FIELDNOTE

Dealing with water quality, extreme events and contaminants

WIN-SA
WATER INFORMATION NETWORK
- SOUTH AFRICA -

WATER RESEARCH COMMISSION

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Dr Eunice Ubomba-Jaswa is involved in efforts to identify pertinent water quality issues during extreme weather and climate events (including droughts) and developing appropriate tools to enable municipalities to better deal with this. As a research manager for the Water Research Commission (WRC), I am looking at lessons learnt during the recent severe and multi-year drought for water resource management.

Dr Eunice Ubomba-Jaswa, Water Research Commission Research Manager
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The City of Cape Town, for instance, experienced one of its worst droughts in recent history and garnered both local and international attention as the countdown to 'Day Zero' began. This term refers to the day when the city's taps are expected to run dry.

The focus on Cape Town also brought to light drought conditions experienced in other parts of the country. In February 2018, the drought was declared a national disaster and had many towns and cities in its grip.

Unfortunately, extreme weather events and climate change will be the 'new normal'. Many cities and towns are just one rainfall season away from a similar kind of worst-case scenario that Cape Town was confronted with.

It is therefore vital that the public and all stakeholders involved in the water cycle (supply, drainage, sewage, wastewater treatment and drinking water treatment plants) are made aware and are then able to adapt to ensure the protection of public health.

Droughts have many impacts, including wastewater influent flows and quality. As expected during times of extreme weather and climate events, the availability and quantity of water is foremost on the agenda and often drives water resource management during that time.

However, in seeking a smart extreme weather disaster management plan, it is imperative to understand the water quality implications from source to tap during such periods. Water quality has direct effects on human and ecosystem health and hence management decisions during extreme climate events need to place water quality at the forefront.

My work, therefore, aims to provide a broad focus on drought, its implications, and how to deal with it.

While drought years come and go, pollution remains a constant threat and needs to be tackled if we are to have water fit for use now and into the future of a warmer world.

There are many ongoing projects within the WRC's portfolio of water resource management that will result in products that can add value to the water sector in terms of the relationship between water quality and health associated with changes in the hydrological cycle (drought and floods).

There are also other projects that deal with so-called emerging contaminants (like microplastics, engineered nanoparticles and pharmaceuticals). These contaminants that end up in our water systems are adding to the already complicated local mix of factors that could affect water quality in South Africa. Researchers are trying to understand the impact of these emerging contaminants and their combined mixtures on our drinking water sources and rivers.

The WRC is, for instance, funding studies that look at the impact of emerging contaminants in the South African context. This includes a scoping survey of microplastics in the local freshwater environment.

We realise that emerging contaminants are a known threat to water quality. During extreme climate events, these contaminants are known to increase and have a negative effect on human health and the ecosystem.

Until now, the projects focused on the method of detection, identification of hotspots and possible removal of these emerging contaminants. Researchers are now also examining what happens to emerging contaminants in water sources during extreme events.

A major consideration when determining the impact of contaminants is not only the quantified level of the contaminant but also the size and demographics of the population that would routinely consume the water.

Some of WRC's work related to drought involve the development of robust water quality models with the input of rainfall data and parameters (physiochemical parameters and known and emerging contaminants). This is done to determine at what concentrations they will be present during drought or flood events and what health risks are associated with it.

There are projects that are under way which are developing faster detection methods for microorganisms and manuals with protocols that can assist municipalities to improve their response times during diarrhoeal disease outbreaks.

It is crucial to determine the level of contamination of our water resources and regularly monitor it.

Projects that fall within the water quality and human health thematic area address the presence of known contaminants, especially biological contaminants such as cholera, and diarrhoea-causing organisms (viruses, parasites and bacteria).

We know current water quality problems in our rivers arise from a few key sources, among which are natural climatic conditions (including low rainfall and high evaporation rates), domestic and sewage effluents, industrial effluents (including from the mining sector) and surface (road) runoff. Sewage effluent increases the number of nutrients in the water and also adds loads of disease-causing organisms to it. A worsening trend in river conditions indicates that threat levels are unlikely to improve without a concerted effort to manage these ecosystems more effectively.

Water management needs to respond appropriately and in a timeous manner to continuous threats to water safety. It is a fact that extreme weather events will increasingly occur and are known to pose a threat not only to the quality of drinking water but also to human health and ecosystems in general.

It is important that research is conducted to support the development of robust information that will effectively guide policy and decision makers and inform wise management strategies.

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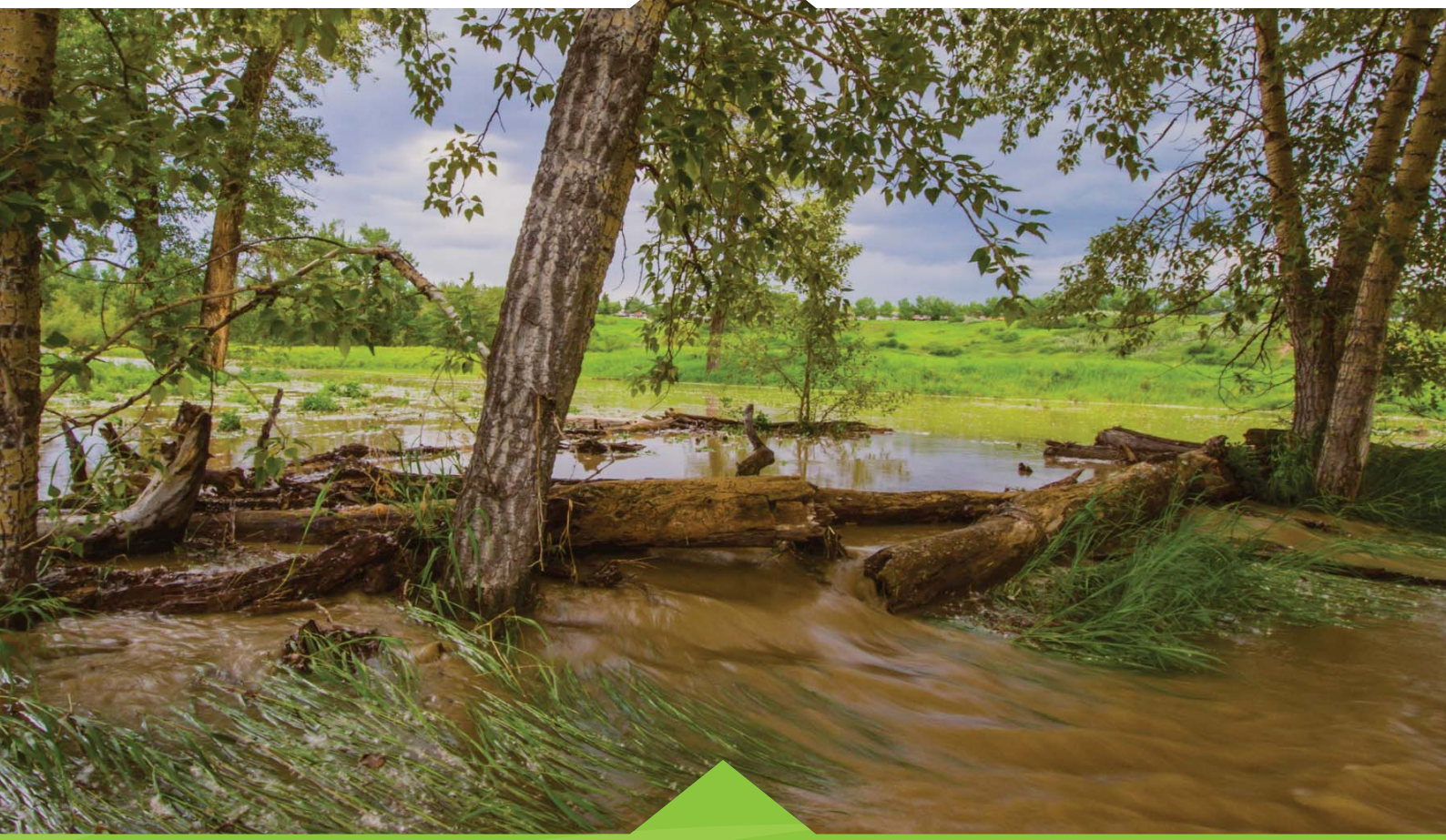

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