science, and inspired employees to act and change their environmental behaviours. Nearly all of those who took part in the Citizen Science initiative had a better understanding of their personal environmental impacts and over three quarters said they were more likely to continue their career with HSBC as a result of their involvement."

"HSBC recognises that in addition to developing their employees' personal and professional understanding of sustainability, the world-class research has been able to transform communities across 36 cities, which has wider economic benefits for business on a global scale."

Indeed, focus on impactful corporate sustainability has become a priority in recent years, as businesses acknowledge that environmental and economic footprints are becoming more aligned. Increasingly, companies have a responsibility to meet the growing expectations of their stakeholders, while continuing to deliver a return to investors and creating a brand with which consumers feel an affinity.

For Ms Pontes, innovation is key; it will be forward-thinking companies that understand the far-reaching impact of sustainability partnerships, unlocking the huge potential for understanding and protecting our environment. With innovation comes better returns on investment, more accurate results and a positive legacy of supporting the natural world, she concludes.

For more information please visit [eu.earthwatch.org](http://eu.earthwatch.org)

## INTERVIEW



01

# Water is the number-one world risk

Today's warning of water shortages could easily become tomorrow's crisis – ignore it at your peril, says **Dominic Waughray** at the World Economic Forum

NICK EASEN

Water is one of the most utilised resources around the world and yet it's among the least respected. Many of us expect access to this life-giving resource to be a right and that it should cost very little. While some governments subsidise its distribution, others extract it to the point that it stresses the very environment it's supposed to sustain.

Mankind squanders billions of litres of water every year at a time when the global population is growing, urbanising and getting richer. In the process we're using a lot more water. The population tripled during the 20th century, yet our use of water increased six-fold.

In the 21st century, throw into the mix weather extremes sparked by a planet stuffed with greenhouse gases and you have a perfect storm that has hydrologists very worried.

For the last three years, the World Economic Forum (WEF) has ranked water crises in the top five global risks. Their *Global Risk Report* for 2018 will again put water top of the table. Catastrophes of this kind exasperated by climate change can trigger conflict and migration.

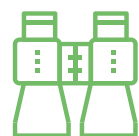
"Water as a risk factor is very insidious and is linked to many social issues; it also has a strong political dimension, creating grand challenges," explains Dominic Waughray, head of the Environment and Natural Resource Security System Initiative at WEF.

## HSBC WATER PROGRAMME IMPACTS



### 2.5k

ecosystems studied across 36 cities and six continents



### 11 years

of research by professional scientists would have been needed without the commitment of a global team of 8,000 FreshWater Watchers



### 40

scientists from 30 international research institutions have led locally relevant research projects

\*2012-2016



“  
The biggest  
challenge  
is actually  
appreciating the  
scale of the water  
issues we face  
globally

“We are also failing to adapt to climate change. We aren’t now talking about one-off extreme weather events. Water also presents a transnational, transboundary problem. The biggest challenge is actually appreciating the scale of the water issues we face globally.”

More than a billion people live in water-scarce regions and as many as 3.5 billion could face water scarcity by 2025, according to the World Bank. The poorest countries and communities are most vulnerable to bad water management and, when it comes to the transboundary issue, more than 260 rivers across the globe run through more than one country.

“Take the River Nile; Egypt needs water downstream, yet many players upstream need water as well, so these issues can flame up politically. Water is a structural long-term risk and many day-to-day economic decisions we make don’t take account of water,” says Mr Waughray.

“Also, people generally don’t move voluntarily. Water crises trigger it. Europe’s migrant crisis is exacerbated by water issues in the central African belt. During

Ethiopia’s famine in 1984, many people affected by drought just stayed where they lived and died. Today they get up and move.”

If we’re to appreciate fully the water we drink, feed our livestock, crops and industry, it’s worth understanding how much we use. For instance, coal-fired power plants globally devour enough water to supply the needs of one billion people. This will double if all the planned power plants come into operation in the near future, according to Greenpeace.

“All the water that pours over Niagara Falls in five months is roughly equal to what’s required to produce coal-fired electricity in the US for one year,” says Mr Waughray.

“Emerging markets are now looking to more coal-fired power stations. A lot more water will be needed. However, in these countries you need 70 per cent of the water for agriculture, so there’s competition and an allocation challenge going on.”

India has 240 million people without access to electricity, mostly in rural areas. The country is trying to raise this group out of energy poverty. One solution the government is looking at is cheap coal; 400 gigawatts are planned by 2035. India is going to need a lot of extra water over the coming decades to fire up these power plants.

Energy isn’t the only water-intensive industry as food production, particularly livestock, is too. Global meat demand is forecast to grow 50 per cent by 2025. Currently, up to 16,000 litres of water is needed to produce a kilo of meat.

“If we already use over 70 per cent of freshwater for agriculture and we face huge increases in demand



Saikat Paul/Pacific Press / LightRocket via Getty Images

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“  
We are at the point  
of the perfect storm  
right now, yet we  
have the technology  
today

for water-intensive meat, and don’t forget those extra demands for water for energy or water stress from climate change, how do we do it?” asks Mr Waughray.

The World Economic Forum believes one answer is technology, whether it’s growing vegetables in vertical farms within a controlled greenhouse environment, which uses 95 per cent less water,

or growing meat in a laboratory, which has similar water-savings.

However, the most exciting developments are in resource management. The fourth industrial revolution, blockchain and artificial intelligence (AI) are all eyeing up the sector and have the potential to disrupt the water industry so it’s managed in a much better way.

The WEF along with the World Bank and technologists are working out how blockchain, the distributed ledger made famous by bitcoin, can be used to manage watersheds. Farmers can be allocated water, and they can then manage and trade their rights fairly, transparently, efficiently and flexibly with 24/7 smartphone access.

AI and quantum computing can be used to predict water usage efficiently; marry this up with satellite imagery, which measures ground water and flow rates, and you have a powerful set of tools.

“We call it wired water. It’s a democratisation tool. The use of tech in water management is very exciting. What we need is radical transparency and this will create a lot less information asymmetry when it comes to water management. Everyone is working in silos – public, private, farmers and energy producers – and it’s not managed well. We can go beyond that,” says Mr Waughray.

“We are at the point of the perfect storm right now, yet we have the technology today. We could not have done this five years ago, but we can’t wait another five to ten years; it will be too late. The building blocks are now in place to radically disrupt how we manage our water.” ●



RJ Sangani/The Denver Post via Getty Images

02

01  
Dominic Waughray

02  
Cattle gather around a shrinking water hole in Colorado, as the feeder stream from the South Fork Republican River slowly dries up

03  
People collect drinking water from municipal water service during World Water Day in Kolkata, India



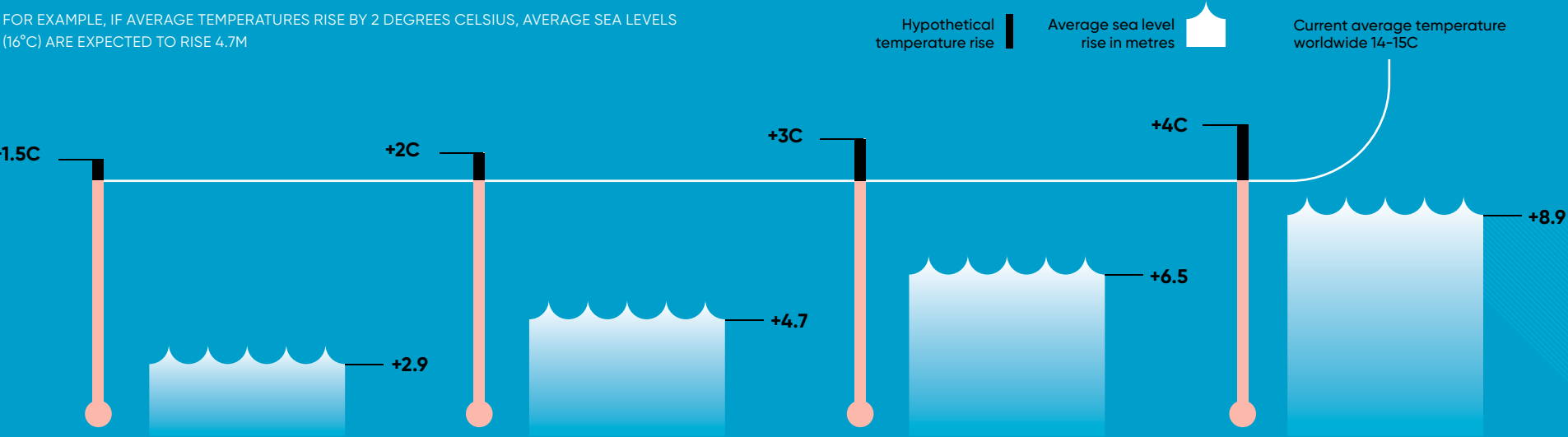
# TIDES OF CHANGE

Despite decades of evidence, global warming remains one of the most contentious, politically charged issues, depending on where you live in the world. However, whether you believe in it or not, the impact that rising temperatures is having on our oceans is undeniable.

While estimates of rising sea levels vary wildly among environmental experts, coastal erosion and shrinking land masses will have a real and irreversible effect on the Earth, and the choices we make today will determine the future of human life as we know it

## HYPOTHETICAL IMPACT OF RISING TEMPERATURES ON SEA LEVELS

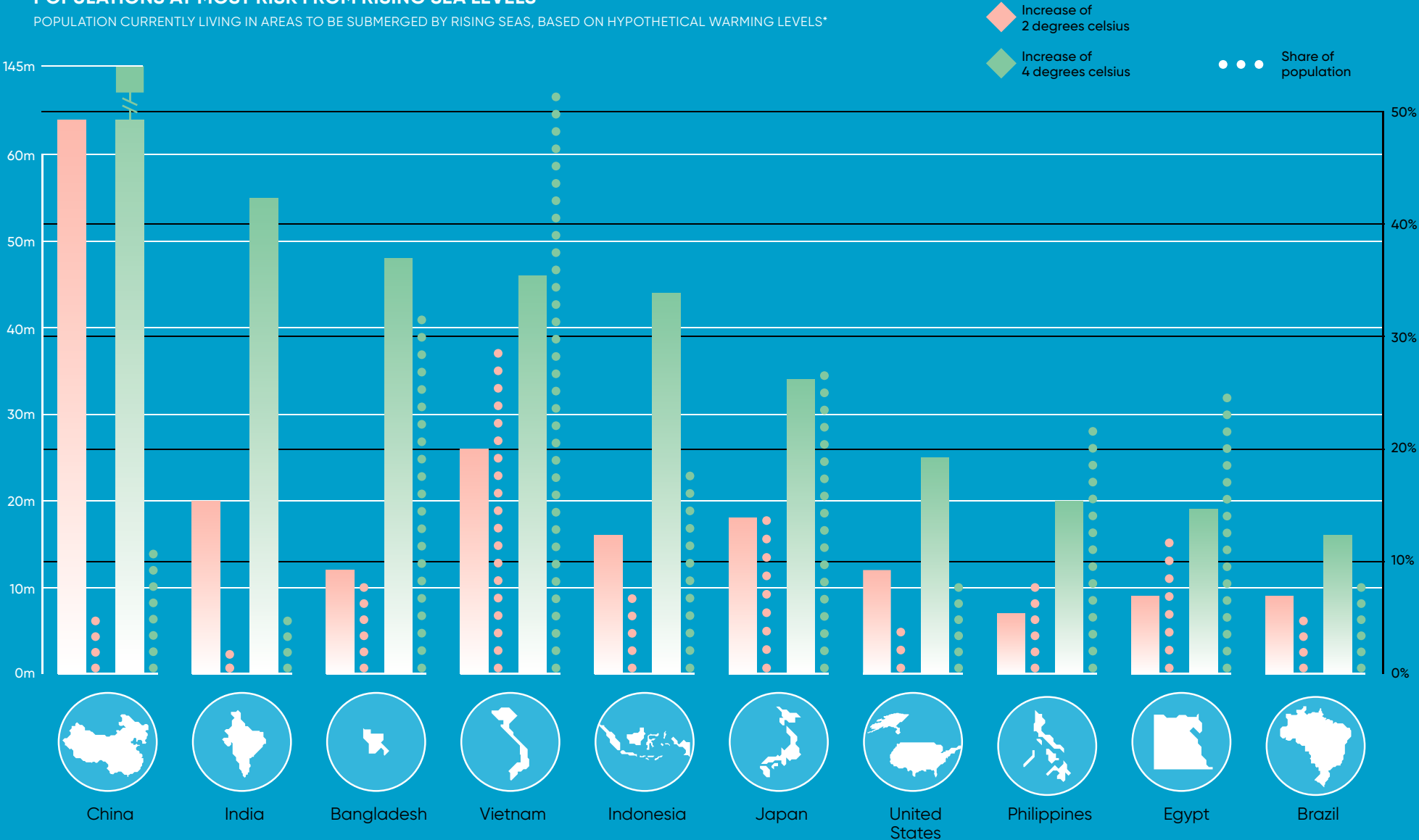
FOR EXAMPLE, IF AVERAGE TEMPERATURES RISE BY 2 DEGREES CELSIUS, AVERAGE SEA LEVELS (16°C) ARE EXPECTED TO RISE 4.7M



Climate Central 2015

## POPULATIONS AT MOST RISK FROM RISING SEA LEVELS

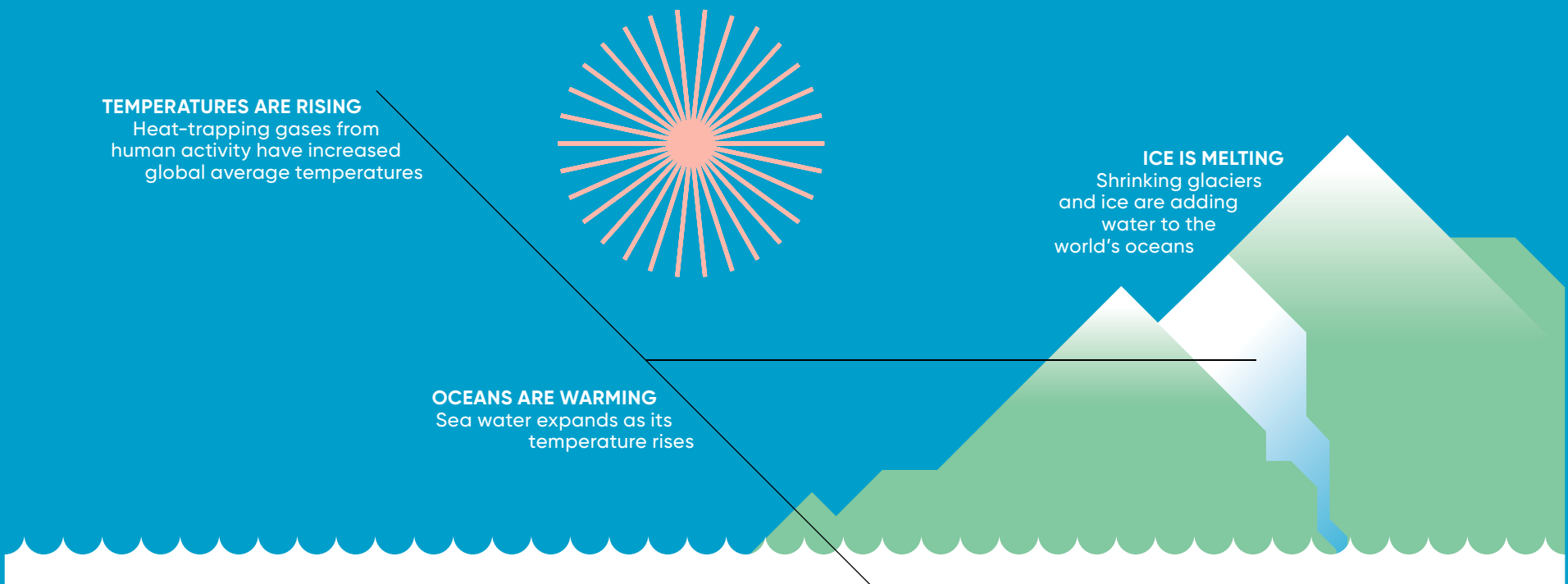
POPULATION CURRENTLY LIVING IN AREAS TO BE SUBMERGED BY RISING SEAS, BASED ON HYPOTHETICAL WARMING LEVELS\*



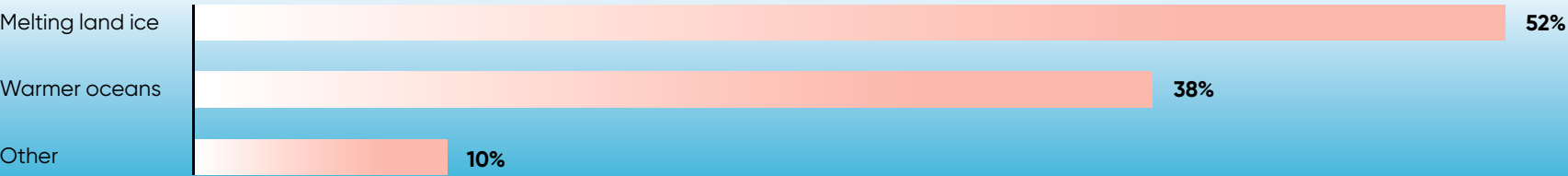
\*Based on 2010 population figures

Climate Central 2015



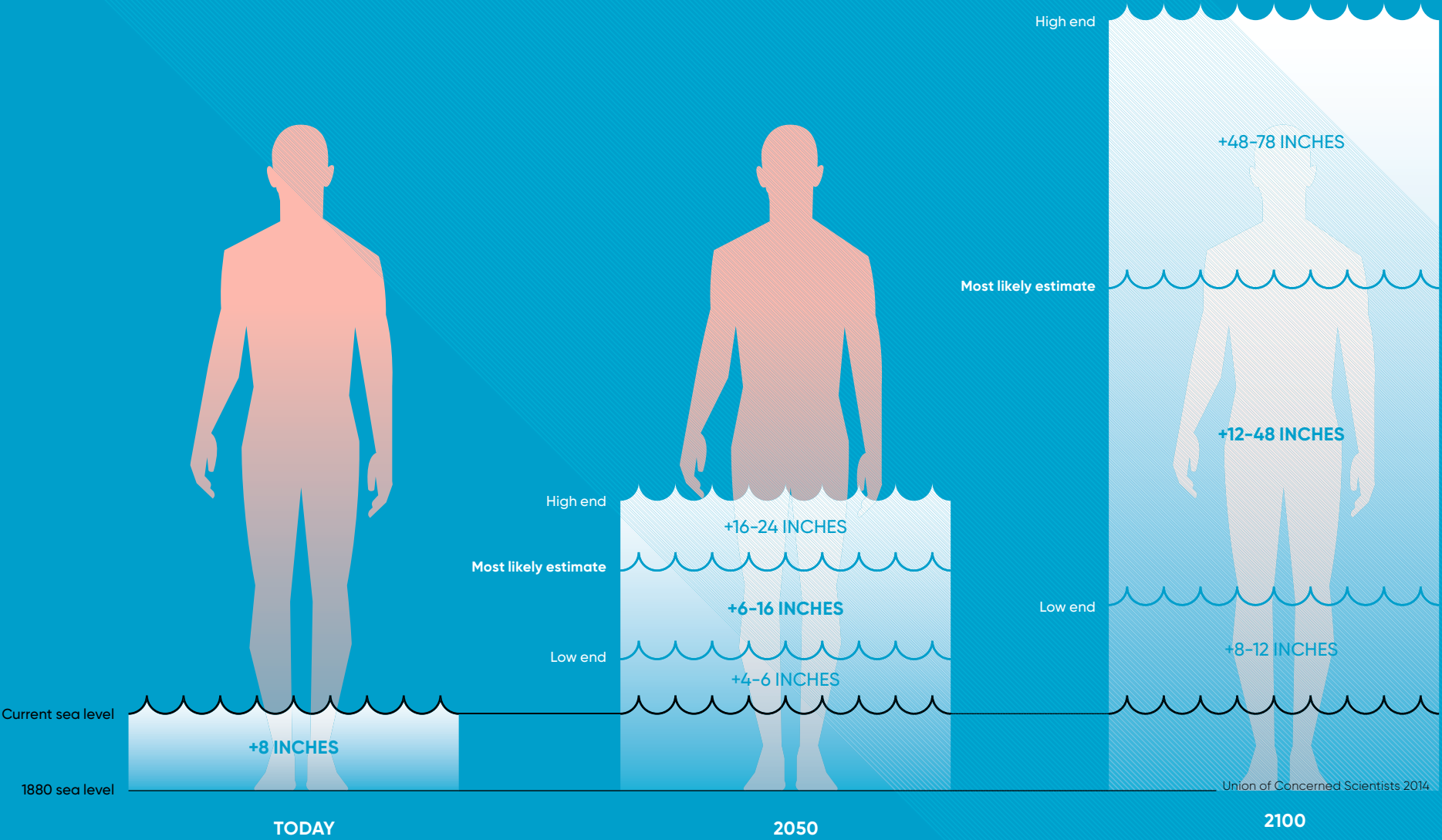


**CONTRIBUTIONS TO RISING SEA LEVELS WORLDWIDE**  
BASED ON RISING SEA LEVELS BETWEEN 1972 AND 2008



Union of Concerned Scientists 2014

**GLOBAL AVERAGE SEA LEVEL RISE**  
PROJECTED INCREASES FROM CURRENT SEA LEVEL, BY PROBABILITY



Union of Concerned Scientists 2014



WASTEWATER

# Where there’s mucky water, there’s brass

The potential value creation of wastewater is now being realised as more enterprises recognise resources are draining away

JIM McCLELLAND

Scientists may have discovered almost \$2 million in gold, flushed yearly through sewage systems in Switzerland, but the value in wastewater elsewhere tends to be rather different.

As the saying goes “Where there’s muck, there’s brass” and for most wastewater there is revenue in bioresources. Wastewater sludge transport, treatment, recycling and disposal are what water regulator Ofwat calls bioresources services, with high hopes for future growth, says Noel Beale, legal director in the water team at Burges Salmon.

“Ofwat claims bioresources can realise customer benefits of £780 million. However, the extent really depends on markets working efficiently,” he says.

Expectations are that sewerage operators will come under increased pressure to do more than simply rely on existing infrastructure. There will be opportunities to expand or contract activities, but also for new market entrants.

The water industry is rising to the challenge, though, says Kieran Brocklebank, head of innovation at United Utilities. “Companies are already active in finding ways to reuse the ‘black gold’ of sludge to reclaim gas, chemicals and nutrients,” he says. “Extracting more gas from wastewater, well-proven technology can generate electricity through combined heat and power for on-site use or back to the grid.”

Some new technologies are market ready and some lab scale, while others still need significant exploration



University of Bath

and investment. One hot prospect in the innovation mix could even be a game-changer for the sector, says Mr Brocklebank. “The Nereda wastewater process is exciting,” he says. “It’s the first time a breakthrough treatment has come to market which removes phosphorus from wastewater and yet demands less footprint, power and chemicals than traditional processes.”

As the first company to prove it works in the UK, United Utilities is also realising circular-economy benefits. “It is a biological process too, so it gives us a chance to extract the phosphorus more easily and reuse it,” Mr Brocklebank adds.

While tightly regulated utilities are mindful of responsibilities on sustainability, it is the commercial prize driving circular agendas worldwide, says Petar Ostojic, chief executive at Neptuno Pumps, in Chile. “The water industry started to embrace the circular economy firstly by being conscious of its social and environmental impact; then, secondly, by seeing its huge business potential,” he says.

As well as bioresources, wastewater can be a valuable source of data, according to new water-fin-



Royal HaskoningDHV

gerprinting technology, pioneered by the University of Bath, alongside Stellenbosch University, South Africa. Urban testing could help limit spread of antibiotic-resistant superbugs such as E. coli, explains lead investigator and professor in environmental and analytical chemistry at Bath, Barbara Kasprzyk-Hordern. “Water fingerprinting has potential to become a truly effective and low-cost early-warning system that can identify and prevent threats to public health, such as the spread of

infectious diseases and major pollution incidents, in real time,” she says.

It works by measuring biomarkers – molecules made by the body characterising disease and illness – in the sewage system.

Urban water contains a mixture of human waste, wastewater and run-off. To epidemiologists, this data cocktail is a treasure trove of resilience information, especially for communities in Africa and Asia facing unprecedented population growth and urbanisation.

In addition to potential flowing through pipes and infrastructure, wastewater pumping systems themselves present resource opportunities, adds Mr Ostojic. “Pumps are the second most used electrical machine on the planet, behind motors,” he says. “They consume approximately 10 per cent of total electrical energy. Any improvement in efficiency not only has an impact reducing energy bills, but also carbon footprints.”

**01** Professor Barbara Kasprzyk-Hordern from the University of Bath testing water in the lab; water fingerprinting can identify and prevent threats to public health

**02** Kingaroy, the first Nereda® wastewater treatment plant in Australia

With pumps widely used across different industries, end-of-life material value supports new circular business models. Reusing and recycling tons of scrap metal waste from mining in Latin America, Neptuno also shrinks its own energy consumption and carbon footprint 70 per cent, manufacturing power-efficient pumps that recycle up to 80 per cent of water.

Multiple beneficiaries exist for thermal energy from wastewater, too, explains Nick Meeten, of Smart Alliances, New Zealand. “Wastewater utilities every day receive heat energy into their sewers, donated free by millions of houses and buildings, each with a hot-water system,” he points out.

Heat energy going down the drain, literally, can be captured and recycled for properties and industrial processes. Utilities also benefit by allowing use of wastewater as a cooling source.

Employing sewer networks for moving and selling heat cuts fossil-fuel consumption and is a much higher-value utilisation of existing city infrastructure. Early adopters include Metro Vancouver, Philadelphia Water and Scottish Water. In addition, Smart Alliances has undertaken wastewater heat-mapping for Dunedin City and benchmarked resource-intensive aquatic centres, estimating energy savings around 60 per cent.

In parallel with generation trends in energy, the water industry is also seeing a rise in decentralised assets and distributed wastewater treatment on-site. Application suits larger-scale industrial, retail and campus-style sites, and this is now on the radar of commercial property players, corporates and brands engaged with green building, says Martin Brown, sustainability consultant at Fairsnape and UK ambassador for the Living Building Challenge (LBC) performance standard.

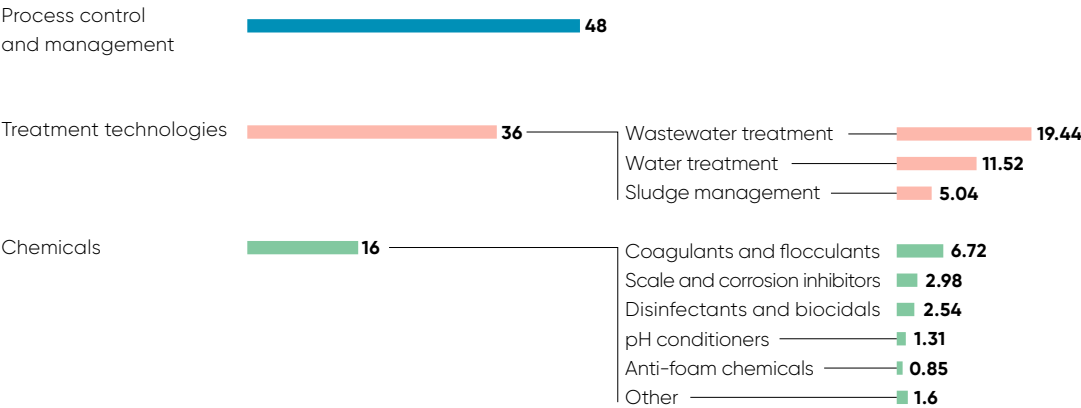
“Investment in on-site treatment is a matter of reputation, resilience and ultimately reduced costs,” he says. “We can no longer simply externalise a building’s impact without questioning the cost.” LBC demands wastewater from buildings work in harmony with the natural water flow of sites and surroundings.

Organisations are encouraged to view on-site treatment, such as constructed wetlands, as integral to a building’s plumbing system.

The obstacle to wider market take-up, however, remains an obstinately unsustainable mindset, Mr Brown concedes. “We currently see wastewater discharge how we once saw material waste as a ‘costless externalisation’ – something to throw away.” But views are changing.

Rethinking wastewater, whether via resource recovery, data and technology, or decentralised assets, is key to a sustainable water future. From black gold to green buildings, it epitomises value-creation potential of the water-energy-waste nexus. ●

## SPENDING ON WATER AND WASTEWATER TREATMENT WORLDWIDE BY SECTOR (%)



Frost & Sullivan 2016

“ Rethinking wastewater, whether via resource recovery, data and technology, or decentralised assets, is key to a sustainable water future





Water Management  
Knowledge | Product | Service

WE KNOW REAL BEAUTY LIES IN THE DETAILS WE KEEP

SOLUTIONS DESIGNED FOR NOW AND TOMORROW

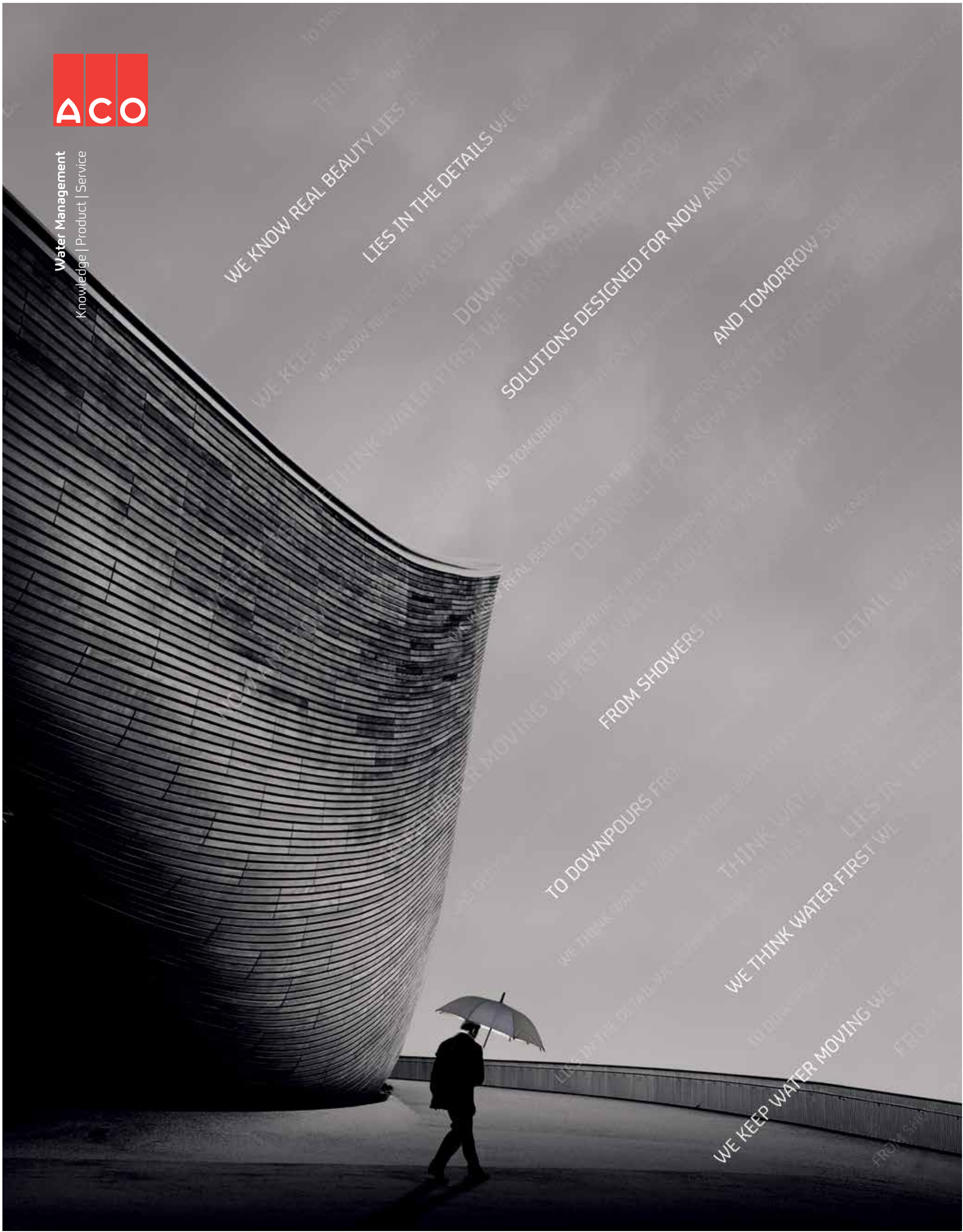
AND TOMORROW

FROM SHOWERS TO

TO DOWNPOURS FROM

WE THINK WATER FIRST

WE KEEP WATER MOVING WE KEEP





## WATER-ENERGY-FOOD NEXUS

# Linking food and energy to save water

The interdependence of water, energy and food resources requires co-ordinated policies and improved management

FELICIA JACKSON

The United Nations forecasts that almost half the world's population will be living in high water stress areas by 2030, while it has become increasingly apparent water management cannot be looked at in isolation as changes in one system affect others.

Lisa Walker, chief executive of Ecosphere+, explains: "Essentially, it's about competition for natural capital – animals and crops, water to feed them, as well as water for bio or hydro energy, mining, oil and gas production, agriculture and cities. The amount of water on Earth has always remained the same, but increasing population has raised demand for food and energy hugely, and both are thirsty."

A case in point is food consumption. Land, water, and energy are needed to produce food and, as food requirements increase, so does demand for these factors. Food production doesn't merely stress its immediate environment; globally traded food is packaged, shipped, flown and delivered to the consumer, and these hidden environmental costs must be factored in to the choices we make as producers and consumers.

Globally, the role of rainforests cannot be forgotten as they are responsible for 65 per cent of rainfall. The Amazon evaporates eight trillion tonnes of water vapour into the atmosphere each year. This "water pump" sustains \$1 billion to \$3 bil-

lion a year in rain-fed agriculture. It also flows south on a jet stream and feeds one of the world's biggest breadbaskets, the La Plata Basin of Brazil and Argentina, with rain, while some even reaches the United States and Europe. Hydropower provides 70 per cent of Brazil's energy, sourced from the Amazon's rivers. High rates of deforestation are disrupting this flow.

As Rabi Mohtar, of the World Water Council's board of governors, says: "The land, water and energy footprint, as well as air, water and soil qualities, are issues that must be quantified and carefully managed to have a food system that is sustainable over time." He warns: "Due to the inherent interconnections between them, a risk to one of these resources will impact the others."

Agriculture already consumes two-thirds of the world's freshwater resources, while one quarter of global energy use is within food production and supply. Hydropower alone is the biggest supplier of renewable energy and provided more than 16 per cent of the world's electricity in 2016. Rates of desertification and drought have skyrocketed to the tune of 12 million hectares of arable land annually.

Action is being taken. Large organisations are looking at vertical integration in the supply chain in a number of different ways, from the implementation of new processes to new technologies. Unilever, for example, is encouraging intercropping for its tea farmers, maximising the use of land and providing diversification for farmers. Smart agriculture is becoming a major buzzword and the widespread implementation is laying groundwork for entirely new approaches.

Mohsen Mohseninia, vice president of market development in Europe at Aeris, says: "Sensors can help collect data about the entire ecosystem in real time, while helping companies offset the environmental footprint of our food. The possibilities that such technologies offer are



DeAgostini/Getty Images

01



VCG/VCG via Getty Images

02



Hanzel Talib EyeEm/Getty Images

03

**01** Evaporated water from the Amazon rainforest sustains \$1 billion to \$3 billion in rain-fed agriculture each year

**02** Floodwater gushes out of Longtan Dam in Guangxi, China; hydropower provided more than 16 per cent of the world's electricity last year

**03** Rates of desertification and drought have skyrocketed

endless. Data can be captured on anything from the changing amounts of rainfall, to the amount of petrol used transporting goods, to the condition of livestock or crops. This real-time data can be used to better understand how this nexus operates and more importantly understand the impact of people's decisions."

There is no doubt that actions are being taken, ranging from increasing support, to fighting deforestation, to changing management of commodity supply chains. The Paris Agreement on climate change includes the REDD+ mechanism

to help reduce deforestation and degradation, development of carbon pricing at the "micro-transaction" which can be scaled up into large sums, and the development of new processes and technologies; these will all provide part of the solution to the challenge.

However, as Dr Feja Lesniewska, from the School of Law at SOAS, says: "All positive incentives could be cancelled out by climate change response measures that are not in harmony with WEF [water-energy-food] systems thinking. For instance, expanding monocultural plantations for bioenergy crops could reduce the availability of land suitable for agricultural purposes, especially in developing countries, as well as place further stresses on fresh water. Although interventions may be geographically specific, they can often have transnational ramifications that threaten other regional ecosystems WEF resilience."

Managing waste is one of the most important ways in which we can address these systemic challenges. In the UK, we throw away

around half our food, import more than half our water in goods and energy efficiency is relatively low throughout the economy. Addressing losses in water, energy and food is the first step towards their effective management, while more education about the interconnectedness of these systems should help drive action.

Many governments are beginning to take the interconnected nature of systems into account, but it's a slow process. The role of business in sustainable development is vital and the UN's sustainable development goals have provided a strategic framework for companies leading the charge.

Gary Davis, president of Ecometrica, points out: "We can drive change through behaviour. Consumers can change their habits quickly and companies take notice of that. Companies get a competitive edge [by greening their supply chain], but it's always important for governments to come in behind, reinforce actions and put in place a regulatory framework."

Mr Mohtar concludes: "Enabling policy coherence must be a priority for addressing and resolving nexus issues. This involves adjusting current practices – business as usual – to allow better communication and co-ordination across agencies that manage water-energy-food resources. Policies for any one of the WEF sectors must also consider its impact upon other sectors." ●



Addressing losses in water, energy and food is the first step towards their effective management



# ‘Brexit arguably provides a once-in-a-lifetime chance to rethink how regulation is best applied within the UK’

**CHRIS LOUGHLIN**  
Chairman  
British Water

There has arguably never been a more vibrant time in the privatised water industry. As water companies strive to become evermore customer centric, while also improving performance and efficiency, the supply chain is being challenged to provide new and innovative solutions that will help take the sector to the frontier of what can be achieved. This has already resulted in some incredibly exciting developments, many of which are being made possible by recent advances, especially in digital technologies.

In the early-90s who would have thought that, in 2017, companies would be using aerial drones to monitor assets, using virtual reality technologies within operations and employing artificial intelligence to provide increased business intelligence? The use of big data, together with advanced monitoring of assets and networks, and the capabilities of remote technology, is steadily revolutionising the relationship between customer service and day-to-day operations.

Such innovation is mission critical for the future. In addition to changing consumer expectations, the sector is faced with significant longer-term challenges in areas such as population growth and climate change. A global crisis is brewing in terms of water availability and so an emphasis on new technologies and techniques that will better protect and sustain this precious resource is inevitably required. No one is better placed to lead this charge than the industry supply chain, working, competing and achieving success all around the world.

Within all of this, the onus is on the supply chain to engage with water companies and identify solutions through a collaborative approach to problem-solving. Major challenges for companies exist, particularly in areas relating to environmental sustainability, so there is a huge opportunity for supply chain partners to step up to the plate and take the industry in new and exciting directions. This will further enable the UK supply chain to build its already strong credentials as an exporter of cutting-edge water industry knowledge and expertise.

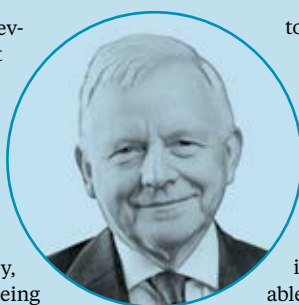
A pressing area of focus is the circular economy and how the water sec-

tor can close the loop in terms of resource and energy sustainability. Many companies are already making inroads in activities such as onsite energy generation through new and existing forms of renewable energy and energy recovery from waste, but there is still a long way to go. Clearly there is a huge opportunity for the supply chain to explore and exploit the opportunities that exist in this space, and it will be interesting to see how this is supported through the evolution of the regulatory framework.

Looking ahead, there are also opportunities presented by Brexit. Regardless of your position on the departure of Britain from the European Union, there is no denying that it can, and should, provide an opportunity to discuss how best to address local issues to improve environmental protection. In recent years, a more holistic approach to drinking water and wastewater management has been adopted, with companies, supply chain partners, communities, landowners, local authorities and other stakeholder groups working more closely together on shared challenges, for example raw water quality issues, flooding and pollution. Brexit arguably provides a once-in-a-lifetime chance to rethink how regulation is best applied within the UK and enable the provision of more tailor-made localised solutions.

This will require even greater partnership-working and further investment in pilot programmes, for example in new and innovative approaches to catchment management. As a result, the UK supply chain, which is best placed to deliver such innovation here, will benefit from vital post-Brexit export opportunities – a springboard into new global marketplaces.

The industry as a whole is being challenged, under increasing scrutiny, to work towards a more sustainable and resilient future that will meet the needs of customers, communities and the environment. This creates a climate in which innovation, fresh thinking and thought leadership are highly sought after. The challenges are increasing – the ambition and capability to take them on should follow suit.



## Southern Water tackles the future

Water is vital. It is fundamental to health, business, tourism and leisure, and forms the foundation of sustainable economic growth across the country, yet it is often overlooked and undervalued



**IAN MCAULAY**  
CHIEF EXECUTIVE  
SOUTHERN WATER

Water companies such as Southern Water play a crucial role in protecting, maintaining and improving the environment, but climate change and an increasing population all contribute to greater pressures on vital water and wastewater services.

That is why Southern Water is taking an innovative and ambitious approach to tackling these issues.

Southern Water has already made great progress in helping our customers reduce the amount of water they use, which means we take less water from the environment.

We've done this through an industry-first universal metering programme, which has led to a 10 per cent fall in consumption. As a result, our customers in Sussex, Kent, Hampshire and the Isle of Wight are among the most water efficient in the country, but there's always more to do.

We're continuing to support our customers reduce the amount of water they use even further and helping them save money in the process through an ambitious project called Target 100, which aims to help customers reduce daily usage to 100 litres a person by 2040, from a current average of 130 litres a person per day.

To achieve this we're working closely with planning authorities and house builders, embedding water sustainability into new homes and retrofitting properties with water-efficient products as well as working on behaviour change awareness campaigns across our region.

Of course, we need to make sure water services are resilient, which is why we've commissioned a report that takes a detailed look at the future of water in the South East.

This research delves into emerging trends, disruptive technologies, cultural attitudes and large-scale challenges such as climate change to help the company develop flexible strategies to meet these challenges.

Partnership is one of the most effective ways to ensure resilience and accelerate innovation. By working with councils and developers or joining forces with farmers, landowners and environmental organisations, Southern Water can better manage, safeguard and enhance the water environment.

“Southern Water believes there has never been a more pressing time to start talking about water

We are leading an integrated water resources plan for the whole of the South East, working alongside all those who abstract water from the environment and have a role in ensuring water is not wasted.

To not only protect, but also enhance the environment, new technologies must be used in smarter, more streamlined ways.

For example, Southern Water is trialling new equipment which will allow

us to extract more energy from water and wastewater treatment processes and operations.

This will help the company reduce the amount of energy it takes from the grid, creating the potential for our sites to become self-sufficient or even become new sources of energy supply to the wider energy network.

One of the greatest achievements of the 20th century was building reliable water and wastewater systems. Since then water companies across the country have been working 24/7 to maintain this vital infrastructure.

Yet people tend to be disconnected from the water cycle. We are used to the simple act of turning on a tap or flushing a toilet without having to think too much about how it flows smoothly through networks, is cleaned and returned safely to the environment, and treated to high-quality drinking standards.

In the South East, we enjoy a beautiful natural water environment with a high number of Blue Flag beaches and world-renowned chalk rivers. However, that environment is delicate and we also face real and growing water scarcity.

That is why Southern Water believes there has never been a more pressing time to start talking about water.

As the guardians of the most precious resource in the world, it is time to speak out about these challenges and, crucially, how we plan to tackle them both now and in the future.

**To find out more about how Southern Water is planning for the future please visit [www.southernwater.co.uk/water-for-the-future](http://www.southernwater.co.uk/water-for-the-future)**





## POLITICS

# Water wars could engulf the poorest

Conflict and political confrontation threaten to drown the call for co-operation in managing the world's limited water supplies

SHARON THIRUCHELVAM

Fresh water scarcity will be the defining global crisis of the 21st century. A decade ago, analysts warned of future water wars, even a world war. Water was labelled “the next oil” because of its importance to economic growth, and its use in everything from agriculture to industry, energy and manufacturing. We have alternative energy sources, but nothing can ever replace water.

“The universal recognition of human dependence on water typically makes it the first issue that states can find common ground to co-operate over, even in cases where states would willingly go to war over other issues,” says Professor Owen McIntyre of University College Cork’s School of Law. “Necessity breeds co-operation.”

States increasingly tend to solve their disputes over river basin and aquifer use through diplomacy and, where necessary, arbitration and judicial dispute resolution. India and Pakistan are a case in point; the Indus River Basin Treaty between the rival nations has survived three wars.

More likely, water scarcity will provide a secondary cause of conflict. It will emerge as a de facto weapon and a strategic target. It will cause sub-national civil unrest, heighten geopolitical tensions around trans-boundary rivers and aquifers, force large-scale migration, and inflame regional instability.

Expect growing localised tensions around specific watersheds between one ethnic group and another. Rather than war between Cameroon and the Central African Republic, today we witness conflict between Cameroon’s nomadic Fulani herdsman, forced southwards by desertification, and settled agriculturalists in the Central African Republic into whose lands they’ve travelled.

In Syria, the worst drought in close to a millennium has been partly blamed for the country’s generation-defining civil war, and the radicalisation that led to the formation of so-called Islamic State (Isis). By

2011, 1.5 million farmers were forced to abandon their land following successive crop failure caused by a four-year drought.

The displaced people, seemingly forgotten by the government, became a wellspring of recruits for the Free Syrian Army, as well as Isis and al-Qaeda. As the conflict deepened, engulfing Iraq, water supplies along the Tigris-Euphrates river basin became a de facto weapon for Isis in a manner that recalls past conflicts in the region, between Syria and Iraq, Syria and Israel, and Iraq and Iran.

In a chilling instance of the susceptibility of the global economy to climate change and the fragility of peace, droughts in Russia have been connected to the rise of the Arab Spring. In 2011, Russia experienced droughts so severe that it banned the export of wheat to protect its own food supply. The move seriously affected net importers in the Middle East and North Africa for whom bread is a large part of the diet. By 2012, bread prices in Tunisia and Egypt shot up, and food shortages struck a match to an underlying tinder of discontents. The following year there were riots and later revolution.

“Here we have the spillover of a drought a long way away in one country resulting in political consequences and conflict in distant countries,” says Professor Grey, hydrologist and policy adviser, who teaches at the universities of Oxford, Harvard and Tsinghua, and headed the World Bank water programme.

The fear is that such conflicts will increase in number as the global demand for water rises exponentially. World population will rise from 7.4 billion today to 10 billion by 2050 and, over the same period, global water demand will increase 55 per cent. Agriculture, which already accounts for more than 70 per cent of global freshwater usage, is forecast to increase another

“Worst affected will be the world’s poorest countries which lack the capacity to adapt



A child displaced from Raqa, Syria drinks from a water tank at a camp for internally displaced people in Ain Issa

60 per cent, while industrial water demand is expected to increase between 50 and 70 per cent, according to the World Bank.

As early as 2025, two-thirds of the world’s population may face water shortages. Climate change will intensify the devastation. According to the Intergovernmental Panel on Climate Change, each one degree celsius mean temperature increase could lead to 20 per cent reduction in renewable water resources.

Worst affected will be the world’s poorest countries which lack the capacity to adapt. Just last year, for example, four years of drought in Zimbabwe were followed by floods that killed 246 people.

“These countries have limited capacity, limited resources, limited knowledge and yet face the most complex problems,” says Professor Grey, who has worked on international water management for 45 years, and has now made it his mission to focus the world’s best minds and emerging talent on these urgent problems. “We need to build capacity, to build universities and to strengthen regional knowledge.”

Improved monitoring, data-sharing and more accurate climate modelling are essential. Currently the meteorological station density in low latitude African countries is anywhere between 1 and 10 per cent of the met station density in Europe, he says, adding: “You cannot manage what you cannot measure.”

By 2030, water scarcity could displace 700 million people worldwide, according to the United Nations Department of Economic and Social Affairs. Over the same period, Africa will experience the fastest population growth, rising to 3.4 billion people by 2100, when one in three of the world’s population will be African. “You think migration is a challenge to Europe today because of extremism,” then-US Secretary of State John Kerry told a climate change conference in

2015, “wait until you see what happens when there’s an absence of water, an absence of food or one tribe fighting against another for mere survival.”

More than half the world’s population rely on water resources that are international, however around

Benefit-sharing agreements provide for the sustainable and equitable management of shared water systems according to each nation’s dependence

two thirds of the world’s trans-boundary rivers lack a co-operative management framework. International treaties are essential to mitigating future conflict and the very process of their agreement is stabilising through widening political participation, enhancing transparency, building trust and spreading confidence.

Often upstream states hold the key to co-operation. Turkey is upstream of several nations in the Tigris-Euphrates basin, most crucially Syria and Iraq, but has largely exploited its water rights, building huge water infrastructure, including 140 dams to store water, for its own benefit, without consideration given to downstream states.

In an interesting turn of events, China is emerging as a responsible upstream neighbour. The country shares 110 transnational lakes and rivers, including the Mekong, Indus, Ganges, Brahmaputra, and the central-Asian Amu Darya and Syr Dar-

ya rivers, which flow into 18 downstream countries.

Only recently, however, has China begun to share its water data, which was previously classified as a military secret. Some argue that China is co-operating now, only having successfully and aggressively provided for its own water needs. Neighbourliness will ensure stability in its backyard and the opportunity to sell its hydro-engineering expertise.

Here lies the crux. States will always act in their own interests. The challenge is to help states calculate those interests in the most sophisticated way. Benefit-sharing agreements provide for the sustainable and equitable management of shared water systems according to each nation’s dependence. In most river systems, for example, water comes from high ground, where you cannot grow food, but can generate hydroelectric power; whereas in lowland floodplains, you can grow ample food, but not generate much power. Exchange and trade of these benefits would provide net benefit to all.

Professor McIntyre observes that policymakers have already begun to reframe water management as something more subtle than a zero-sum game. “People now talk in terms of ecosystem services, ecological flows and how to protect the whole ecosystem, taking water storage, hydropower, water cleanliness and flood attenuation into account,” he says.

At this crucial juncture, neutral, unaffected nations should play a role in advancing these agreements. Halting overseas aid and focusing national interests inwards will prove highly irresponsible in the long run, argues Professor Grey. He concludes: “The problems of the complex parts of the world are problems for all of us and, if we don’t contribute to a solution, then we will all suffer.”



# Shaping the future of water in the South East

Water plays a unique and vital role in all our daily lives. Without exception it is critical to our communities, homes, schools, businesses and environment.

Southern Water commissioned the 'Water Futures' report on the future of water in the South East to support and inform our long term planning.

We need to make sure the water and wastewater services of tomorrow are resilient and can adapt to the needs of our customers and our region by facilitating growth and enhancing the environment.

The future holds many challenges and opportunities and this research delves into emerging trends, disruptive technologies, cultural attitudes and large-scale challenges such as climate change. By understanding these more fully we can manage water wisely to add value to our region, both for the people living and working within it and the precious environment which makes the South East unique.

**For more information on 'Water Futures' visit [southernwater.co.uk/water-futures](https://southernwater.co.uk/water-futures).**





# ACHIEVE BETTER SYSTEM DESIGN FOR YOUR WASTEWATER TRANSPORT NETWORKS

'IT WAS A COMPLEX  
PROJECT, BUT TOGETHER  
WITH GRUNDFOS, IT'S  
BEEN INCREDIBLY PAINLESS  
TO START UP THE WHOLE  
THING.'

**Jan Magnusson**  
Head of Kållands Water &  
Wastewater Association  
Lidköping, Sweden

## A TROUBLE-FREE WASTEWATER TRANSPORT NETWORK

Explore how you can use Grundfos' expertise to reduce design complexity and achieve better system design for wastewater transport networks.

Grundfos takes the greatest risk factors out of the equation when designing or refurbishing a wastewater transport network, ensuring cost effective, reliable and optimised operation.

Read a customer case about how to manage a large and highly complex network design challenge or download our Wastewater Engineering Manual at  
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