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South Africa – National Legislations and National Targets for Sanitation

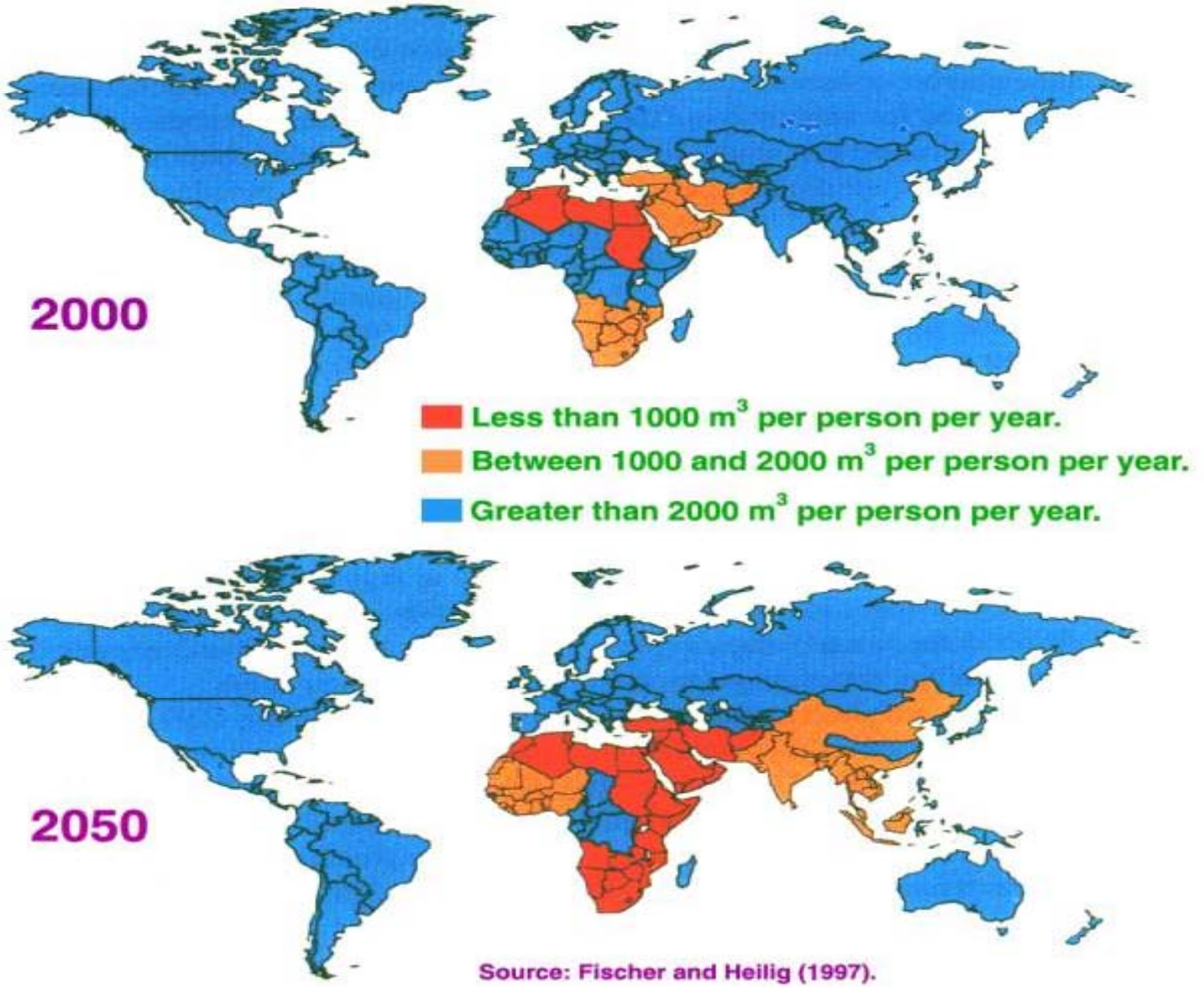
Ditshego Magoro

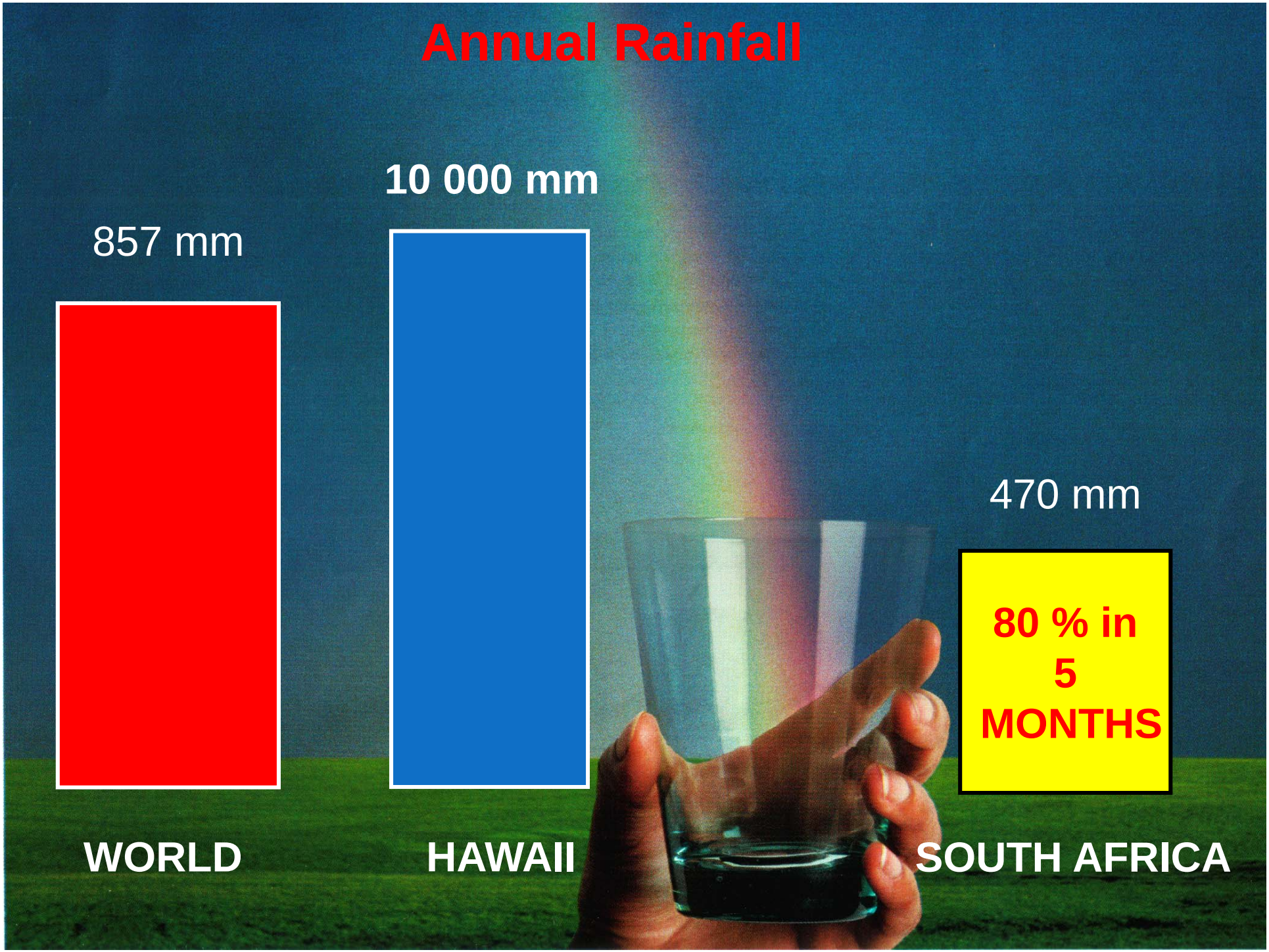
Rivka Kfir

Water Research Commission

South Africa

Global Water Scarcity




Annual Rainfall
857 mm
10 000 mm
470 mm
80 % in
5
MONTHS
WORLD
HAWAII
SOUTH AFRICA

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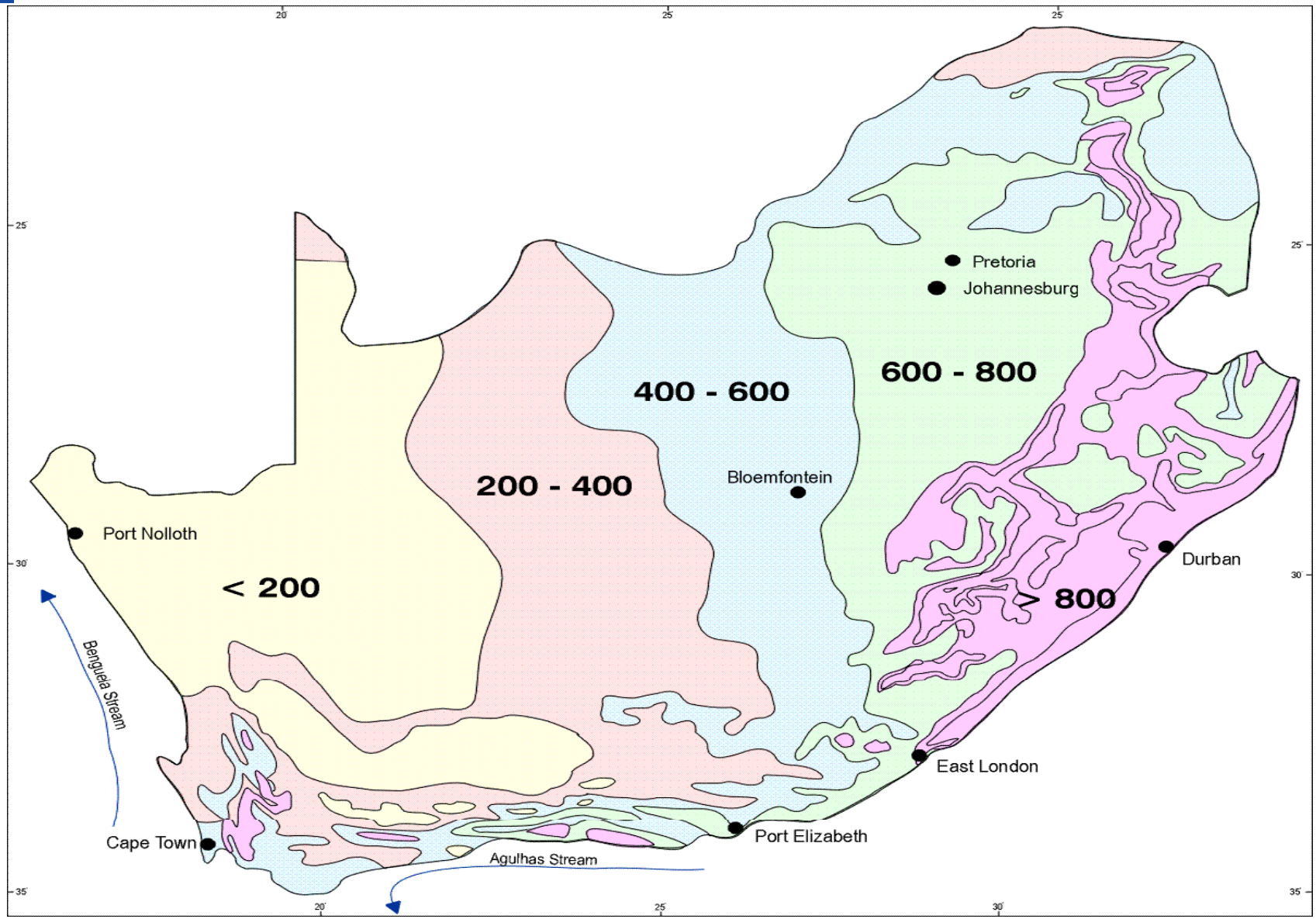
Distribution of Rainfall in South Africa



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In South Africa

- Low rainfall, which is not distributed evenly and high evaporation rates
- Only 8.6% of rainfall is available as surface water and groundwater resources are also limited
- In many catchments water demand exceeds supply
- Water scarcity is compounded by pollution of surface and groundwater
- Total Dissolved Solids (TDS) and Eutrophication are problematic

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South Africa Rural Reality - Livelihoods

- Rural population 19,9 (40%)
- More than half of the unemployed live in rural areas
- 22 million in poverty (70% in rural areas)
- 14 million people are reported to be vulnerable to food insecurity
- Livelihoods are insecure / risk averse
- Agriculture makes up 10 – 30% of livelihoods
- State grants / remittances main cash basis of rural livelihoods (dependency)
- Homestead gardens most important rural livelihood source for food security

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In South Africa

- About 77% of the water available originates from surface water, 14% from return flow and 9% from groundwater
- Water quantity - we need to
  - augment our resources
    - Storage
    - Reduce loss
    - Improved use
    - Recycling, reuse
    - Desalination
  - plan across sectors - water is crosscutting and is a limited resource
  - plan for growth in population (estimated annual rate of 2% will result in an increase from 47 million to 53 million by 2025); about 12% of the population i.e. 5.7 million need access to safe water supply
- Basic sanitation covers about 73% of all households
  - Wet sanitation – sewer requires water
- Climate change and energy issues

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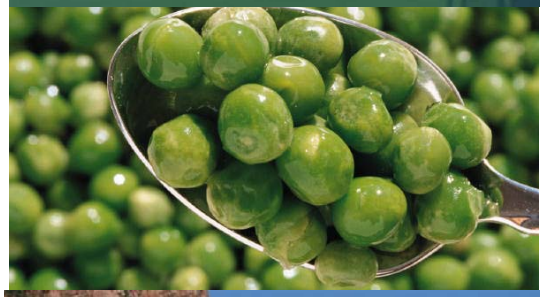
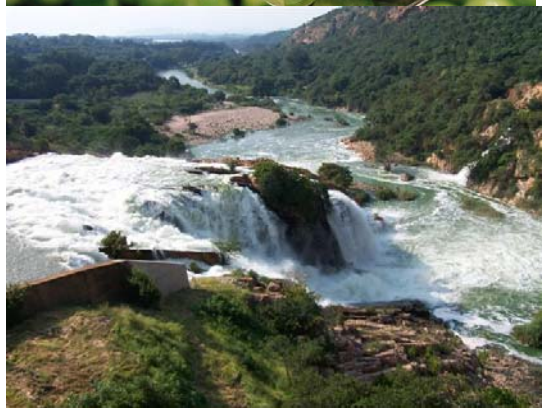
Hartebeestpoort Dam



Eutrophication

- Enrichment of natural eco-systems with Nitrogen and Phosphorus
- Secondary treatment processes were upgraded and retrofitted to also remove Nitrogen and Phosphorus.
- The Nitrogen removal processes typically involved denitrification.
- The Phosphorus removal processes involved chemical means (typically metal salts) or enhanced biological Phosphorus removal (EBPR).
- The new generation Nitrogen and Phosphorus removal processes were generically referred to as Biological Nutrient Removal (BNR) processes.

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Legislation

- **The National Water Act (Act no. 36 of 1998)**
  - **Provides the framework to protect water resources against over exploitation and ensure that there is water for social and economic development and water for the future**

Water resources	Water services
National responsibility	Local responsibility
National Water Act	Water Services Act

  - **Implementation**
    - **Development of a National Water Resource Strategy for the country as a whole**
    - **Catchment management strategy for a water management area (catchment)**
    - **Determine the reserve – basic human needs and ecological reserve**

The South African Constitution,1994

- Local municipalities are empowered to provide water and sanitation services through the creation of water supply systems, and waste-water and sewage disposal systems

The Water Services Act 1998

The Water Services Act provides a legislative framework for the rights of access to basic water supply and basic sanitation. It provides for the setting of national standards and of norms and standards for tariffs. The Act also provides for water services development plans as well as a regulatory framework for water services institutions and water services intermediaries

The South African Constitution,1994

- The Bill of Rights contained in the constitution emphasises the right of all South Africans to dignity (section 11), life (section 10), safe environment (section 24), and access to health care (section 27)

- The constitution outlines the responsibilities of local government to manage its administration, budgeting and planning processes to give priority to the basic needs of communities, and to promote the social and economic development of communities (section 153) with the support of national and provincial government

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Sanitation
Policy and Framework

Definition of sanitation

- *"Sanitation" refers to the principles and practices relating to the collection, removal or disposal of human excreta, household waste water and refuse as they impact upon people and the environment*
- *Good sanitation includes appropriate health and hygiene awareness and behaviour, and acceptable, affordable and sustainable sanitation services*
- *The minimum acceptable basic level of sanitation is:*
  - *appropriate health and hygiene awareness and behaviour;*
  - *a system for disposing of human excreta, household waste water and refuse, which is acceptable and affordable to the users, safe, hygienic and easily accessible and which does not have an unacceptable impact on the environment; and*
  - *a toilet facility for each household*

White Paper -Water Supply and Sanitation

- The White Paper on Water Supply and Sanitation Policy published in November 1994 highlighted the importance of establishing a national sanitation policy
- In 1994 - 18 million South Africans were lacking basic sanitation
  - This equals about three (3) million households

The White Paper on Basic Household Sanitation 2001

- **The paper became the national policy**
  - **highlight the impact of poor sanitation on health, living conditions and the environment;**
  - **articulate government policies on sanitation;**
  - **provide a basis for the formulation of local, provincial and national sanitation improvement strategies aimed at addressing the backlog;**
  - **provide a framework for municipality driven implementation programmes;**
  - **promote greater coherence and co-ordination amongst the different spheres of government and amongst other role players in addressing the sanitation problem;**
  - **ensure that sanitation improvement programmes are adequately funded; and**
  - **put in place mechanisms to monitor the implementation of this policy and sanitation improvement programmes so that corrective action can be taken when necessary.**

Principles

- **Following the principles expressed in the Basic Household Sanitation White Paper**
  - **it is essential for households to be key participants in the decision making process**
  - **Water Service Authorities must ensure that a demand responsive approach in that consumers are given service level choices with the knowledge of what the service levels cost**
  - **all tariff structures must take cognisance of free basic services and consumers must be informed of the health related aspects of sanitation which will require intensive communication processes**
  - **The strategy includes comparative costing of the various sanitation facility options**

Principles (cont.)

- Following the principles expressed in the Basic Household Sanitation White Paper
  - The technology choice must ensure consumer demand, which implies acceptance of the service level and willingness to pay the tariff, associated with that service level
  - Service should be viable, understanding of the environmental impacts of the sanitation choice and the technical feasibility of the facility
  - Establishing a tariff policy, which provides for free basic sanitation, is central to the success of arrangements to provide a free service effectively

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Strategic Framework for Water Services (2004)

This is a key document for the provision of water and sanitation services in South Africa, and provides the overall norms and standards, responsibilities, and key delivery targets and indicators for the water services sector (water and sanitation) in South Africa

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Free Basic Sanitation Policy

(under development)

Free basic Sanitation Implementation Strategy

- The right of access to a basic level of sanitation service is enshrined in the Constitution of South Africa
- Municipalities have an obligation to ensure that poor households are not denied access to basic services due to their inability to pay
- The aim of the Free Basic Sanitation Implementation Strategy is to guide Water Service Authorities in providing all citizens with free basic sanitation by 2014. The strategy is informed by the vision of sanitation for all.
- Given the challenges facing WSA's the household sanitation targets of the Strategic Framework for Water Services may not be met by 2010
- In lieu of this, a revised target has been set for 2014 whereby all people in SA must have access to a functioning basic sanitation facility

Free Basic Sanitation Policy (cont.)

(under development)

Free basic Sanitation Implementation Strategy

- There is a broader policy commitment by government to extend the free basic services to all households (aimed at poor households for whom free basic services represent a significant poverty alleviation measure)
- The concept of `free basic sanitation` is a controversial issue as international experience generally confirms that sanitation is a service, which, more than any other, requires the engagement of the consumer
- This engagement, and the associated benefit to health which improved sanitation brings, is best achieved if the consumer makes a contribution to the service
- Free basic sanitation means that consumers get the service without making contributions in cash or in kind with the exclusion of certain `on site` components of the facility

Funding

- Through the fiscus or Treasury
- Two grants provided:
  - Municipal infrastructure grant for capital
  - Equitable share for O&M

Benefits

- Political commitment
- Fiscus support
- Strong regulation of delivery
- Targets set in policy
- Aimed at the poor
- Providing basic sanitation
- Policy is well developed and enabling

Challenges

- A very strong supply driven approach
- Emphasis is on the engineering and the civil elements
- Lack of choices provided
- Large scale implementation
- Lack of community participation and acceptance
- No arrangements for O&M
- Monitoring of quality not well established
- One size fits all approach, no room for innovation
- Migration of Sanitation to Human Settlements Dept.

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Reuse of Wastewater in South Africa

- Indirect and direct reuse of wastewater forms an integral part of water resources management in South Africa
- Treated wastewater is extensively reused in the inland parts of South Africa
- Return flows from domestic and non-domestic activities typically occur as point discharges of treated effluent into a watercourse or as diffuse seepage that may occur from irrigated areas to a river

Estimated volumes of major return flows in South Africa (Basson, 1997)

Region	*Volume of return flows* (10^6 m^3/a)	*Reuse/No Reuse*
Northern	650	Re-use
Central	14	Re-use
Eastern Coastal	51	Re-use
	124	No re-use
Southern Coastal	51	No re-use
South Western	146	No re-use
Total	1036	$715x10^6m^3$: Re-use (69%) $321x10^6$ m^3: No re-use (31%)

Regulations

Box 4.1. GOVERNMENT GAZETTE (DWAF, 2001)

Regulation Gazette No. 7079

Vol. 432 Pretoria. 8 June 2001. No. 22355

GOVERNMENT NOTICE

No. R. 509

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

WATER SERVICES ACT, 1997

REGULATIONS RELATING TO COMPULSORY NATIONAL STANDARDS AND MEASURES TO CONSERVE WATER

The Minister of Water Affairs and Forestry has under sections 91() and 73(I) (j) of the Water Services Act, 1997 (Act No. 108 of 1997), made the Regulations in the Schedule.

Disposal of grey water

7. A water services institution may impose limitations on the use of grey water if the use thereof may negatively affect health, the environment or available water resources.

Use of effluent

8. (1) A water services institution must ensure that the use of effluent for any purpose does not pose a health risk before approving that use.

(2) Any tap or point of access through which effluent or non-potable water can be accessed, must be clearly marked with a durable notice indicating that the effluent or non-potable water is not suitable for potable purpose.

(3) A notice contemplated in sub regulation (2) must be in more than one official language and must include the PV5 symbolic sign for non-potable water as described in SABS 11 86: Symbolic Safety Signs: Part 1 : Standards, Signs and General Requirements.

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Reuse of Nutrients and Excreta

- There is no specific legislation for this
- Any reuse activity is guided by the Water Act and the specific legislation related to Reuse and Sludge management
- Because of our sensitive catchments and the need for return flows, it is not encouraged without meeting minimum requirements

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Guidelines for the Utilisation and Disposal of Wastewater Sludge

- Wastewater sludge management in South Africa is underpinned by rigorous research and stakeholder participation
- This has culminated in the release of a five volume series of wastewater sludge management guidelines, Guidelines for the Utilisation and Disposal of Wastewater Sludge, Volume 1 – 5
- These guidelines are suited to local conditions and focused on benefiting the economic, social, environmental and health aspects of South African society

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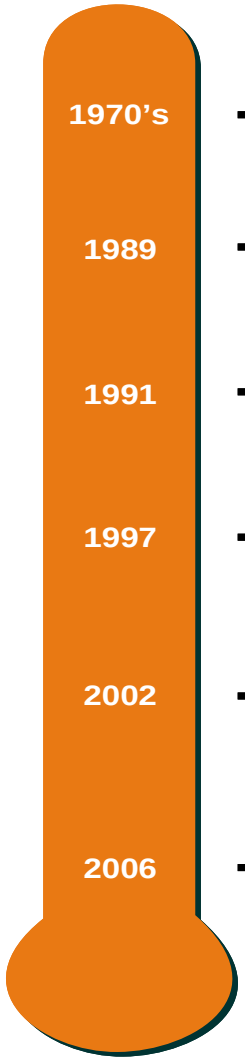
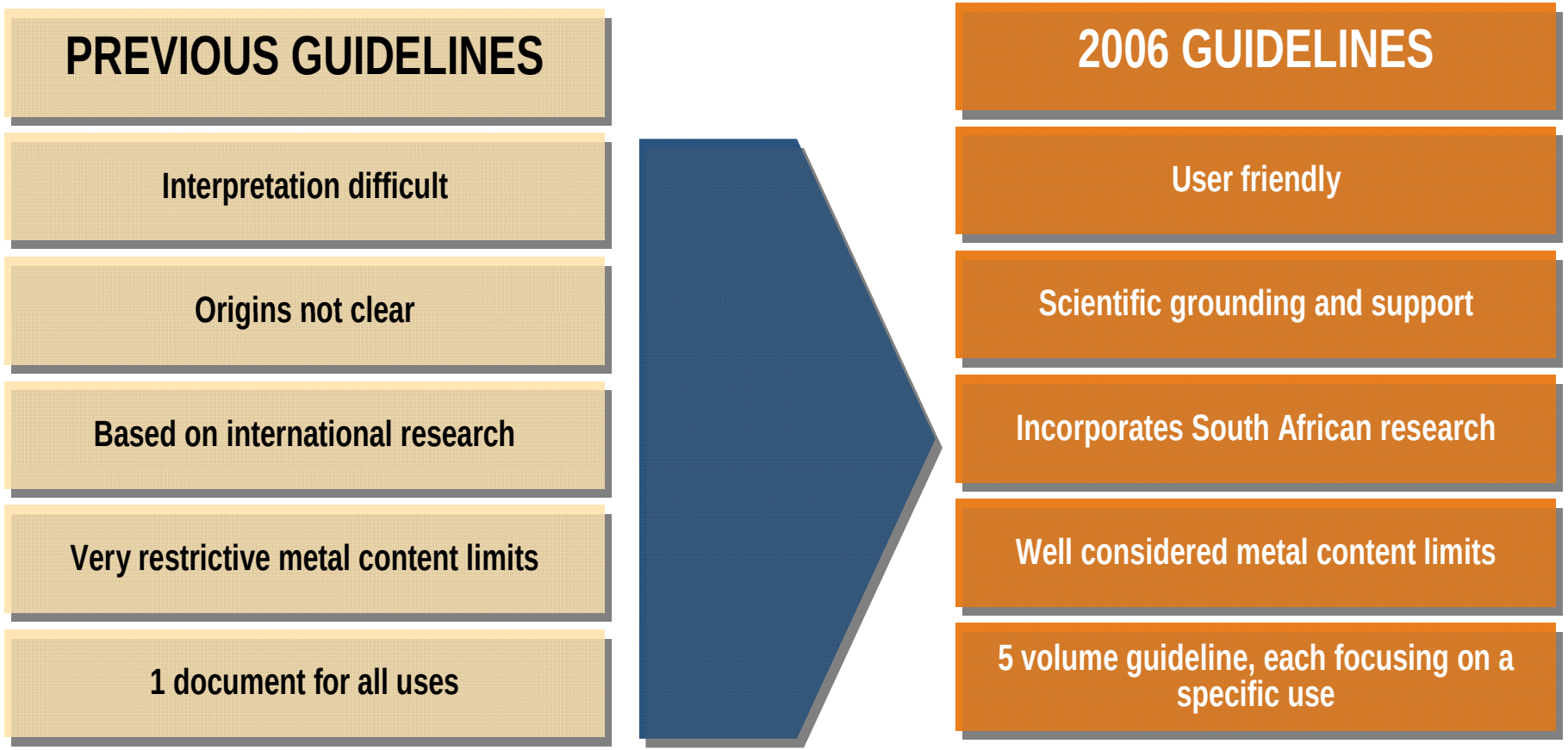
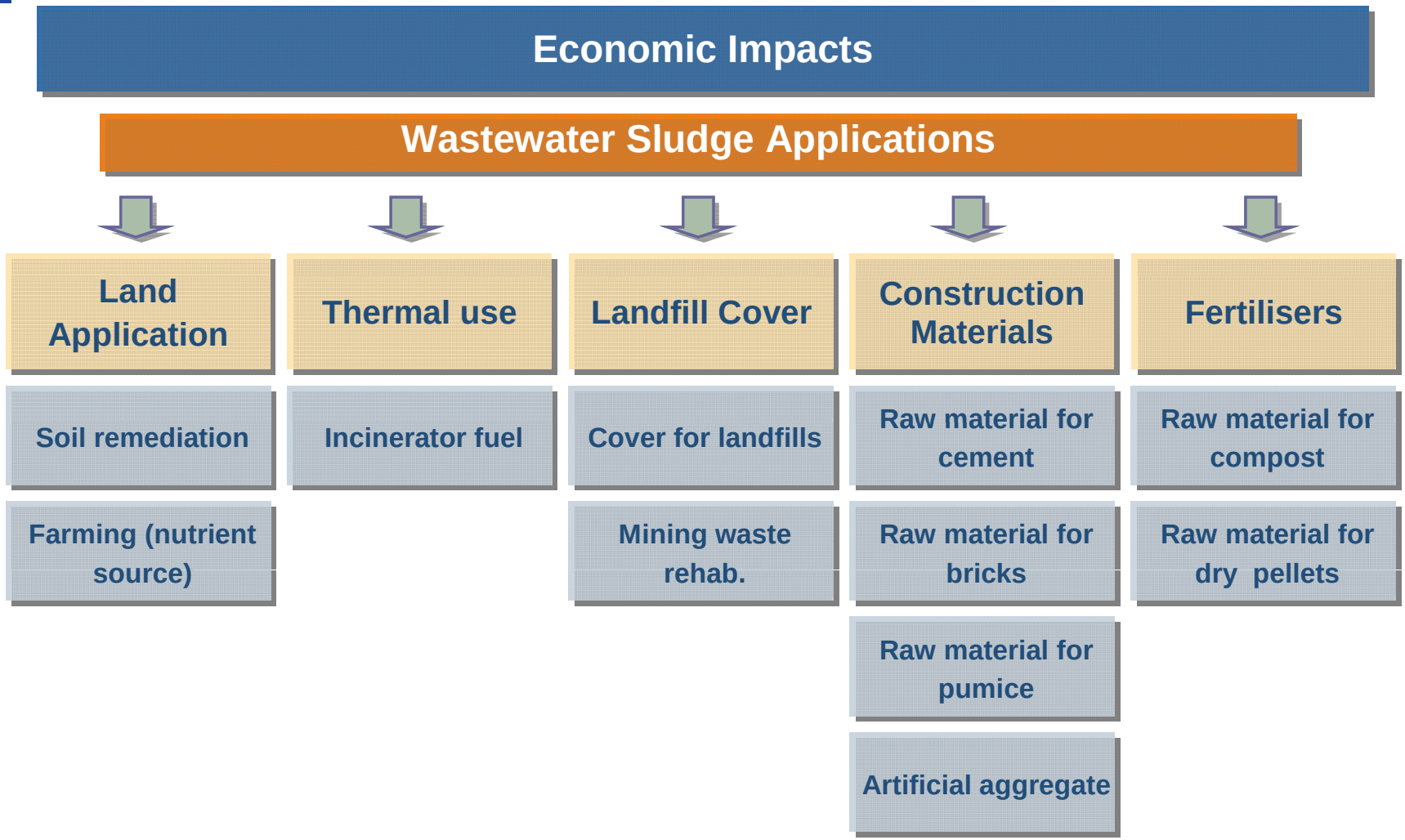
An Overview of Wastewater Sludge History in South Africa

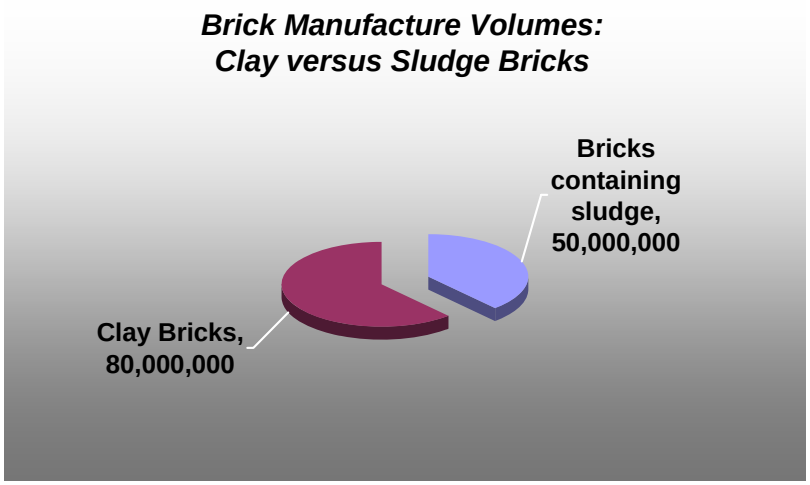
Wastewater Sludge Management History

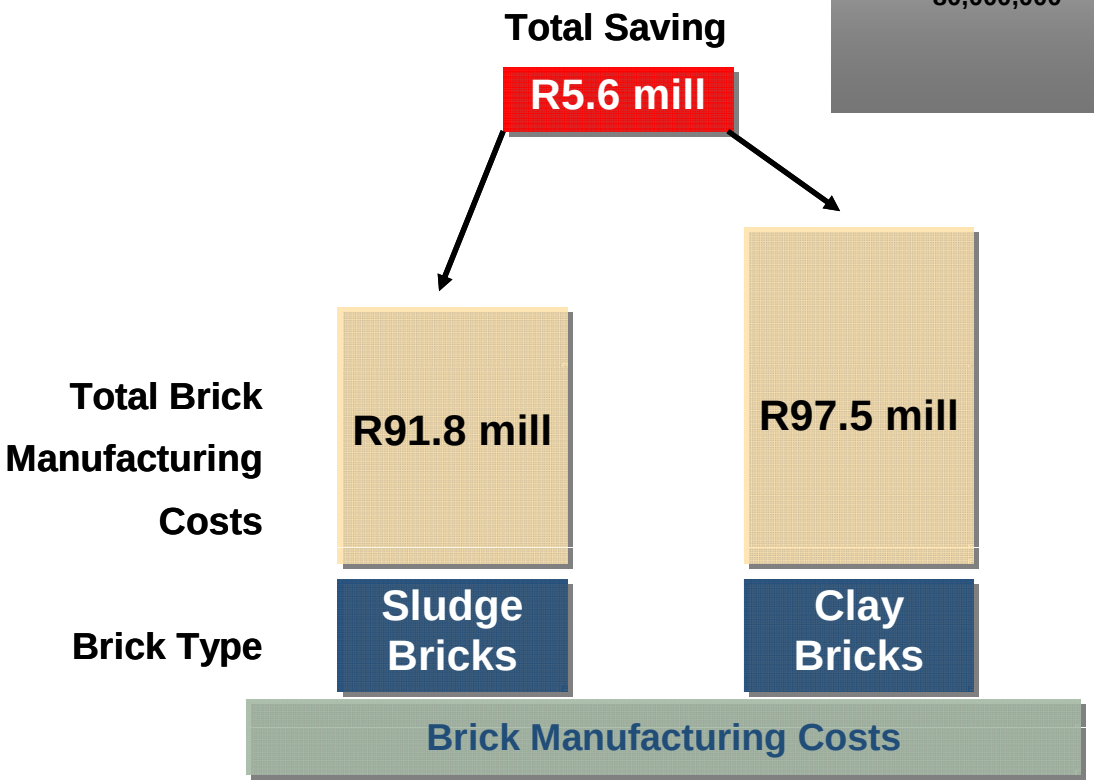


1970's	Section 20 of the National Health Act (63 of 1977) provided general provisions that in principle encapsulated the management of sludge, but included no specific sludge handling provisions.
1989	The Sludge Management Division of the Water Institute of Southern Africa released the, "Sewage sludge utilisation and disposal information document."
1991	The Department of Health published the, "Permissable utilisation and disposal of sewage sludge," which outlined permissible sludge applications with respect to land.
1997	The "Permissable utilisation and disposal of sewage sludge, Edition 1 ("1997 Guidelines") was produced with the aim to promote safe handling, disposal and the utilisation of sewage sludge.
2002	An addendum to the "Permissable utilisation and disposal of sewage sludge, Edition 1 ("1997 Guidelines") was produced because these guidelines were found to be too restrictive and wastewater treatment plants were struggling to comply with these recommendations.
2006	A focused analysis and review of the existing wastewater sludge guidelines was initiated in 2001. These results were collated and formed the basis for the latest set of wastewater sludge guidelines, "Guidelines for the utilisation and disposal of wastewater sludge, Volume 1 - 5."


PREVIOUS GUIDELINES
Interpretation difficult
Origins not clear
Based on international research
Very restrictive metal content limits
1 document for all uses
2006 GUIDELINES
User friendly
Scientific grounding and support
Incorporates South African research
Well considered metal content limits
5 volume guideline, each focusing on a specific use


Economic Impacts
Wastewater Sludge Applications
Land Application
Soil remediation
Farming (nutrient source)
Thermal use
Incinerator fuel
Landfill Cover
Cover for landfills
Mining waste rehab.
Construction Materials
Raw material for cement
Raw material for bricks
Raw material for pumice
Artificial aggregate
Fertilisers
Raw material for compost
Raw material for dry pellets


Brick Manufacture Volumes:
Clay versus Sludge Bricks
Bricks containing sludge, 50,000,000
Clay Bricks, 80,000,000


Total Saving
R5.6 mill
Total Brick Manufacturing Costs
R91.8 mill
R97.5 mill
Brick Type
Sludge Bricks
Clay Bricks
Brick Manufacturing Costs

Wastewater sludge has been identified as an effective raw material for fertiliser manufacture

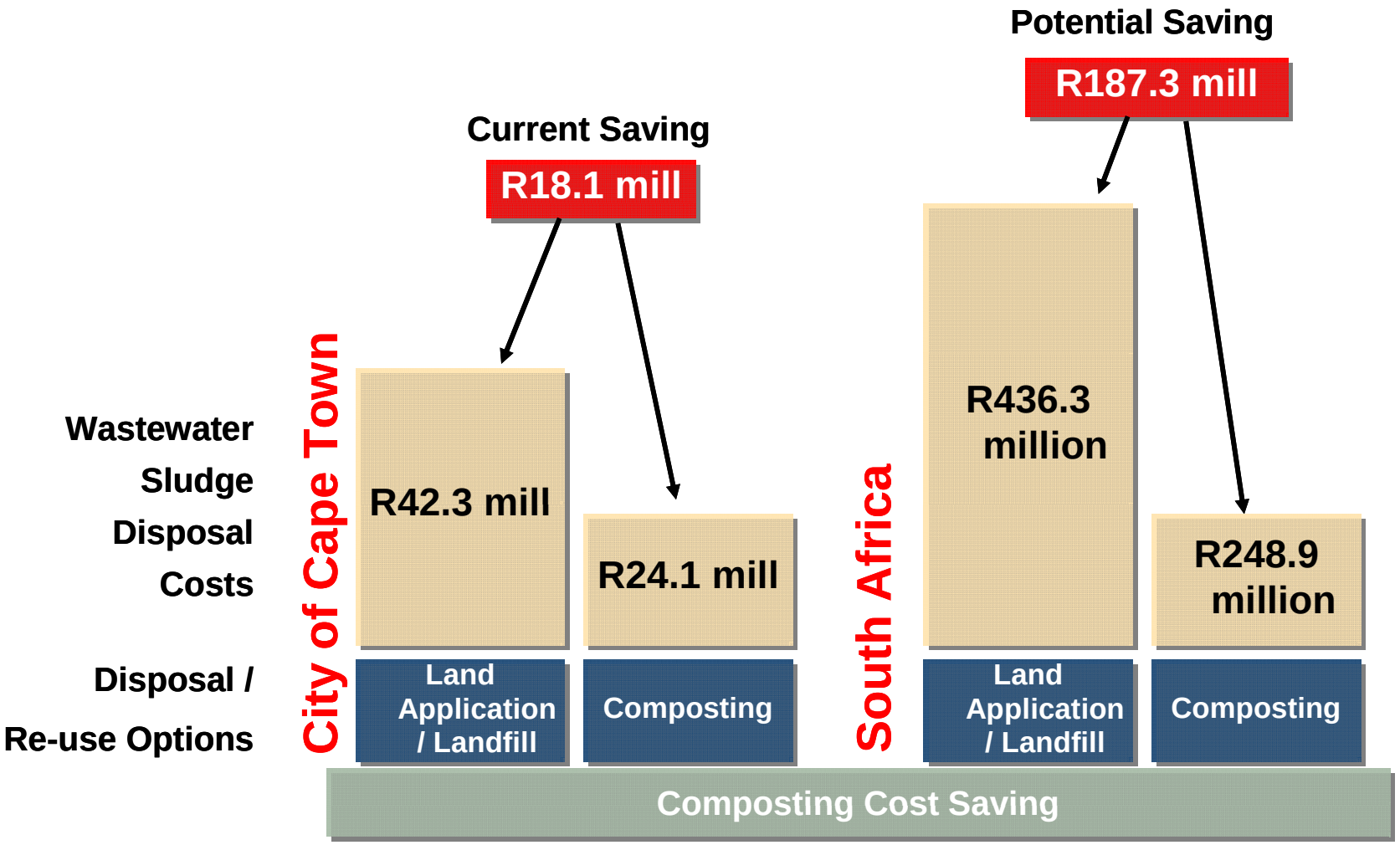
The City of Cape Town utilised approximately 20, 000 m^3 of wastewater sludge for the manufacture of fertiliser during the period June 2003 until July 2004

Wastewater sludge fertiliser products can be registered as quality grade agricultural fertiliser in South Africa

The pelletisation of wastewater sludge produces a dry and highly effective fertiliser product

Fertiliser Company Revenues		
Product	**Volumes**	**Revenue / annum**
Business 1		
Dry compost product	24 tons / day	R2.2 million
Compost land application	48 tons / day	R4. 3 million
Business 2		
Dry fertiliser product	10 tons / day	R600, 000
Total Revenue Generated		**R7.1 million**

Application	Dry tons per annum
Composting	**9120**
Land application – farming	**13440**
Land application – roll-on lawn	**192**
Pelletisation	**3420**
Total	**26, 172**


Potential Saving
R187.3 mill
Current Saving
R18.1 mill
Wastewater Sludge Disposal Costs
Disposal / Re-use Options
City of Cape Town
R42.3 mill
R24.1 mill
Land Application / Landfill
Composting
South Africa
R436.3 million
R248.9 million
Land Application / Landfill
Composting
Composting Cost Saving

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Farmers in the Swartland region of the Western Cape have struggled to produce profitable yields because of the soils low nutrient levels. The land application of wastewater sludge has significantly improved the nutrient and moisture content of these soils and farmers have been able to realise profitable yields from previously unprofitable areas. Land application requires careful management, but when applied correctly, as displayed in the photo alongside, the results are positive.

This field was not utilised for 12 years because of poor sandy soils and low crop yields. One application of wastewater sludge was successful and produced a good yield, as is evident in the photo.

The land application of wastewater sludge not only improves the nutrient content of the soils, but the moisture content levels improve as well.

This photo clearly depicts the superior plant and root stocks that can be achieved by utilising wastewater sludge for land application. The plant on the right hand side was grown in a field that was treated with wastewater sludge while the left hand plant was grown in an untreated field.

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Thank you for your attention