PERSPECTIVES ON WATER & THE ECONOMY - WITH SPECIFIC REFERENCE TO MPUMALANGA

PSEF 2019
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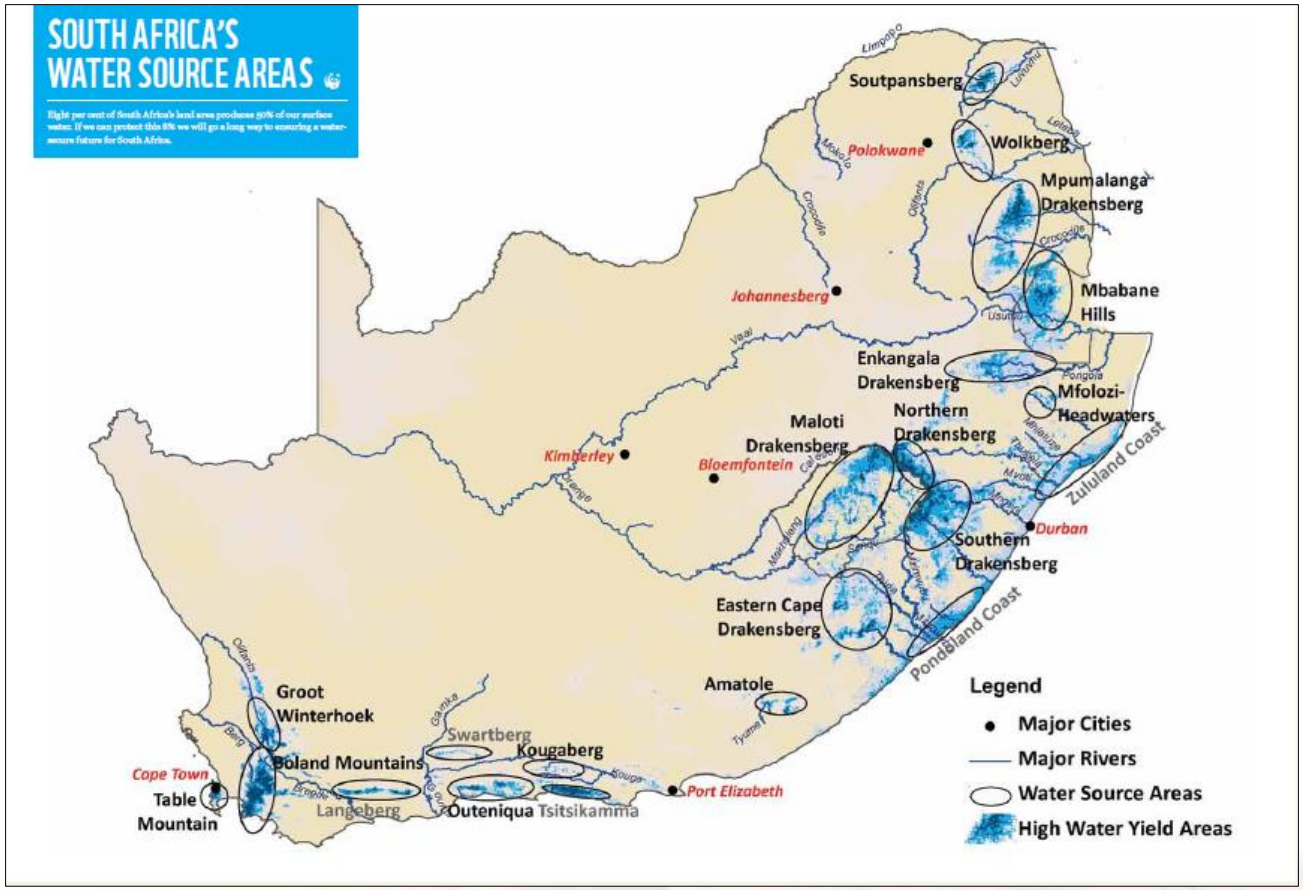
economic development & tourism
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

MPUMALANGA
THE PLACE OF THE RISING SUN

WATER SUPPLY

- Based on rising population, economic growth projections, scarcity of resources as well as current use and efficiency levels, South Africa will demand 17% more water than exists by 2030.
- 3 of the 16 strategic water source areas (WSAs) originate in Mpumalanga, namely the Enkangala Drakensberg WSA, Mpumalanga Drakensberg WSA and Mbabane Hills WSA .
- 9 water management areas (WMAs) were established to allow the effective management of rivers and water resources that differ across the country. There are 3 WMAs in Mpumalanga, namely the Olifants WMA, Inkomati-Usuthu WMA and Vaal WMA.

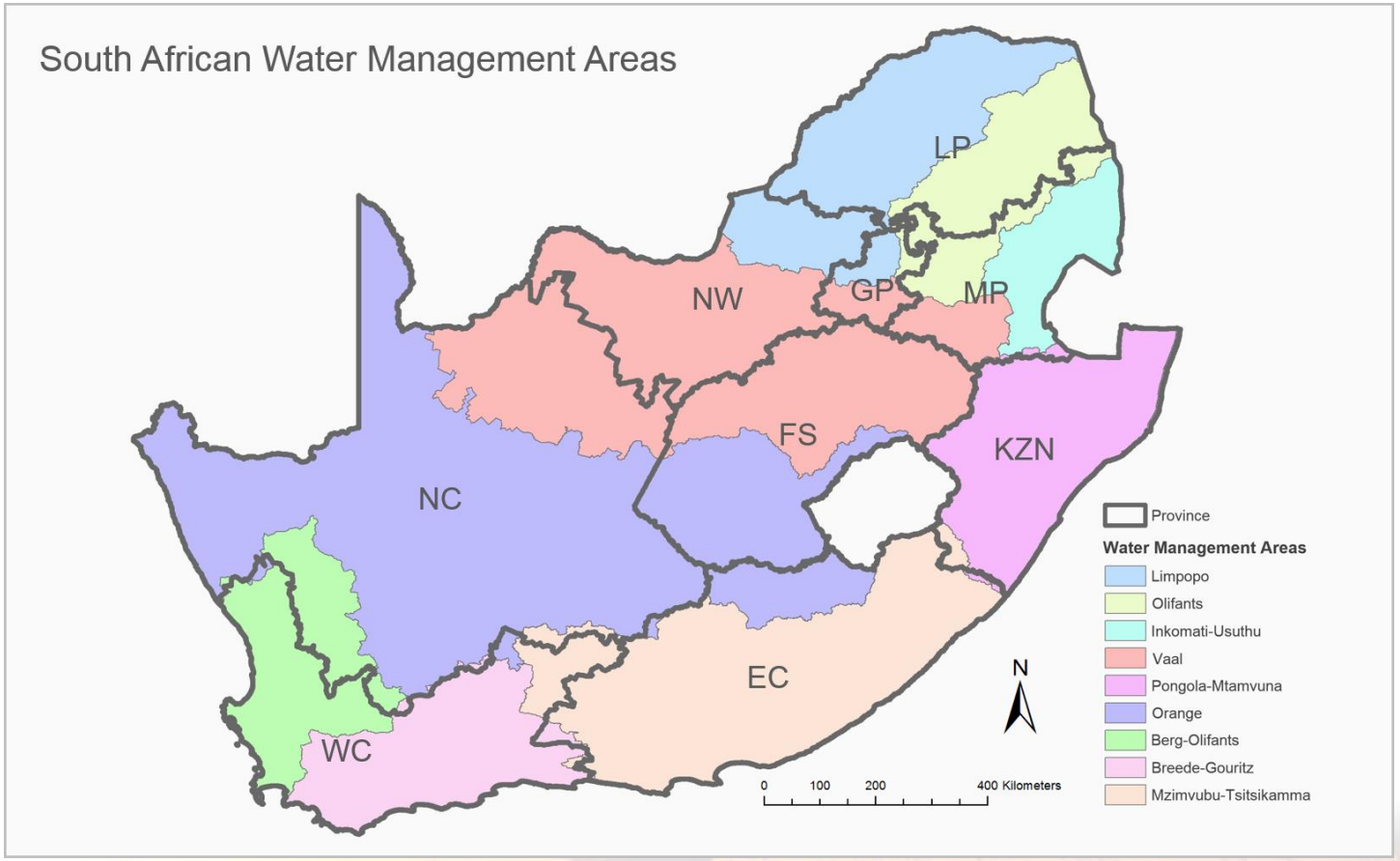
WATER SUPPLY - WSAs



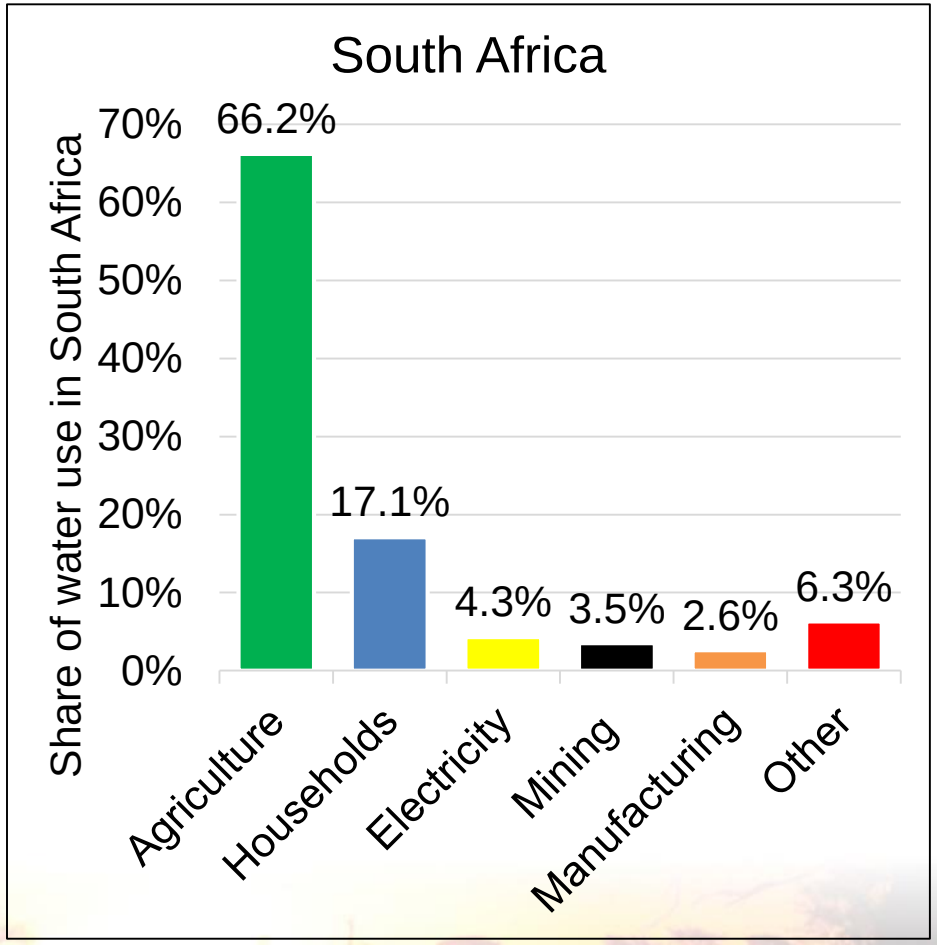
WATER SUPPLY – RIVERS & REGIONS

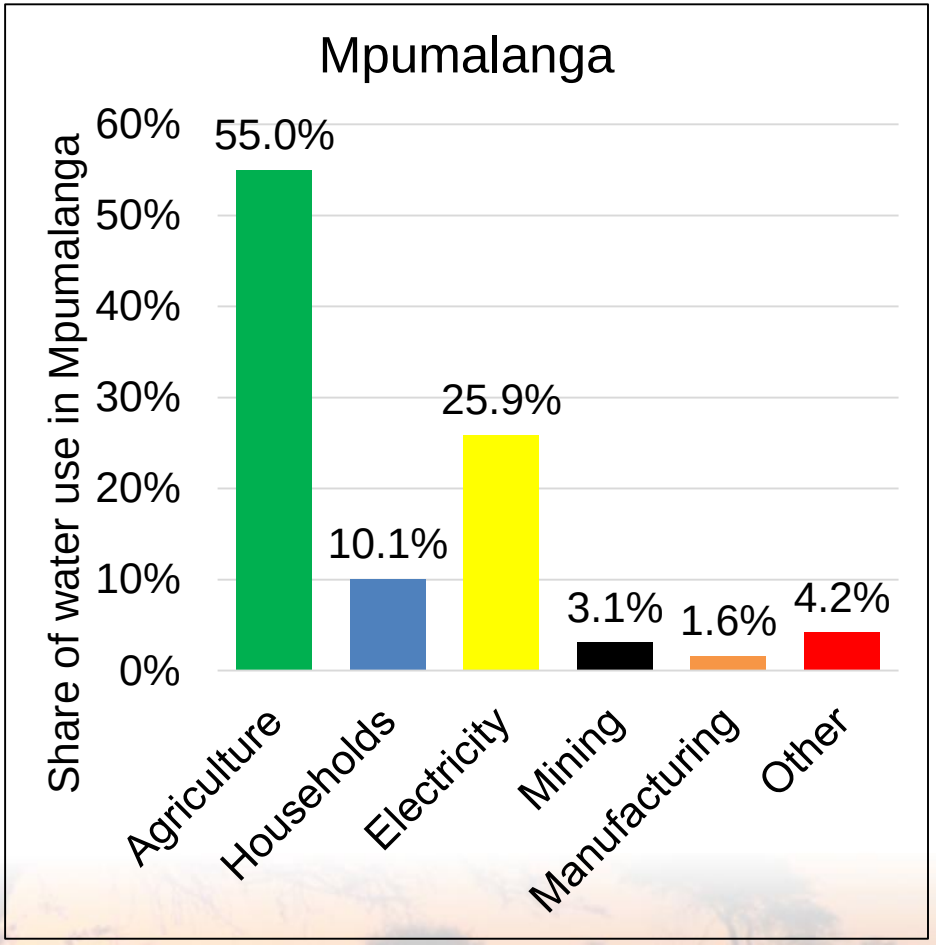
	Enkangala Drakensberg WSA	Mpumalanga Drakensberg WSA	Mbabane Hills WSA
Main rivers	Vaal river Thukela river Pongola river Wilge river Bivane river Assegaai river	Olifants river Crocodile river Elands river Sabie river	Usutu river Lusushwana river Komati river Pongola river Mpuluzi river
Regions supplied	Mpumalanga KwaZulu-Natal Gauteng Free State	Mpumalanga Limpopo Mozambique	Mpumalanga Eswatini Mozambique

WATER SUPPLY - WMAs



WATER DEMAND





INEFFICIENCY ISSUES IN WATER DEMAND

- Making agricultural irrigation systems more efficient could save between 30-40% of current water use – *DWA, 2014*.
- Households and municipalities can reduce consumption by 12-30% by addressing leaks & increasing household water efficiency – *Seago & McKenzie 2012*.
- Estimated that 774 million cubic metres (MCUM) or 36% of water supplied by 62 water supply systems was non-revenue water (NRW) & 1 430 MCUM when extrapolated to the national level – *WRC 2007*.
- Annual water lost through leaking pipes & theft in Johannesburg alone would fill 87 743 Olympic sized swimming pools – *Waterwise, 2015*.
- If per capita water consumption was lowered to world average by 2035, the demand-supply gap would be reduced by almost half – *ISS, 2014*.

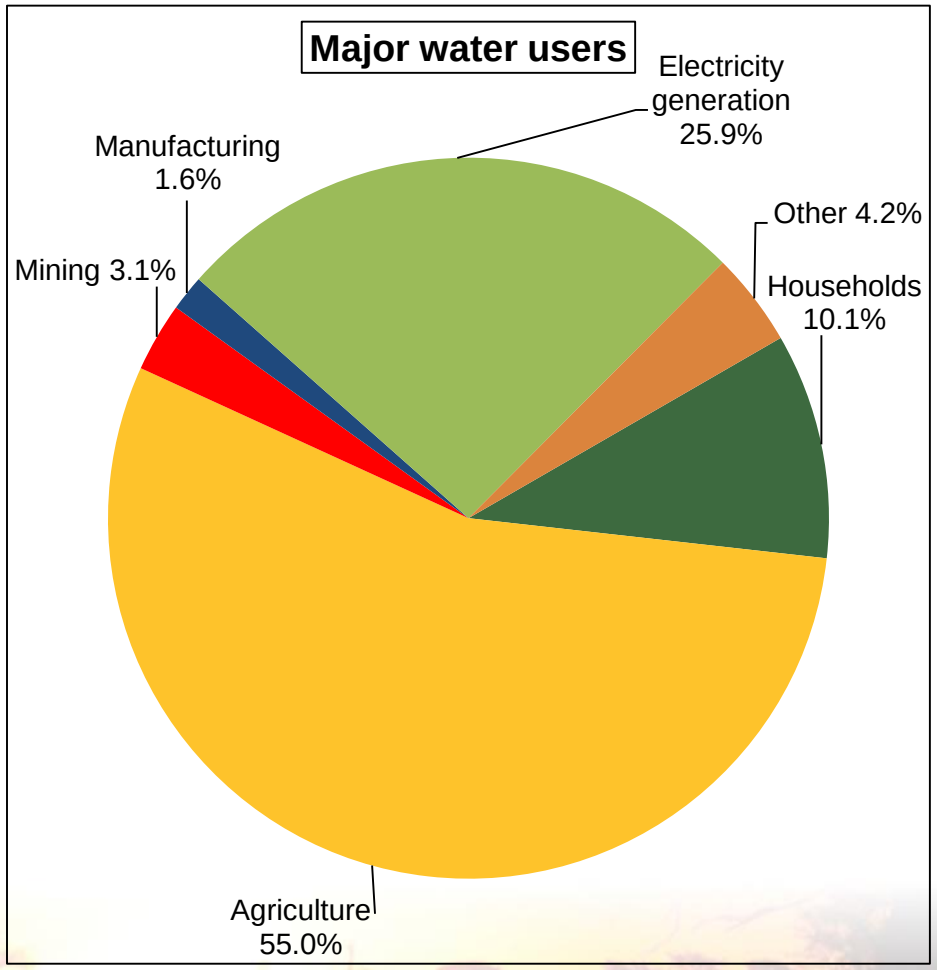
WATER DEMAND PERSPECTIVES IN MPUMALANGA (1)

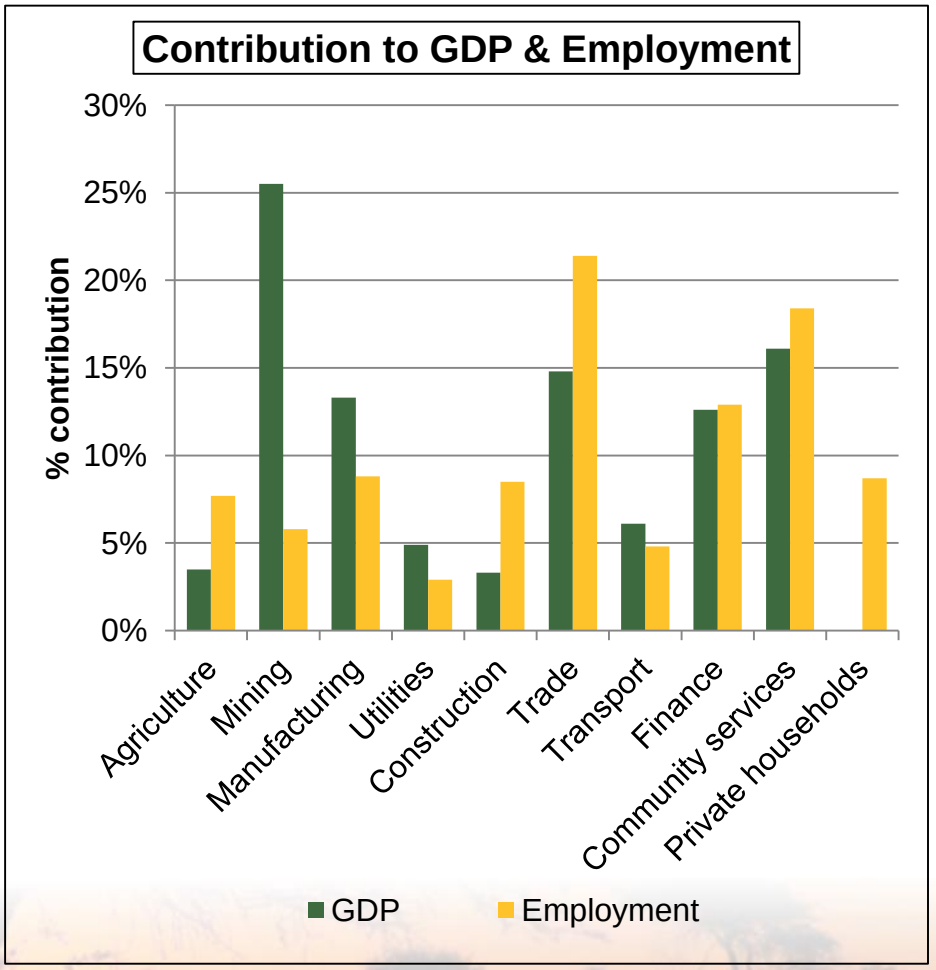
- Olifants WMA
  - Upper Olifants sub-area comprise:
    - Victor Khanye, Emalahleni, Thembisile Hani, Dr JS Moroka, Steve Tshwete & Emakhazeni.
  - Middle Olifants sub-area covers parts of:
    - Thaba Chweu & Bushbuckridge.
- Inkomati-Usuthu WMA – covers parts of:
  - Chief Albert Luthuli, Dr Pixley Isaka Seme, Mkhondo, Emakhazeni, City of Mbombela, Thaba Chweu, Bushbuckridge & Nkomazi.
- Vaal WMA
  - Upper Vaal sub-area covers parts of:
    - Msukaligwa, Dr Pixley Ka Isaka Seme, Lekwa, Govan Mbeki and Dipaleseng.

WATER DEMAND PERSPECTIVES IN MPUMALANGA (2)

- According to a *Reconciliation Strategy for the Olifants River WMA:*
  - the Upper Olifants sub-area only had a 3.3% balance available in 2010, and
  - the Middle Olifants sub-area was already in deficit (1.0%).
- According to a *Business Case for the Inkomati-Usuthu Catchment Management Agency:*
  - the Inkomati sub-area already had a 20% deficit in 2012, and
  - the Usuthu sub-area only had an available balance of 1.0%.
- According to a *Business Case for the Vaal Catchment Management Agency:*
  - the total Vaal WMA only had a 3.3% balance in 2015.

MPUMALANGA – WATER DEMAND & CONTRIBUTION

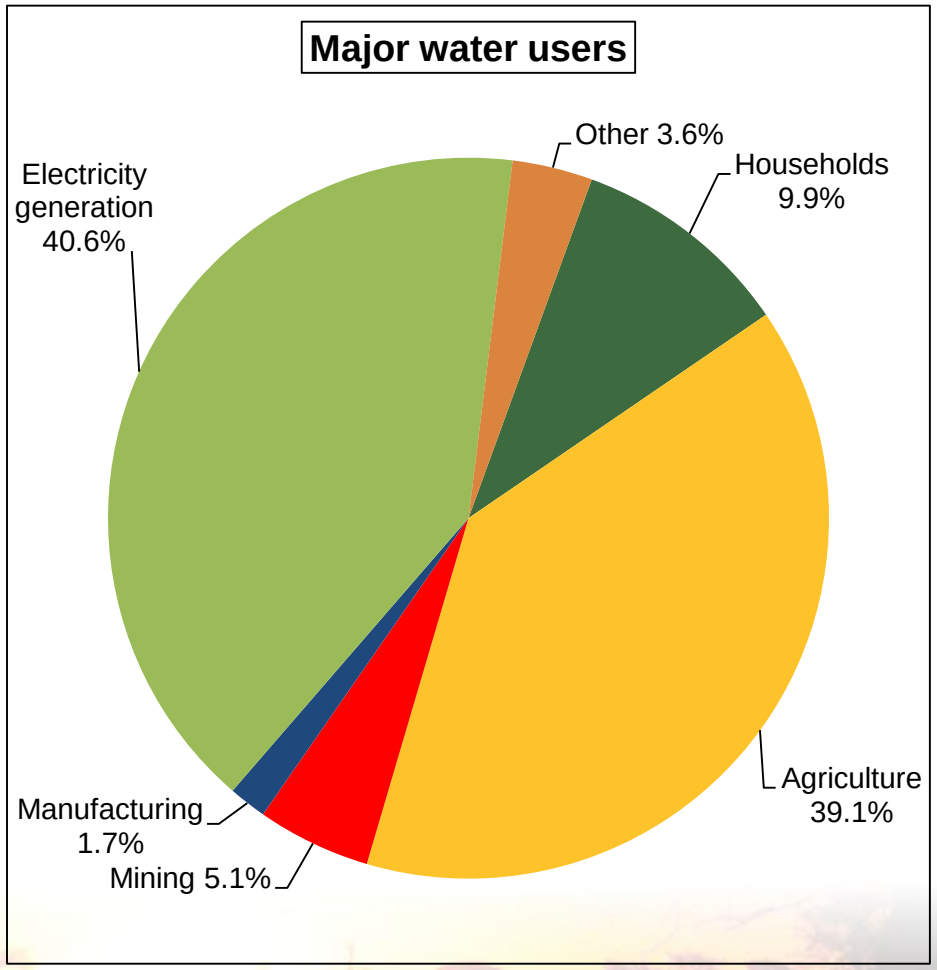


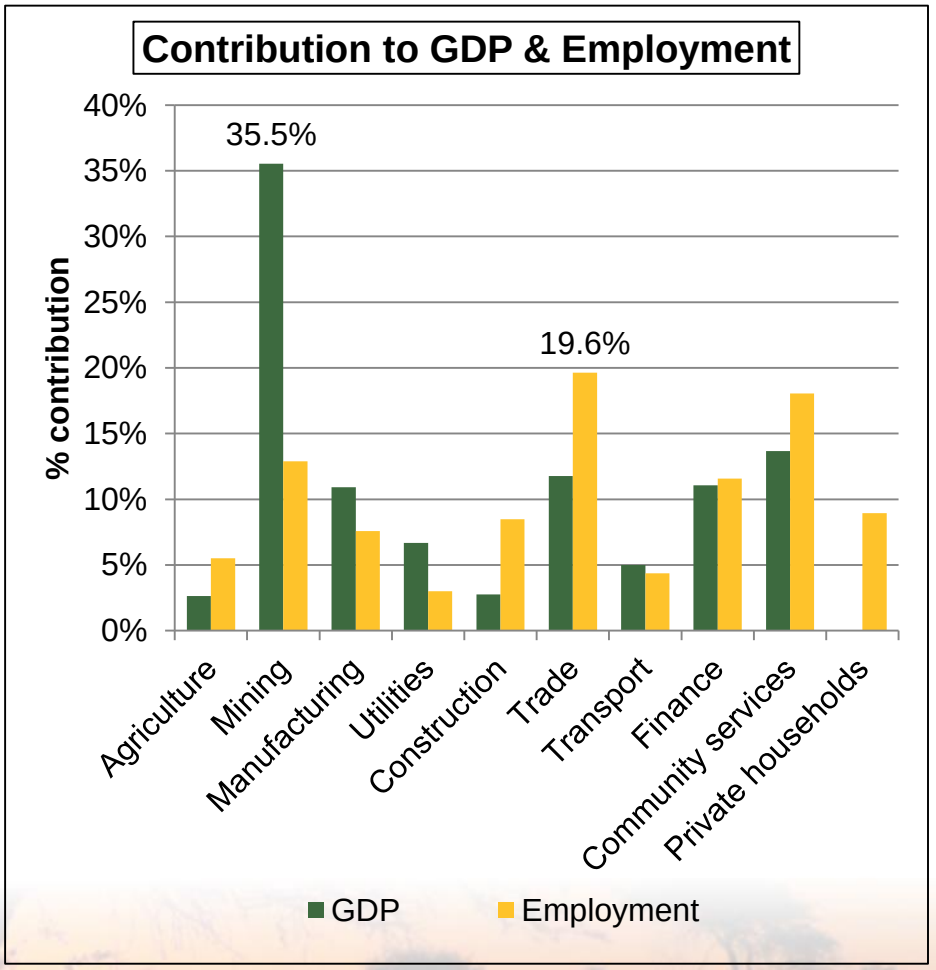


MPUMALANGA – WATER DEMAND & CONTRIBUTION

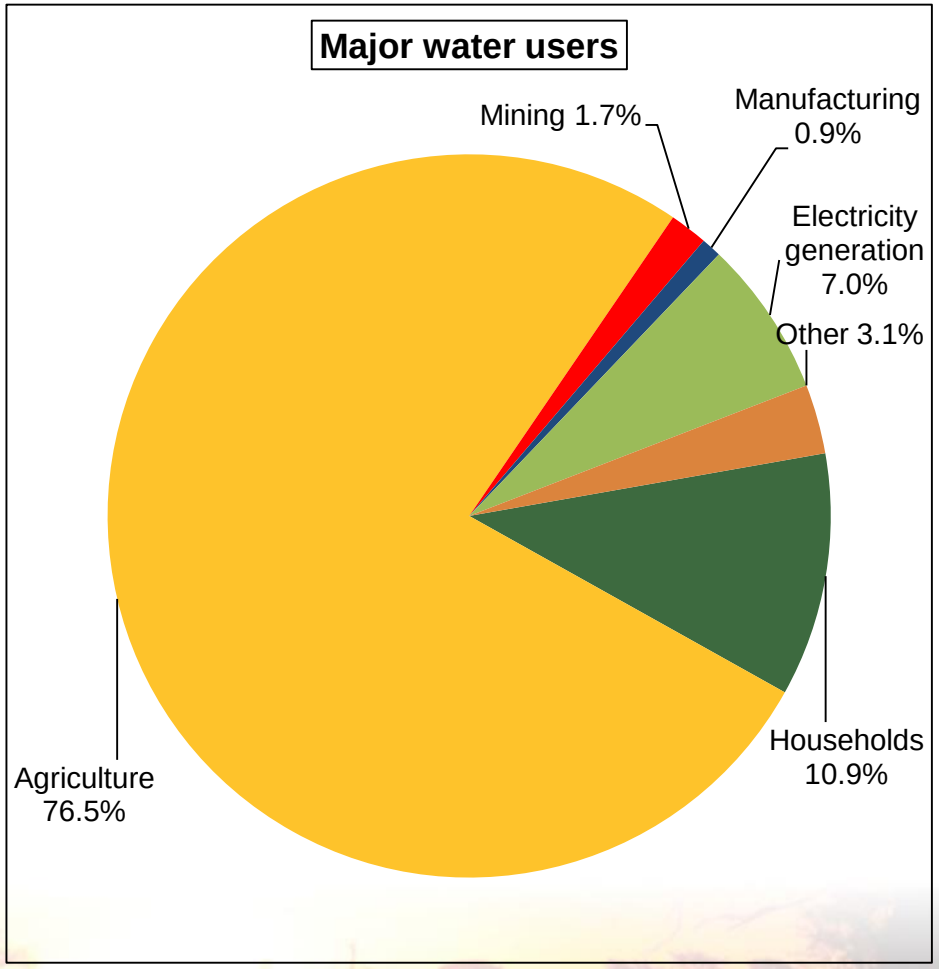
Water user	GDP contribution per MCUM water used	Employment contribution per MCUM water used
Agriculture (55.0%)	R6 499 771	87 jobs
Electricity generation (25.9%)	R18 813 306	48 jobs
Mining (3.1%)	R831 507 388	1 230 jobs
Manufacturing (1.6%)	R798 417 101	3 037 jobs

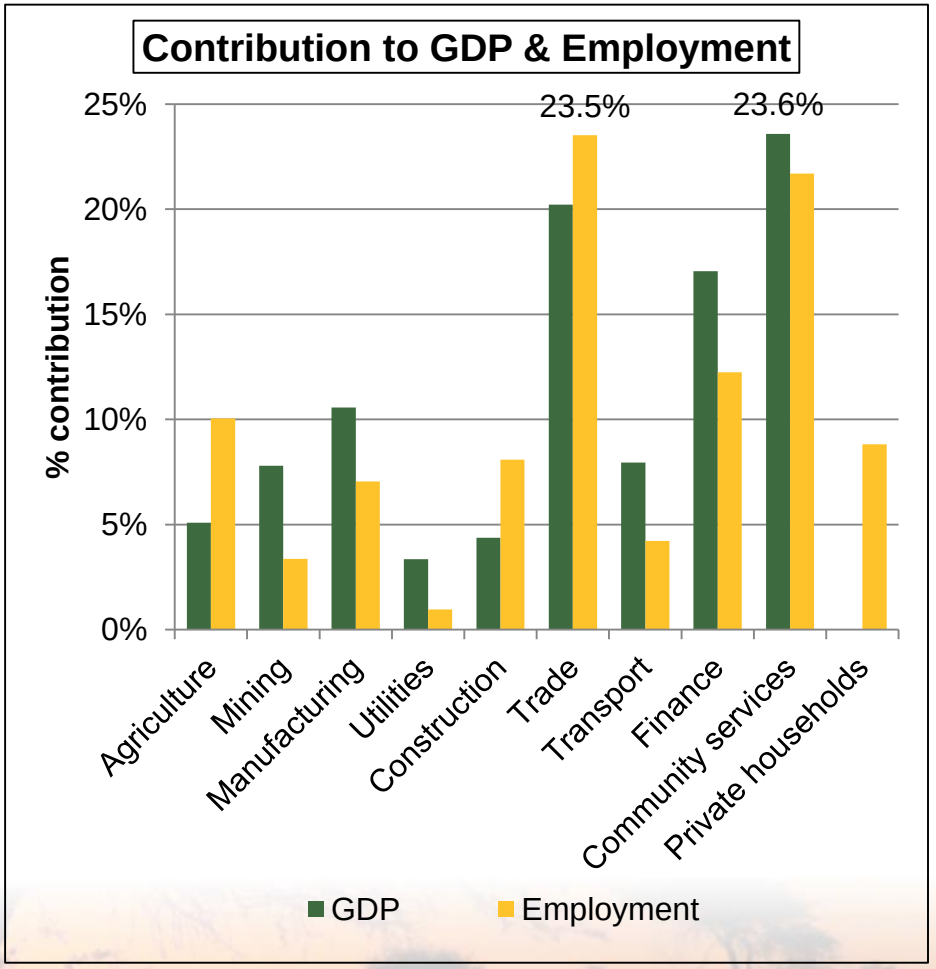
OLIFANTS WMA – WATER DEMAND & CONTRIBUTION



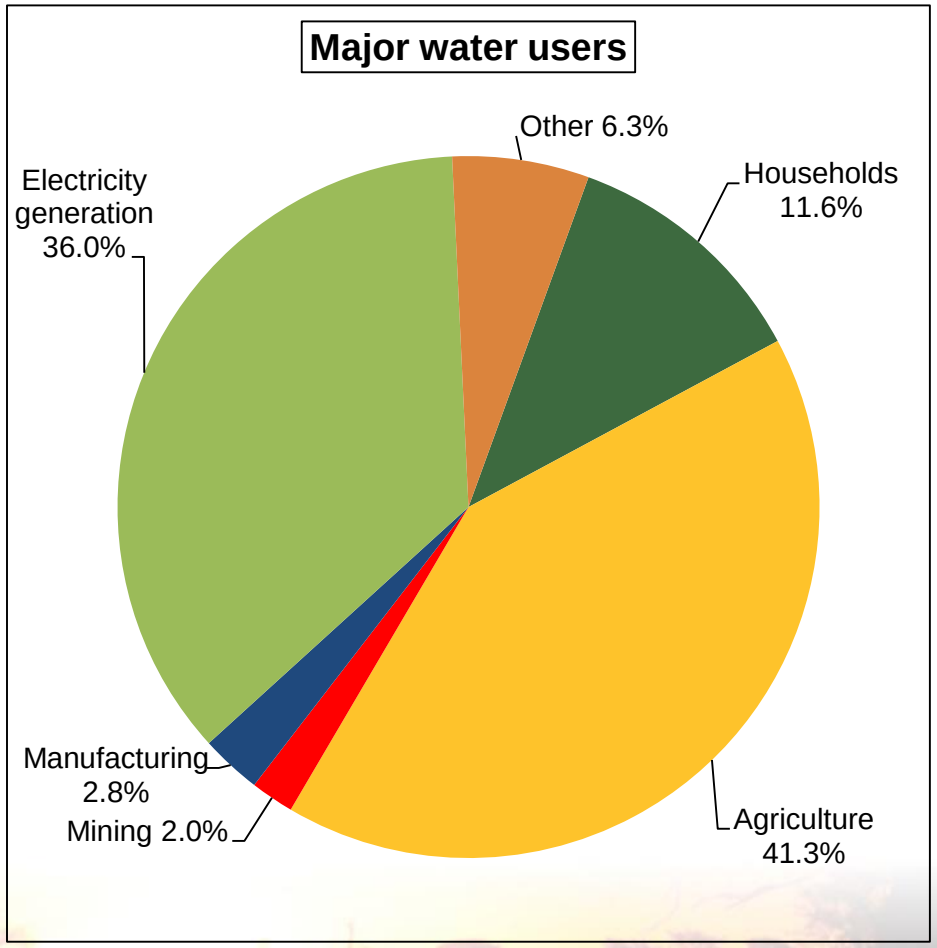


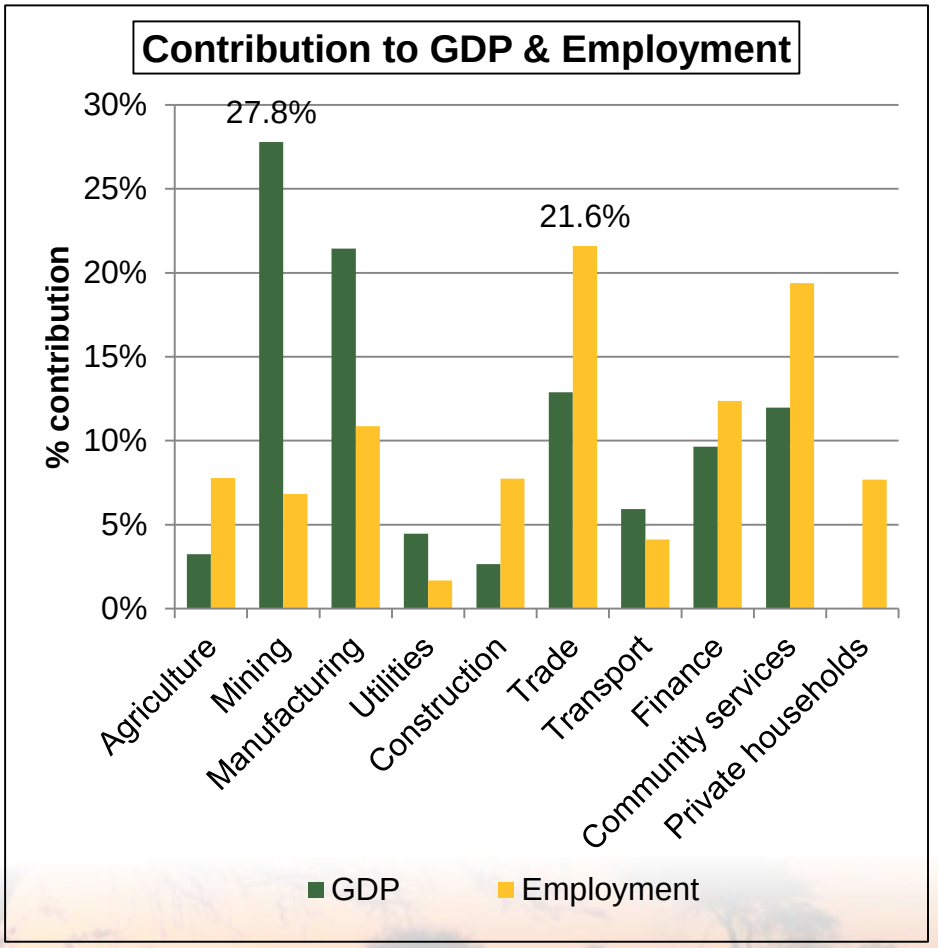
INKOMATI-USUTHU WMA – WATER DEMAND & CONTRIBUTION





VAAL WMA – WATER DEMAND & CONTRIBUTION





FUTURE WATER DEMAND IN MPUMALANGA

- In 2017, the base year of the CID, Mpumalanga's total water use was 2 037 MCUM.
- There was already an approximate deficit in 2017 of 77 MCUM or some 4.0%.
  - 77 MCUM = slightly more than the volume of water that mining used in 2017.
- In the relatively low economic growth scenario that is currently foreseen up to 2030, water use in Mpumalanga is expected to increase by 1.6% per annum to 2 490 MCUM.
- Without extra sources, re-allocation of existing use, more efficient use and re-use by 2030, the deficit is expected to be 530 MCUM, or 27.0% of existing supply.
  - 530 MCUM = approximately 90% of the water that electricity generation is expected to use by 2030.
- In a higher growth scenario, water use is expected to increase by 2.1% per annum and the resultant deficit to increase to 708 MCUM, or 36.1% of total supply.
  - 708 MCUM = slightly more than the expected combined water usage of electricity generation, mining and manufacturing by 2030.

FUTURE WATER SOURCES IN MPUMALANGA (1)

Potential sources/strategies	Likelihood	Description
Development of surface water resources & transfer of water	Somewhat likely – specifically in Sabie river system and Crocodile river system of Inkomati-Usuthu WMA	Dam sites are few and far from ideal and would be expensive to develop. Any impact of additional storage on South Africa's ability to meet international obligations would also have to be negotiated with neighbouring countries.
Groundwater development, management & artificial recharge.	Likely – specifically in Olifants WMA	Drilling of boreholes to access groundwater and the management thereof is an ongoing process. Artificial recharge, the process whereby surplus surface water is transferred underground to be stored in an aquifer for later abstraction and use, is growing in importance in South Africa and internationally.
Water re-use	Likely – specifically in Olifants WMA & Inkomati-Usuthu WMA	This is becoming more acceptable and feasible because of increasing water shortages, improved purification technology and decreasing treatment costs. Improvements in membrane technologies and their affordability have made a significant contribution in recent years.
Alien invasive plant removal	Likely – specifically in Olifants WMA & Inkomati-Usuthu WMA	Clearing invasive alien plants as a cost-effective strategy for water catchment management.
Desalination of seawater	Unlikely	Desalination of seawater could provide an unlimited resource of fresh water, especially to coastal areas. However, while the costs of desalination technology are decreasing, the escalating cost of energy is a concern, particularly because desalination requires large quantities of energy.

FUTURE WATER SOURCES IN MPUMALANGA (2)

Potential sources/strategies	Likelihood	Description
Management of AMD	Likely – specifically in Vaal WMA & Olifants WMA	While the pollution from AMD is a significant problem, the potential increase in water availability from treated AMD offers opportunities for making additional water available to supplement traditional water resources. The quantity of additional water that can safely and reliably be made available from this source has yet to be confirmed. Whether additional water becomes available or not, the AMD must be managed and treated and the polluter-pays principle must apply where mines still have an identifiable owner.
Water harvesting	Likely	A water harvesting programme (i.e. rainwater) has a narrow but important focus on the provision of water storage tanks for rural households and other institutions such as clinics, schools and hospitals. While the collected water is intended for irrigation of food gardens to improve food sufficiency and for other productive water uses, this water will also be used for domestic purposes.
Next generation toilet technologies	Likely	The South African Sanitation Technology Demonstration Programme (SASTEP) is busy evaluating demonstration-ready models. Specifically in municipalities that have service delivery challenges. These next-generation toilet technologies are modular units with a hygienic interface and new treatment processes. Examples of these processes include hydrothermal carbonisation, combustion and electrochemical treatment.
Imports of water intensive goods	Unlikely	The import of water-intensive goods such as agricultural crops from other countries where the availability of water for irrigation is not a limiting factor. This opportunity brings with it significant socio-economic consequences such as: • Associated loss of work opportunities in agriculture and downstream economic activities. • Implications for national food security.

CLOSING THE GAP – POLICY IMPLICATIONS

1. Become a water-conscious country with sufficient knowledge & skills in the water sector.
   a. Develop skills & provide job opportunities in water management & treatment.
2. Implement strong water governance with resilient stakeholder partnerships.
   a. Incentivise private sector to plan, invest in & implement water management systems.
   b. Develop innovative financing solutions for i.e. converting alien plant biomass into commercial bi-product.
3. Manage water supply and demand regulations more rigorously and protect water resources.
   a. Incentivise zero-liquid discharge in manufacturing industry through recycling.
   b. Promote interdependencies of industries to trade and share water at different levels of cleanliness through water treatment agreements.
4. Become a water-smart economy and a leader in Africa in commercialising low-water technologies for industry and agriculture.
   a. Invest in research & commercialisation & adopt technology as well as techniques.