

Managing and protecting SA's groundwater

Chetan Mistry, Strategy and Marketing Manager at Xylem Africa, talks about the importance of managing and protecting our groundwater resources, and the Xylem solutions making this possible.



Groundwater supplies are not infinite. It is possible to exhaust and even pollute them, and recharging underground aquifers can take years, even decades," warn Chetan Mistry of Xylem Africa.

"At the moment, many mines, farms, communities, industries and wastewater treatment plants discharge polluted water into our water systems, which causes massive issues for water security and puts pressure on SA's groundwater resources," says Chetan Mistry, strategy and marketing manager for Xylem South Africa.

From an organisational perspective, the management of quality water is an intrinsic part of the new ESG protocols now being used to measure how responsible brands and companies are. But water security should also be a priority for governments and municipalities, and the resource underpins the success of the United Nations' Sustainable Development Goals (SDGs).

"If you look at the Sustainable Development Goals, poor water quality affects pretty much all of them. In rural communities, women often walk for several kilometres every day in search of access to clean water (SDG6), which impacts directly on gender equality (SDG5), and their ability to secure decent work (SDG8), and it impacts on poverty, hunger and good health (SDGs 1, 2 and 3, respectively)," notes Mistry.

Similar arguments can be made for every one of the seventeen SDGs, he continues, because access to water of suitable quality is fundamental to everyone's survival. Water impacts corporate sustainability and public sector service delivery. Governments can enforce water-protection policies, municipalities can reduce water wastage and theft, and individuals can use water smartly and report water abuse, such as pollution.

Groundwater: our reserve supply

The borehole has long been a South African staple, most notably for farmers accessing groundwater from underground aquifers for irrigating crops and watering livestock. South Africa, says Mistry, has relatively abundant supplies of groundwater. However, "groundwater supplies are not infinite. It is possible to exhaust and even pollute them, and recharging underground aquifers can take years, even decades," he warns.

Groundwater is our backup, but there is already substantial and growing use of this resource. Agriculture is still the main consumer, accounting for two-thirds of current groundwater consumption, but, according to a 2019 report by the CSIR, 'Groundwater: The Impact of climate change on South Africa's future groundwater availability', mining and residential users are responsible for around 15% of current groundwater consumption.

In most places on the planet, groundwater is crucial. According to the Groundwater Project, it supports nearly half of Earth's population and three-quarters of its irrigation needs. While South Africa is still largely dependent on surface water, this is changing quickly: growing populations and shifting climates are increasing the demand for groundwater, with rural communities often dependent on groundwater for safe drinking water.

"Traditionally, we assume that the water pumped from underground sources is clean and ready for consumption. Yet researchers testing groundwater at boreholes are discovering concerning levels of harmful bacterial life, such as E. coli-contamination, probably coming from SA's

Xylem's Lewara borehole pump brand, which offers premium efficiency and longer life in this challenging pumping environment.

buckling wastewater treatment sites. In addition, heavy metals and other pollutants from mining, farming, and industrial sources are leaching into our groundwater systems. These incidents are still a minority, but that they exist at all is reason to be concerned."

Hence the need for urgent action.

Managing groundwater levels

With more water being extracted, it is quickly becoming necessary to monitor and control how much water is being extricated and how this impacts the water level in each aquifer.

To access groundwater from a borehole, a deep – often 60 to 80m – and narrow well needs to be dug. A high-head submersible pump is then dropped into the well. As well as being energy efficient, reliability is essential, so Mistry recommends using a premium quality borehole pump, such as Xylem's Lewara borehole pump brand, which offers premium efficiency and longer life in this challenging pumping environment.

"Anyone operating pumps to extract groundwater will benefit from greater control and measurements. Not only is it likely that governments will start enforcing more oversight to ensure aquifers remain stable and healthy, but it makes sense from a sustainability perspective to measure what you use. Doing so will help manage the health of an aquifer – which can take decades to recharge if depleted – and ensure that water-heavy operations are not wasteful."

Xylem will soon be introducing a solar-powered range of borehole pumps geared particularly to markets where access to electricity is an issue. Here, the controllers can help operators carefully manage when and how much water is pumped every day.

Monitoring water quality

From a monitoring perspective, however, the bigger issue is water quality. Contaminated water can seep into the groundwater, which means that wells will be contaminated as well. The solution, Mistry suggests, is twofold:

"We need to ensure that any water discharged into the natural environment meets minimum discharge quality levels. To protect those that dependant on borehole water, the quality of extracted water should be routinely monitored and tracked to ensure the water is safe for its intended use," he says, adding that Xylem offers a whole range of environmental quality monitors from its Italy-based Xylem YSI brand, which can pick up pH, turbidity, bacterial and heavy metal contamination, and more.

If the water is contaminated, Xylem can help with a targeted treatment solution, because the treatment process will change depending on the source of the contamination and the condition of the water. Simple filtration and disinfection may be enough, but Xylem offers a full suite of water treatment solutions, from bio digesters and clarifiers to ozone and UV disinfection.

"We have also recently acquired Evoqua, an advanced water treatment services company that adds fluoridation and several other ultrapure treatment processes to our portfolio, mainly suited to utility scale water treatment," he says.

Far more important than treating extracted groundwater, though, is to find the source of the contamination and to treat the discharge water. Chetan Mistry cites tailing dams as an example. "Instead of having a tailings dam that simply tries to store mine-affected water, which often seeps into the groundwater if the dam floor is compromised, there is an opportunity to set up a treatment plant and a fresh water reservoir that could enable the water to be safely discharged. Even better, the water can be reused on the site. Most wastewater can be brought back to a reusable quality standard and the investment will deliver savings and positive financial returns," he says.

"Many companies are reluctant to invest in water treatment. But between the rising scarcity of water, which is leading to more quota restrictions, and the impact of polluted water on surrounding communities, there is a good business case to invest in wastewater processing. The community that works around a mine will typically be the worst affected by poor quality discharge water. Lowering pollution and even

offering water to those communities can support development and cooperation.

The same principles apply to biowaste contamination in agriculture, where flush and washdown water can easily be treated to water crops, for example.

The role of smart technologies

Key to overcoming water contamination issues is using smart monitoring, ICT and analytics to make specific problems as transparent as possible and quickly identify how to respond before significant harm is done. Mistry says that Xylem recently partnered with Idrica to bring together Xylem's portfolio of digital solutions. The partnership offers an integrated software and analytics platform – Xylem Vue powered by GoAigua – that enables water and wastewater utilities to connect and manage their digital assets and streamline operations in a simple, secure and holistic view.

The extended use of these and other smart technologies, if incorporated into both policy and ongoing water management procedures, can be used in just-in-time response procedures to act on poor water quality issues.

"While the trend is very concerning, we can secure our groundwater sources. Legislation

and enforcement policies, coupled with greater investment in smart systems, will provide better water management insight and efficiency, enabling water authorities and users to respond quickly to prevent contaminated water entering our rivers and aquifers. "Water is our most neglected resource, not just locally but also globally. But that also means it is full of opportunities for savings, development, and collaboration. Taking care of water today is a lasting investment. And groundwater is the canary in the mine. If our groundwater sources are depleted or polluted, it means the situation on the surface is dire. "With the right attitude, partnerships and technology, however, we can preserve water for generations," concludes Chetan Mistry.

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