

OPINION

What might the future hold for the water sector? (Spoiler: Climate change will likely turn the sector on its head)

What does the future hold for the global water sector? Daily distractions can easily cause one to not reflect much on what may be coming over the horizon. So writes Dawid Bosman of the Trans-Caledon Tunnel Authority (TCTA).



Hardly any sector or industry remains unchanged in the long run. The energy sector is in the midst of a widespread renewal due to the shift towards renewables, along with much greater private sector involvement, and a move towards decentralised generation. Abroad, we are seeing similar shifts in the water sector, with the adoption of non-conventional water resources. The expectation is that, soon, this will gain momentum locally as well. But there are credible indications that the water sector, globally and locally, will need to adapt and grow capacity to meet an even greater challenge in the medium term; a disruptive period for water is waiting in the wings.

Looking into the future is daunting, and not an exact science; usually, we must accept that nearly all forecasts will be wrong. A business school professor once said about forecasts: "Only

forecast if you must. But then, never give a date. If you are urged to give a date, then never give a number. And if you end up giving both a date and a number, make sure you never go back there." But forecast we must, or we could not plan. We can improve our forecasts by making better assumptions and following recognised trends, not fads or whims; so, we can hope to be less wrong than a complete thumb-suck, and with luck we may even anticipate some parts of what may come. With this in mind, let us venture a glimpse into the future of the water sector.

Two challenges

Two major challenges seem to stand out; the first is well-known and has been grappled with for at least two decades, mostly by multinational institutions: The world is running out of freshwater. The second challenge emerged more recently and has not been

debated as widely as the first, but holds every promise to turn the sector on its head: The large burden of adaptation to climate change that will fall to the water sector – and its limited ability to respond adequately.

Freshwater is running out

Considering the first challenge: Global water scarcity was the subject of a comprehensive study in 2009 by the 2030 Water Resources Group, published as *Charting our water future*. It found that if global water productivity were to improve only at historical rates, and not accelerate, or new water be produced, then a 24% freshwater deficit would arise by 2030. Alas, current World Bank data shows that improvement in global water productivity, an indicator of economic production per quantum of freshwater drawn, has not shifted from its historical trajectory. The world is in a freshwater deficit, and this deficit is growing.

This aligns with more recent findings; in 2019 the UN Global Water Practice asserted that more than two thirds of the world's population already suffer severe water scarcity for at least one month of the year; nearly half of this population live in India and China. Earlier this year, on 20 March 2024, the United Nations (UN's) *World Water Development Report* was published, indicating that nearly half the global population does not have access to hygienic sanitation, and 2.2 billion people do not have a reliable supply of drinking water. These deficits have increased significantly over the past two decades, despite being targeted as one of the UN's sustainable development goals for 2030. Commenting on this, *The Guardian* wrote: "Little progress has been made on water issues in recent years as the climate crisis, pollution and overuse of freshwater resources in some areas have put further stress on water."

The global water sector remains compromised by widespread inefficiency in water management, largely the result of weak institutions and sub-economic pricing; this is exacerbated on the demand-side by too slow progress in improving water use efficiency in agriculture, industry and homes. We are of course not running out of planetary water, but we do have eight billion people surviving on a small fraction of one percent of planetary water that is accessible freshwater; this is now reaching its limits, and hence the need arises to make better use of what we have, and to inject additional freshwater, sourced from the sea and desalted.

Locally, the 2018 National Water and Sanitation Master Plan indicates that South Africa has been in a water deficit for some time, even though we are in a better position than most nations. Sensibly, the Master Plan proposes closing the gap mainly by using less (i.e., demand management), wasting less (improved conservation), and tapping into 'new' water (non-conventional water, such as desalination and reuse). This approach of addressing both the demand and supply side, and of diversifying the water resource portfolio, is seen in other countries as well.

There is comfort in the knowledge that, where and when it becomes necessary, the technology and know-how exist to produce any amount of freshwater anywhere on the planet, at a predictable price; one need only look to a city like Riyadh in Saudi Arabia to see it being done.

Addressing the scarcity challenge will require stronger institutions, the widespread adoption of economic pricing and new business models, a much greater role for the private sector, and managing water within a new paradigm. There is anticipation of a landmark report by the Global Commission on the Economics of Water, due in September 2024, to guide on these issues. The growing freshwater shortage is bringing the longstanding shortcomings of the sector into renewed focus, but real reform appears to be slow. However, the second great challenge may well create the necessary conditions and urgency to mobilise such reform.

Dealing with climate change

The second challenge relates to how the water sector will need to deal with a changing climate.

There are of course two broad areas for climate change action: First, **mitigation** of the causal effects behind climate change, which involves mainly the reduction of Greenhouse Gas (GHG) emissions in all human activity, and the preservation of carbon sinks, such as the tropical rain forests, in an effort to contain the effects of climate change. Then there is also **adaptation** to climate change, whereby all of humanity will be compelled to adapt how we live and where we live, according to the demands of a changing climate.

It is generally agreed that there is only a limited scope for the global water sector to **mitigate** climate change; Global Water Intelligence (GWI) estimates that only around 2% of global GHG emissions stem from the pumping and treatment of water, and the management of run-off and sludge. Much of this will be mitigated in any event when the energy sector transitions to renewable energy.

However, climate change mitigation across all other economic sectors is not happening fast enough. Despite the efforts by some 200 countries to decarbonise their economies, it now seems that the target set by the Potsdam Institute, of limiting global average temperature increase to no more than 1.5 °C relative to the pre-industrial level, is slipping out of reach. The European Union's (EU's) Copernicus Climate Change Service reports that 2023 was the hottest year on record, at 1.48 degrees warmer than the pre-industrial level. Mitigation of climate change is proving to be a very hard thing to do.

An implication of warming beyond this threshold is that the effects of climate change will likely be much worse than previously expected. Speaking of his impressions emanating from the May 2023 Global Water Summit in Berlin, where Christiana Figueres (negotiator of the Paris Accord on climate change) and Johan Rockström of the Potsdam Institute shared their research on post-1.5°C impacts, the GWI publisher Christopher Gasson says: "Together, they took us to the edge of the known world of international emissions agreements, and gave us a glimpse of the abject terror that lies beyond. It is a world in which the unpredictability of the water cycle comes to dominate our lives".

Already, we are seeing how climate change is leaving its harrowing mark on a planetary scale. With increasing regularity, newsfeeds report of climate-related disasters; even well-resourced countries with modern infrastructure are not spared

the trauma of lethal wildfires, cyclones and heatwaves. What happened in California, Hawaii, Chile, East Africa, Europe, Mexico, Ghana, Argentina, India, Libya, Canada, Myanmar and many others, all in 2023, is surely exceptional. The human and economic toll is grim: Reliefweb estimates that in 2023, at least 12 000 people died in floods, wildfires, cyclones, storms, and landslides, which is 30% more than in 2022. This excludes the much larger number of deaths caused by climate change-related droughts and heatwaves, which is more difficult to attribute and capture.

Floods are particularly dramatic and costly. In his 2021 biography on water, Giulio Boccaletti describes how “atmospheric rivers” are created to convey vast amounts of moisture from the tropics to the midlatitudes. These are tracked by microwave satellites and can be hundreds of kilometres wide and thousands of kilometres long and carry the same amount of water as a major river. The moisture released from these ‘rivers’ can be devastating, overwhelming even highly engineered catchment areas; where there is little flood protection, the impact is usually much worse.

There is now broad agreement that global warming is associated with more frequent and more severe weather anomalies. This

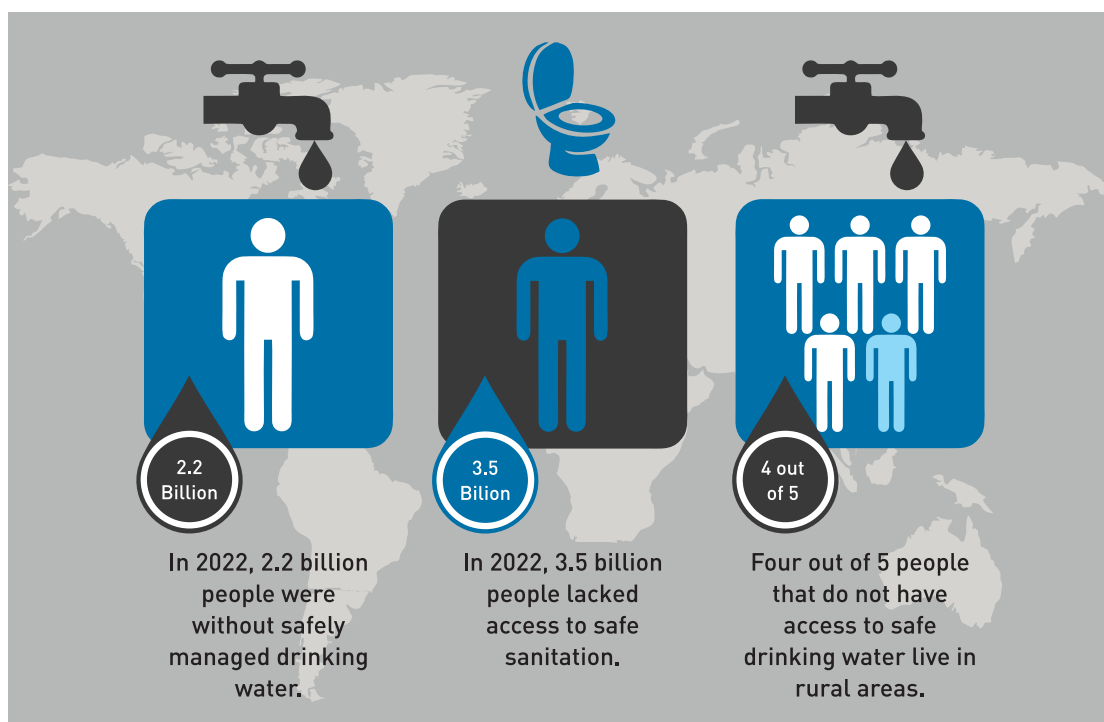
will require adaptation to minimise its impact on lives and livelihoods, which could be in the form of coastal barriers, flood protection through grey and green infrastructure, climate resilient water and sanitation systems, dedicated water infrastructure to combat wildfires, and much more. A recent white paper by GWI, *Investing in a water-secure future*, indicates that 70 to 80% of climate adaptation spending could go towards water management.

“Whatever the cost of climate change mitigation, the cost of climate change adaptation will be at least ten times more, and 70% of it will fall on the water cycle. Our industry is simply not ready to carry that kind of burden,” says Gasson. He also anticipates that vast capital flows will come into the water sector from climate funding. This will rapidly reverse the traditional dynamic in water investment, of demand exceeding supply and late-cycle expenditure, as vast amounts of climate change funding start pursuing water projects, in a quest to improve resilience.

However, the water sectors in most countries are far from ready to be absorbing such a step up in investment, and generally has a limited capacity for converting funding into meaningful and



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productive projects. Long suffering from under-investment, the water sector might well be traumatised by what it had been yearning for.

Reflection

There are also some grounds for optimism, though. Gasson reminds us that climate comes in the form of wind, heat and water; in excess or scarcity, each has the potential to unsettle our fragile existence. Whereas human ingenuity has yet to find scalable solutions for managing wind and heat (notwithstanding the small-scale cooling of our homes and offices), we have mastered the ability to produce virtually unlimited amounts of water from the sea, and we now have the energy sources to do this with minimal environmental impact. A vast supply of water will enable us to do at least two important things in adaptation

to climate change; there may be many more.

One, would be to secure both our water supply and livelihoods against droughts and floods; this would require a fundamental rethink of how we manage catchment areas and water security, with a much greater reliance on non-conventional water resources. Quite likely, surface water infrastructure would increasingly have a role to contain floods. And two, would be to create more green infrastructure, combat desertification and increase the planetary biomass, which would also serve as a carbon sink.

But for now, at least, our mastery of the production of water is perhaps our best tool in the adaptation to an increasingly hostile climate.

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