

# BULK WATER SUPPLY

## The balancing act of Gauteng's water security

*To secure water for Gauteng in the long term, some important actions are required in the short term. Petro Kotzé investigates.*

Alastair McLachlan



"It's not a crisis, but one thing is for sure, it can't be business as usual," says Timothy Nast, Gauteng Provincial Government Chief Director of the Planning Division, in reference to the province's water security.

Gauteng's water supply has always been precarious, but outside of prolonged droughts, a supply has always been secure. Perched on the divide between the Limpopo and Orange river basins, the province itself is home to few streams. Apart from the 15 million or so residents that call it home, a constant and secure water supply to Gauteng is also critical because the province supports the bulk of our country's economy.

To ensure this, water is imported via the highly engineered Integrated Vaal River System (IVRS). This collection of dams, rivers, pipelines and canals supports the quarter or so of all South Africans that reside in the Gauteng City Region (GCR) as well as 50% of the country's GDP (water is also supplied to a substantial proportion of the economic activity in the Crocodile-Marico and Upper Olifants catchments). ESKOM, SASOL, mines and vast urban settlements all tap from the IVRS.

### **Why Gauteng doesn't run out of water**

Gauteng is thus water secure because it taps water from beyond its borders. The IVRS's system of pipes and infrastructure imports water from five different river basins, across six provinces and

Lesotho. It includes water from the uThukela River in KwaZulu-Natal (stored in the Sterkfontein Dam), the upper uSuthu in Mpumalanga and, through the Lesotho Highlands Water Project (LHWP), the Senqu River (a tributary of the Orange). In total, the system includes a collection of fourteen dams.

The storage capacity alone is enough for Gauteng to hardly feel the pinch of droughts. The 9 300 Mm<sup>3</sup> per annum that the IVRS keeps is six years of Gauteng's water supply. The dams (excluding Bloemhof, which is downstream of Gauteng) store nearly five years of the average flow in the Vaal River. The vast spread of the systems further reduces risk. It's unlikely, for example, that all 40 000 km<sup>2</sup> that it covers will be affected by drought simultaneously. (In comparison, the Western Cape system that Cape Town taps from stores less than two years of average flows with a catchment area of just 803 km<sup>2</sup>.)

Still, the demand being placed on the system is ever increasing, and with plans for more water to be added severely delayed, the resilience of the IVRS is now being scrutinised.

#### **A resilient system under threat**

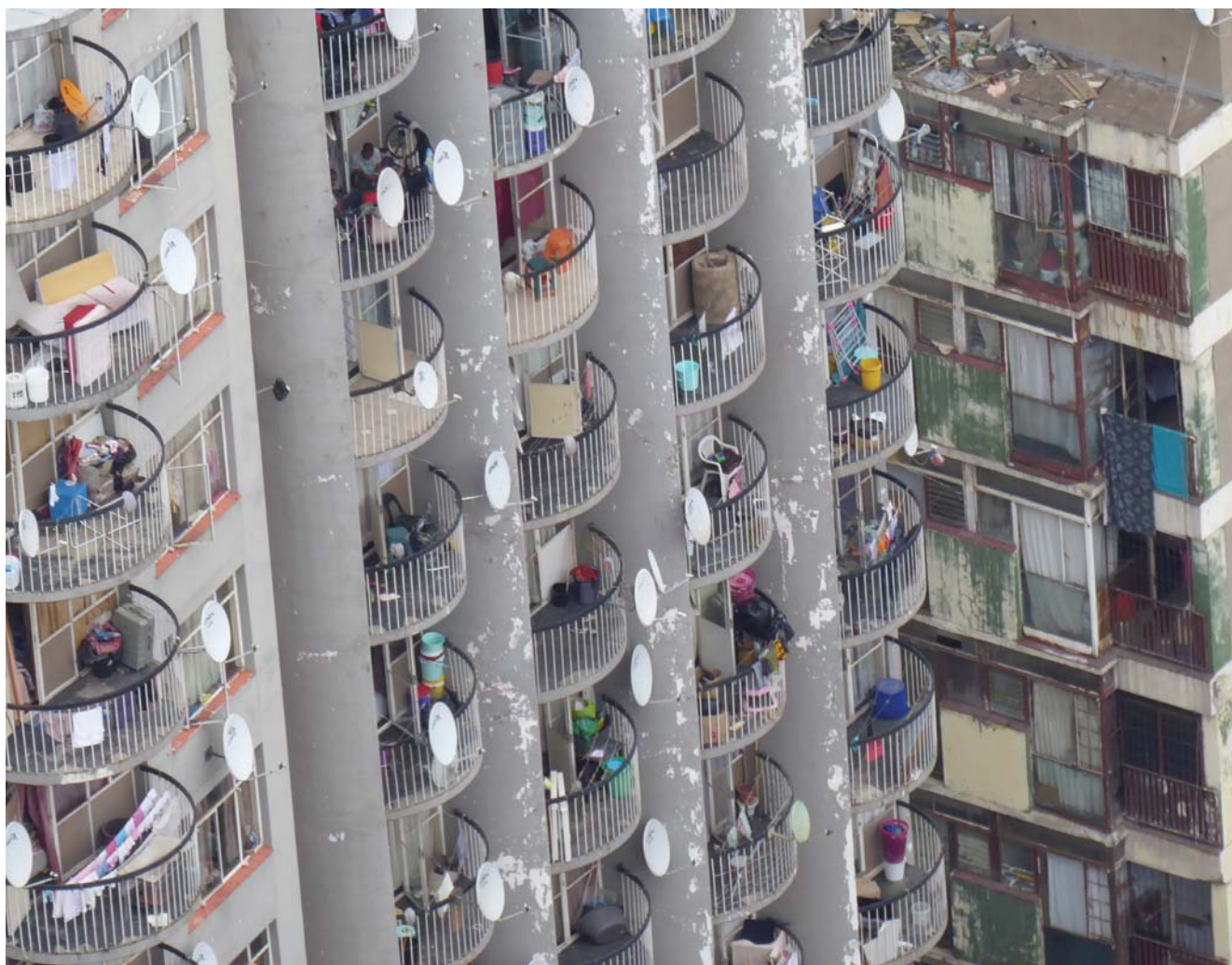
"We are facing a situation where available bulk supply is capped and the population continues to grow," says Nast. In fact, the province sees the highest growth in South Africa. Between 2008

and 2018 natural population growth and in-migration pushed 3 392 495 more people into Gauteng.

To cater for increasing demand, more water for the IVRS will be added during phase 2 of the Lesotho Highlands Water Project. More specifically, additional water is to be supplied from the Polihali Dam, which is set to be constructed on a tributary of the Orange-Senqu River in Lesotho. This should ensure adequate water for the region until 2030. However, though planned to be completed in 2018, construction of the dam has now been pushed back to 2026 after which it will need to be filled with good rains before being of use.

A further challenge in the mix is that the system relies on variable and unpredictable climate. Multiyear droughts are not unfamiliar to Gauteng resident, but the threat of climate change adds more risk to the scenario.

"Other than in times of drought there has generally been no concern for water," notes Nast. While there is no immediate danger of shortages, the mentioned supply and demand challenges has led to discussion about water security for Gauteng is now taking place in times of apparent plenty.



Jaco Roets

*Between 2008 and 2018 Gauteng grew by 3,4 million additional people.*

*“In the longer term, Gauteng must work to build a more resilient community that can live comfortably within its available water resources and manage the risks that it faces.”*

In 2018, the Premier requested a project to understand urban water challenges in the GCR, what long-term water security entails and how it can be achieved. Though Provincial Government is not responsible for water supply, its role as coordinator of functions across the province, and responsibility for disaster risk management, has urged them to turn their eyes towards the water.

Conducted by the Gauteng City Region Observatory (GCRO) and a team of water specialists from Pegasys Consulting and the Wits School of Governance in close consultation with Provincial Government representatives, the result is the **Water Security Perspective for the Gauteng City-Region**, released in November last year. For the first time, the Provincial Government has put forward ideas,” explains Nast.

The goal of the perspective is to achieve water security for the GCR. For the project purpose, security is defined as “the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies.”

## A plan for sustained water security

“We took a very deliberate approach,” says project coordinator and GCRO senior researcher, Gillian Maree. The perspective’s proposed plans and solutions are not revolutionary or new, but what sets it apart from existing water management plans for the province is that it crosses hydrological and administrative boundaries. It looks at water security from the perspective of a city region as a whole, she explains. “For this, the Provincial Government has the best view of the complexity of how the city region functions.”

The perspective calls for a balance between short-term and long-term priorities. Immediate priorities include ensuring that Polihali Dam is completed on time. Until then, the province will be at risk of supply shortages if, or when, a prolonged dry period next takes place. In the meanwhile, water consumption must be kept at sustainable limits, and water use must be restricted as soon as drought risks looms.

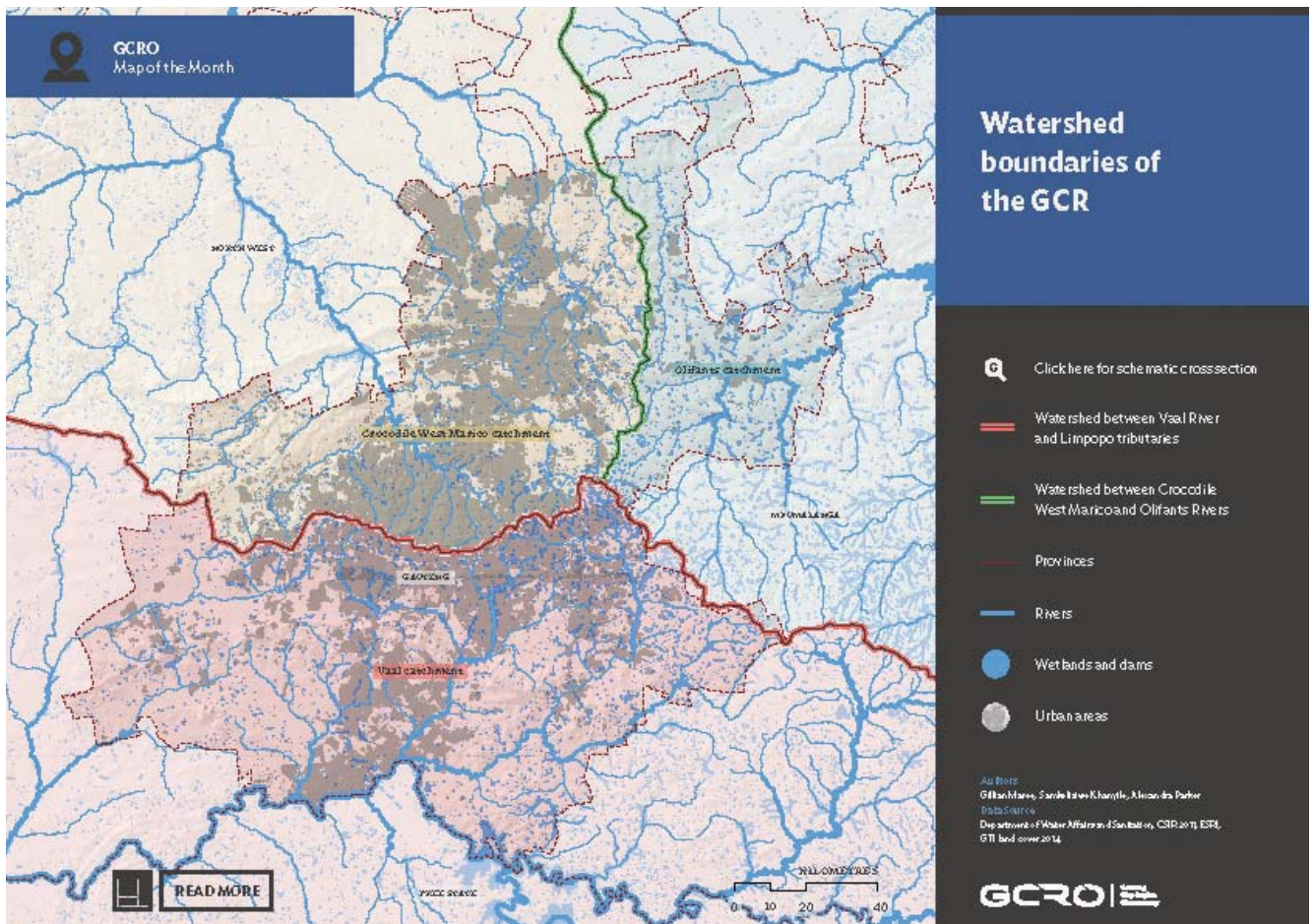
In the longer term, Gauteng must work to build a more resilient community that can live comfortably within its available water resources and manage the risks that it faces. This will entail buy-in from city planners and architects. People need to understand the urban water cycle, and the impact of their behaviour on it. Then, all residents must be afforded access to safe and reliable water supplies and sanitation services.

Maree says that the core of the plan is encapsulated in five identified critical issues and programmatic areas of intervention. The five critical issues are as follows:

Mark Lewis



*Pollution from Gauteng is contributing to the eutrophication of the province's dams.*



The watersheds that feed Gauteng's water system.

- 1. Supply and demand:** On the demand side, Gauteng's per-capita water use must be reduced, as must losses in the municipal water distribution system. Everyone must be prepared for restrictions at times of drought, and urban planning must drive towards water efficient cities. On the supply side, the IVRS must be effectively monitored, operated and maintained to sustain reliable bulk water supplies. The system infrastructure must be further developed, and the Vaal River Reconciliation Strategy updated as a priority. The water mix must be diversified with potential sources such as groundwater, wastewater reuse, treated acid mine drainage, and rainwater harvesting.
- 2. Institutions:** Institutional weakness and possible failure at all levels is a threat to water security. National and provincial government must support and regulate municipalities for the provision of water supply and sanitation services.
- 3. Stormwater management:** Urban planning and development must take account of the management of stormwater to reduce flooding risks and health hazards as well as water supply and wastewater disposal requirements. In the long term, the goal must be to make Gauteng's cities greener and more sustainable.
- 4. Water quality:** Cities are a major source of water pollution, much of which is due to improperly managed wastewater infrastructure. While the four largest municipalities will have to make 95% of the water savings to balance supply and demand, smaller municipalities must focus on improving their wastewater treatment which is a disproportionately

large source of pollution.

- 5. The way forward:** The strategy proposes an action plan as a more structured programme to address the longer term goals and five programmatic areas of intervention.

The perspective then goes ahead to specify five programmatic areas of intervention that will require action in the short term, but will necessitate ongoing support and effort. These will also require cooperation across institutions and partners in the GCR:

- 1. Reduce water demand:** Available water must be allocated between municipalities and other users and programmes put in place to keep consumption within these limits.
- 2. Manage variability to prepare for water scarcity:** Water availability must be managed so users can be alerted and take action if there is a threat of scarcity. For this, the IVRS must be maintained and updated. Operating rules and plans need to be put in place and agreed to by all water institutions before they are needed.
- 3. Invest in alternative water sources and tools for water conservation:** To reduce risk, more water must be made available by diversifying sources of supply. These could include groundwater, rainwater, stormwater, reuse of wastewater and treated acid mine drainage.
- 4. Manage water quality to limit pollution and achieve environmental goals:** Pollution from Gauteng is contributing to the eutrophication of the province's dams, reducing their value for recreational purposes. Updated

water quality modelling is required to guide policy interventions and wastewater disposal strategies to reduce and increase the volumes of reusable water.

- 5. Effective institutions for water security:** Many of the challenges to creating water security in the GCR relate to the performance and capability of the complex set of institutions with water related mandates. The perspective sets out a programme of action that municipalities, water boards and water utilities should take to build strong institutions that will ensure water security.

### The new route is not without speedbumps

Although the proposed solutions are not groundbreaking, they can be seen to be so in the context of Gauteng, says Nast. The challenges in implementing these solutions are many, however.

For one, there are different silos where water management takes place, Nast explains. For example, there are no forums where one can engage directly with municipalities on what they are doing to reduce consumption, and what their plans are. "We have to look differently at how we do this," he says.

The challenges at municipal level is another serious aspect. While some municipalities are well off and do a fair amount of planning, says Nast, some at the other end of the spectrum are near collapse. "There comes a point in which the mismanagement of the water justifies intervention." Furthermore, the financing for water infrastructure and management should also be looked at. "Is water priced correctly?," he asks as example.

Yet, changing consumer behaviour might be the biggest challenge for Gauteng. "It's not just about building dams," says Nast. "In the long run the key is the use of water, not the supply." But, he continues to say that it will be difficult to motivate for the kind of change they are looking for regards water use behaviour, especially since water supply at the moment seems flush. Unless

there's a major drought, he thinks it will be tough. "The key is communication, and education."

Regardless of the difficulties, it's integral that the recommendations should see implementation now. "Planning for water scarcity is important to supply a degree of certainty." Nast explains that the ideal would be to be able to notify residents when dam levels are low, for them the lower their water use accordingly. Once drought hits, the window for such rational decisions have closed.

"With any disaster like a drought you have to make unpopular decision before the impact hits," agrees Maree. You have to plan your way in and out of drought. Due to the storage capacity of the IVRS, the time period before the impact of drought hits in Gauteng is five to six years. Maree notes that this is longer than a political term, making implementation difficult, as a governing party would have to make unpopular choices about water, but not necessarily reap the benefits.

### Taking the plan forward

According to the stipulated action plan there is an enormous amount to do, says Maree. "Yet, because there is enough water at the moment, water concerns have been placed on the back burner again."

"The one encouraging sign, however, is that this is being picked up in a cooperative way, and that there is real concern whether this is being implemented." Yet, she sees the real positive as something else. "It's not about how many projects and policies we have on water security, but how we make sure that water is on people's minds all the time when they're making decisions."

The strategy can be seen as proof of that. "There has certainly been a shift. Water is something that is now being taken much more serious on high levels."



*The Katse Dam is part of the Lesotho Highlands Water Project, which feeds Gauteng.*