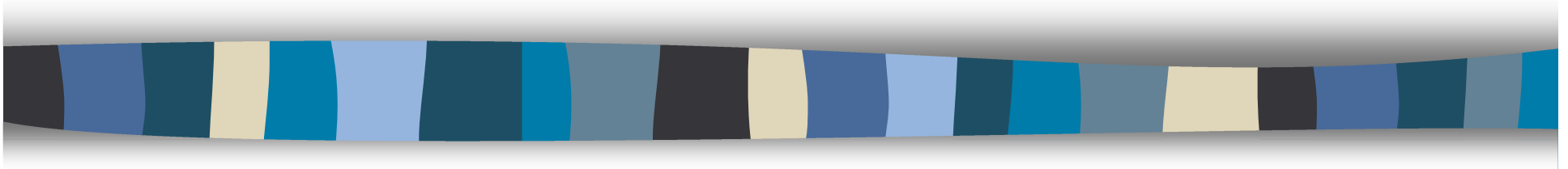


Developmental Pricing of Residential Water Use in South Africa



By: *Kim Adonis*



Water Supply

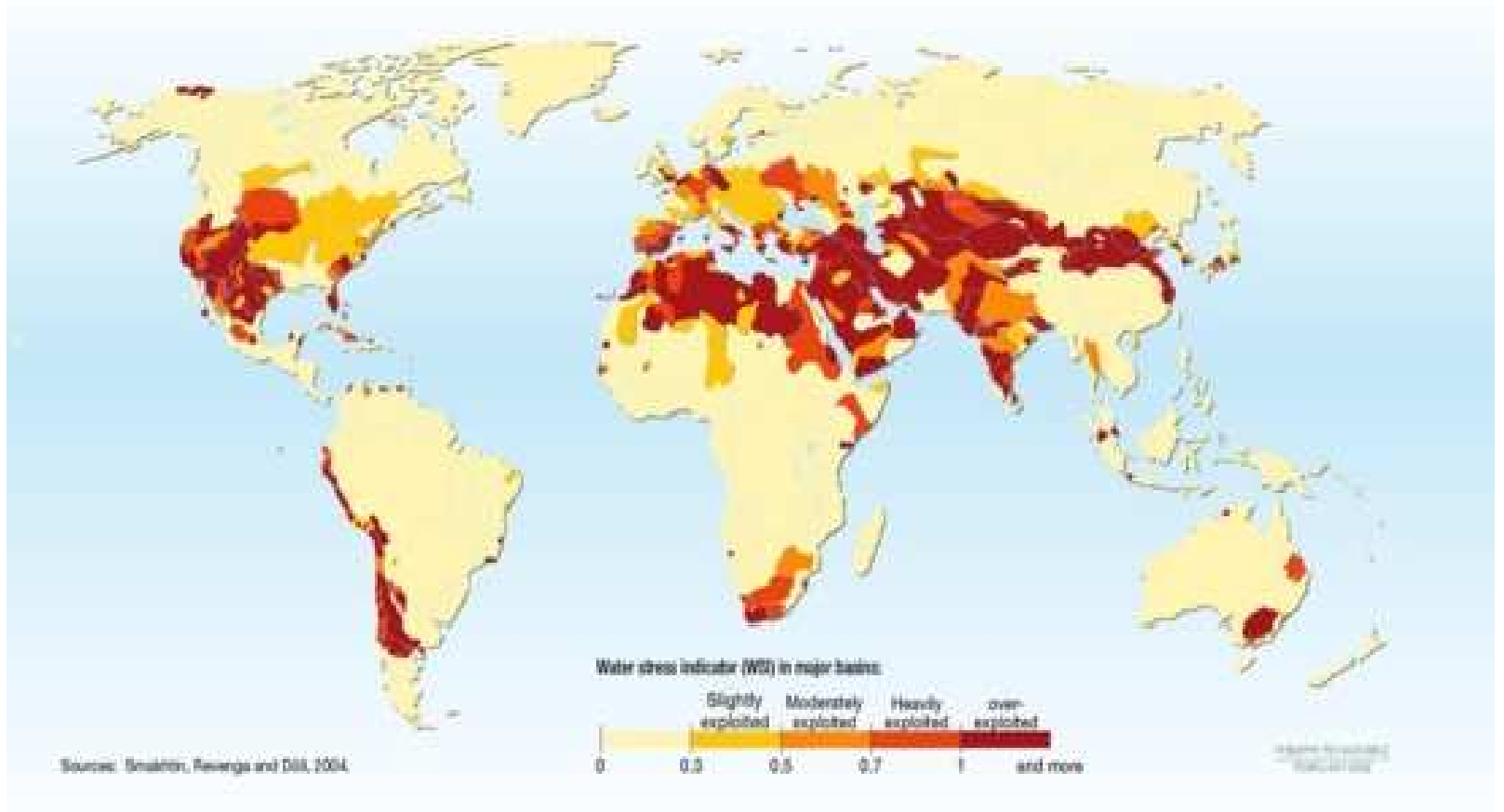
- Low and variable annual average rainfall of 460mm
- High evaporation rates 1,100mm and 1,300mm which exceeds average annual rainfall in some areas
- Only 8% of rainfall converted into water runoff
- 70% of SA water supply from 4 rivers - all shared with other countries



Water Demand

- Urbanisation and industrialisation – increased demand of households and economic sectors
- Mismatch between location of water resources and population settlement patterns
- Negative water balances for 11 of the 19 Water Catchment Areas (WCAs)
- South Africa forecast water deficit of 1.7% by 2025

Water Scarcity Index



Historical Context & Background

Pre-1994 water legislation

Riparian rights

Supply-side
management

Inequitable distribution by
household and sector

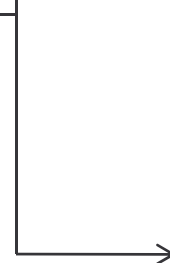
National Water Act 1998

Public ownership

Demand-side
management

Prioritisation of
Water for human needs

Legislated water licenses
and pricing mechanisms





NWA Provisions

Three aims:

1. Equity
2. Sustainability
3. Efficiency

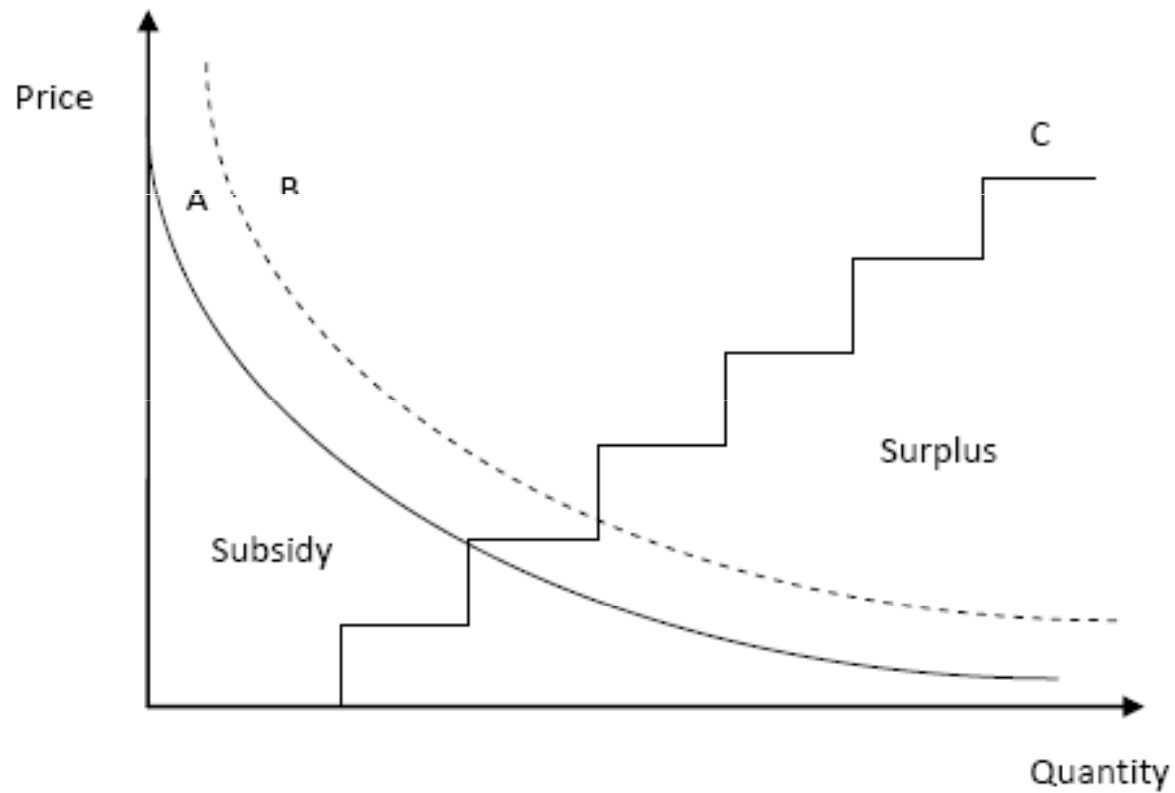
- Provisions for pricing water to capture economic value of water → **commodification**



Current Pricing Model

- Practical implementation - pricing models based on full cost recovery
- 2001 - free basic allocation of 6,000 litres per household per month
- Consumption > free allocation subject to increasing block tariff
- Cross-subsidisation from high to low consumption households
- Theoretical framework - pricing model based on utility pricing as outline by Ramsey where $P \neq MC$
- Price differentiation based on consumption levels

Increasing Block Tariffs



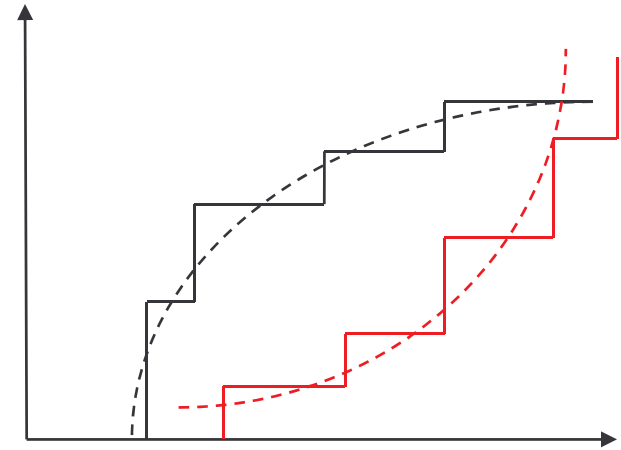
Source: Bond, 2008:47

Pricing Critiques

Two major critiques:

1. FBA insufficient long term survival and a dignified life
2. Determinants of step tariffs too narrowly defined as it is based solely on a municipalities need for cost recovery

Households quickly exhaust their initial allocation and are thereafter subject to unaffordable tariffs.





Pricing Critiques continued

- Ramsey pricing – size of steps determined by consumer responses to price and cost recovery



Price elasticity of demand

- Little known about effects of water prices on household consumption behaviour
- Existing model omits impact of prices changes on consumers
- Disconnect between pricing theory and practical implementation of pricing models



Importance of Elasticity

Elastic Demand

Consumers responsive to changes in price

Inelastic Demand

Consumers unresponsive to changes in price

- Water is a necessity - demand for water should be inelastic across income groups
- BUT...some literature shows that the elasticity of demand for water for low income households is relatively elastic
- Apart from Bailey & Buckley – no other work on calculation of elasticity in SA



Research Question

How should a water pricing model be designed in order to ensure that the goals of equity, efficiency and sustainability are achieved?



Contextualising the question

In answering this question, the research will specifically;

- Calculate the price elasticity of demand

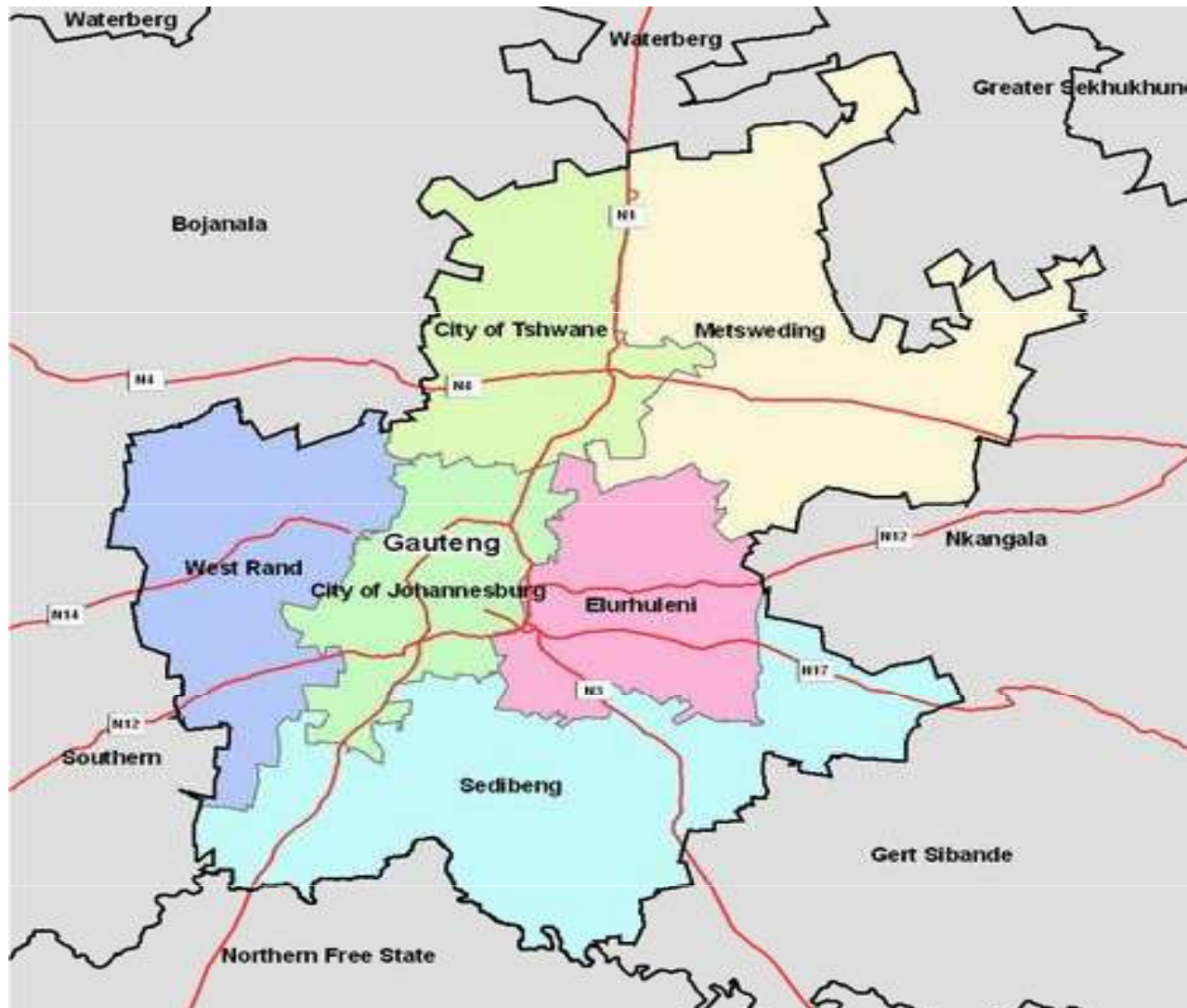


3 metros in Gauteng

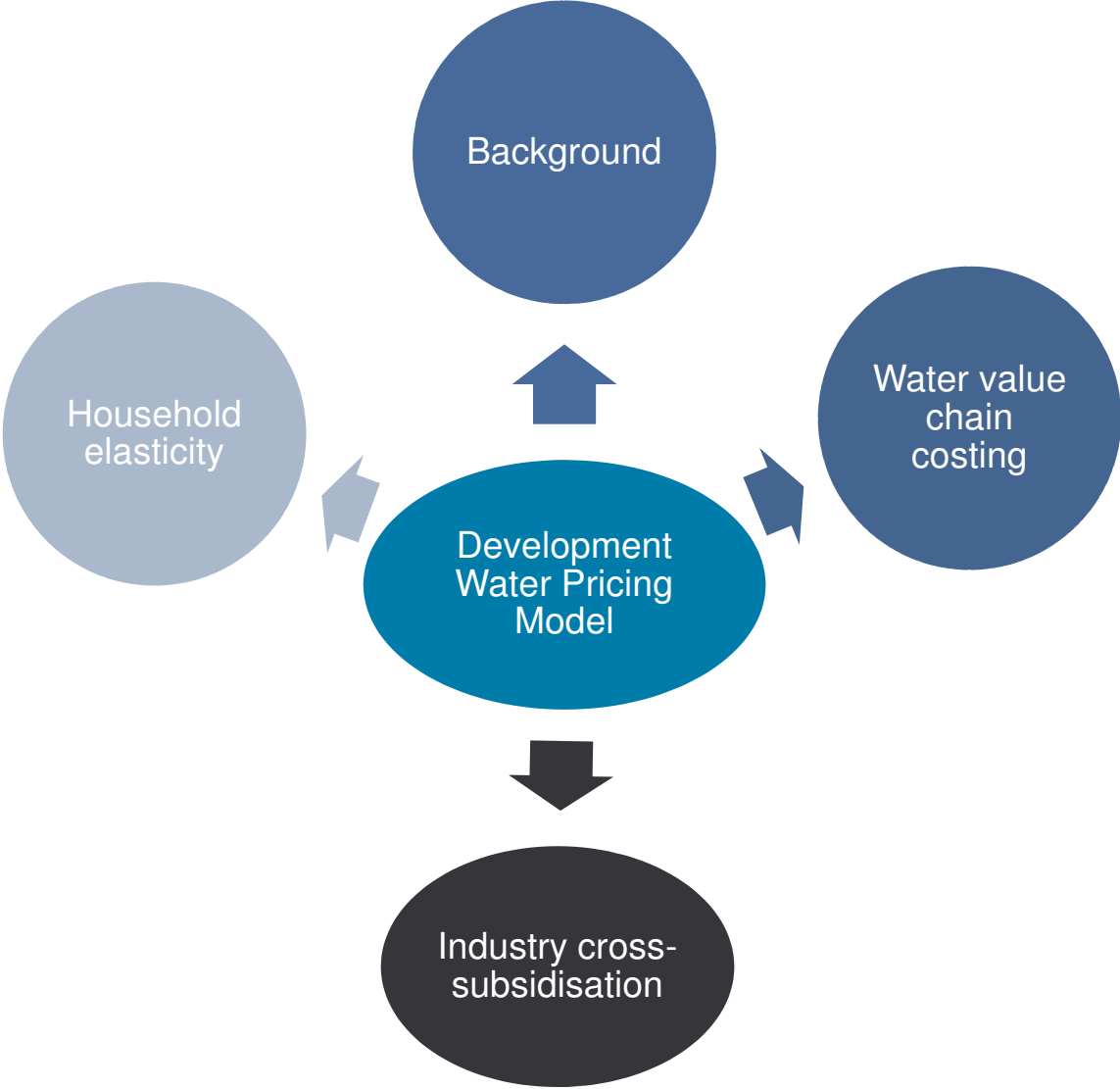


Water for residential use

Why Gauteng?



Research Themes





Background

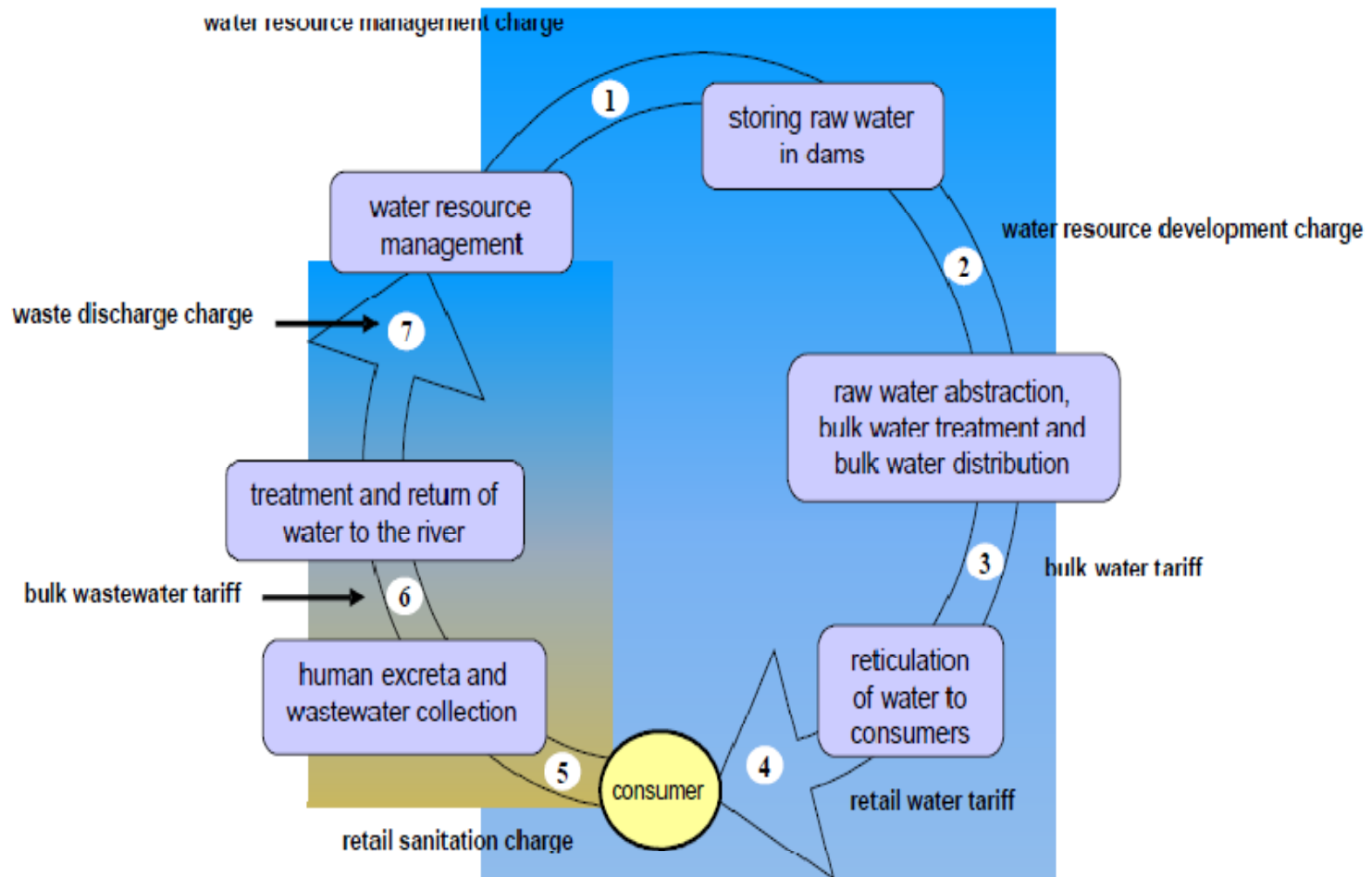
- Historical, legislative & policy framework for water pricing in SA
- Trends in access to water since 1994 by metro – demographic component



Value Chain Analysis

- Structure of the water sector and composition of water use in Gauteng
- How is water infrastructure financed?
- Potential estimation of the negative externalities from water pollution during mining production and other industrial processes – to be included within the costs

Water Value Chain





Industry cross-subsidisation

- Possibilities for cross-subsidisation from industry to households?
- Sectoral analysis Gauteng Computable General Equilibrium (CGE) model
- National and provincial impact of cross-subsidisation on both households and industry
- Analysis of allocative efficiency across sectors



Household Elasticity

- Theoretical underpinnings of increasing block tariffs?
- How have households in the metros changed their consumption patterns in response to changes in water prices?
- Econometric estimation of the price elasticity of demand for water for households that reside in CoJ, CoT, Ekurhuleni



Data challenges

- Deriving accurate costing within each stage of the value chain – complex institutional structure
- Elasticity calculations – price and quantity data from metro's (billing data)
- Data constraints - deemed consumption, flats and shared dwellings
- Mapping consumption data to income levels

Thank you



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