Water Crisis: Slaying the Dragon

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Overview

1. Symptoms
2. Common myths
3. Underlying causes
4. Slaying the dragon
5. Until the fat lady sings
Symptoms
Symptoms

Is there a dragon on the loose?
Q: Are we facing a water crisis similar to the energy crisis?

Answer: Yes!

Crisis committee

22 October 2008 (joint SAICE / WISA)

Snowballed since then

994th e-mail yesterday

Publicity
Supply/demand Mismatch

Supply
“Unless we do something about the current growth trends and needs, we are going to have a water shortage by 2013”

“But even with the fastest implementation, these [projects] will only be ready by 2019”

DWAF DG
Engineering News 26 September 2008
Supply/demand Mismatch

High demand + 15% WDM/WC
Supply/demand Mismatch

High demand + no WDM/WC
Water Supply Shortfalls

But, at WfGW Summit:

15% saving only at 1% p.a.
Supply/demand Mismatch

High demand + 1% p.a. WDM/WC growth

Effect of introducing 15% saving at 1% p.a.
Supply/demand Mismatch

So, Vaal system supply crisis?

- Right now, YES
- Until such time as:
  - Curtail water theft
  - Implement WDM/WC
Supply/demand Mismatch

Similar problems with Mgeni
Resource Theft

Theft
“... irrigation water use in the Vaal River System has increased by more than 100% between 1998 and 2005 for the area upstream of Vaal Dam alone.”

“Up to 240 million m$^3$/a of irrigation water use in the Upper Vaal WMA is estimated to be unlawful.”

“This has been a shocking discovery, and probably the main reason why the Vaal River System is currently in deficit.”

The Water Wheel May/June 2008
Resource Theft

Latest estimate 175 million m$^2$

Think incremental cost of LHWP

- Your water bill
- Handful of unscrupulous farmers costing us close on R1 billion p.a.!

Perhaps charge them for it?

- Cool R2 million p.a. for 50 ha centre pivot!
So, is resource theft a crisis?

- Compare with Mohale Dam
- Is 4 years acceptable?
Demand Management Failure

WDM
Demand Management Failure

![Graph showing annual demand (MCM) versus targeted reduction (%)]

- **Observed**: Black line
- **2000**: Pink line
- **2003**: Red line
- **2004**: Cyan line
- **2005**: Blue line
- **2007**: Red line (with arrow)

Y-axis: Annual Demand (MCM)
X-axis: Years (1994 to 2010)
Demand Management Failure

Causes:

- Water losses
  - Decaying infrastructure
Demand Management Failure

Local Authorities

- Huge crisis

(Photo’s removed of water burst and rusty manhole / fittings)
Demand Management Failure

- Private households
  - Just as bad
- e.g. Soweto

(Photo removed of connection to house)
Demand Management Failure

Causes:

- Water losses
- Inadequate budgets
Demand Management Failure

Gauteng WDM/WC requirements

R3 billion deficit

Current WDM funding in Gauteng
R 50 to R 100 million
Demand Management Failure

Causes:

- Water losses
- Inadequate budgets
- NWRS / WSDP mismatch
Demand Management Failure

- Planning assumes WDM/WC
  - NWRS

- LAs fail to implement
  - WSDP
Demand Management Failure

Supply

Implement

NWRS

WSDP
Demand Management Failure

Supply

Implement

NWRS

WSDP

WDM
Demand Management Failure

Holding it together:

- National Water Resources Strategy
  - Where is it?

- Water Services Development Plans
  - Are they being prepared?
  - Are they based on reality?
  - Are they addressing the critical issues?

Feedback?
Demand Management Failure

Causes:

- Water losses
- Inadequate budgets
- NWRS / WSDP mismatch
- Conflicting policies

DWA advocates WDM

Dept. Agriculture hands out hosepipes!
Decaying bulk infrastructure
Decaying bulk infrastructure

**Bulk infrastructure**
- Grootdraai Dam canal
- Tugela-Vaal canals
- Koppies Dam irrigation canal
- Where else?

**NWRIA** - to be running by 2008?
- Where is it?
Water Quality

Quality
Water quality

Water that is too polluted to use is as serious as no water!

This is beginning to happen in some areas:

- Vaal
- Crocodile
- Limpopo
- Fish / Sundays
Water quality
Water quality

Vaal Dam downstream of Villiers 30 January 2009
Water Quality

Enforcement is major challenge

- **Salinity and mine waste:** Huge economic cost
- **Eutrophication:** Economic cost / aesthetics
- **Biological:** Major health threat
- **Environmental:** Condition of resource

Waste water charge

- Why not implemented?
Water quality

Recent e-mail:

“I was at the Howick WWTW “outfall” into the Mgeni River today – looked like the effluent in an anaerobic digester – dark brown, thick and smelly. It flows through an informal settlement, which is about two paces away from the houses on either side of the torrent, which then disappears over the Krantz to meet the river after the scenic Howick Falls. I saw a child take a container and rinse it out in the “water”. Absolutely horrific!”

Judy Bell, 13 October 2008
Capacity / Skills Shortage

Capacity
Capacity / Skills Shortage

- Insufficient capacity
- Loss of key skills
- High turnover
  - For those we want
  - the duds stay for ever!
Capacity / Skills Shortage

Local Authorities

- 7-fold loss of engineers/technologists
- Infrastructure maintenance collapsing
- Demand management failure
- Water treatment failure
Management crisis
- Skills
- Corruption
- Political interference

Rates boycotts

Now strikes threatened
- E-mail No. 994
Trade union federation Fedusa on Wednesday warned South Africa was sitting on a water crisis "time bomb".

Citing "inadequate management and monitoring" by water service authorities, Fedusa said it had filed notice with the National Economic Development and Labour Council (Nedlac) of possible protest action.
Capacity / Skills Shortage

Middle Management Gap

DWAF, Water Boards, Metros
Middle Management Gap

- Top
- Middle
- Lower
Middle Management Gap
Middle Management Gap
Middle Management Gap

- Top
- Middle
- Lower

- Retirement, Industry
- Bursary repaid
- Bursaries
Middle Management Gap

Inappropriately qualified
Middle Management Gap

Result:

- Dilution
- Disillusionment
- Increased overhead
- Communication
- Gap remains
Middle Management Gap

DWAF: 250 engineering posts:

- Only 39% filled!
- Grds 8&9: only 6 of 45 posts!
- 47% of skilled staff retire within 10 years
Middle Management Gap

- Widening gap
- Managers becoming inaccessible
- Essential functions beginning to crack
- Water theft undetected for years, etc.

→ National crisis!
Common Myths
Common Myths

- “AMD tidal wave coming!”
- “The dams are full”
- “I’ll be retired by then”

for some this may be true
Underlying Causes
Education spiral
Education spiral

Year: 0

School

University entrance

Other Careers
Education spiral

Year: 0
School

9
University entrance

12
Maths
Literacy

95%
Teaching

Other Careers

Other Careers

Other Careers
Education

13 YEARS

Year: 0

School

7

University entrance

9

Maths

Literacy

12

CPD

16

19

Drop Out

13 YEARS

95%

Other Careers

Other Careers
Education Spiral

HDI targets not being met
- Maths and science teaching

Throttled by maths literacy

Even core maths undermined
- Now can elect not to do geometry!
- Grade creep (~25%): Wits 100 ➔ 270

> 13 years needed to ramp up output
Ah, but we’re working on it!
Education spiral

➡️ National crisis!
Slaying the dragon
Slaying the dragon

The art of prophesy is to motivate the actions that prove you wrong

e.g. Jonah

First step to rehabilitation:

Acknowledge / own the problem
Slaying the dragon

1. Supply / Demand:

- **Expedite:**
  - LHWP 2
  - Spring Grove Dam

- **Eradicate Water theft**
  - Water allocation
  - Legal ducks in a row
Slaying the dragon

1. Supply / Demand:
   - **Accelerate WDM / WC**
     - Political will
     - Funding (Provision + application)
     - Capacitate LAs
   - **Public cooperation campaign**
     - Educate into water efficiency
     - Maintain systems of indigent
   - **Produce NWRS and WSDPs**
   - **Coordinate message of departments**
Slaying the dragon

2. Water quality:

- **Central oversight**
  - Monitoring, reporting and feedback

- **Political will in LAs**
  - Awareness and prioritisation
  - Funding and control how it is used
  - Get rid of the duds

- **Regional intervention**

- **WDCS**
3. Infrastructure:

- Political will
- Funding
  - Control thereof
  - Ring-fence revenues
- Municipal boundaries
Slaying the dragon

4. **Capacity and skills:**

- Political will
- Remove political interference
- Effective recruitment
- Salaries (double)
- Working conditions
- Appropriate filling of posts
- Mentoring and “Re-treading”
5. Education:

- Revamp maths & science education
  - Repair maths syllabus
  - Eliminate “grade creep”

- Salaries of teachers / lecturers
  - Double salaries of competent maths and science

- Proper career guidance
  - At least from grade 9

- Raise the bar for teachers
  - High standards
  - Reward the best
  - Get rid of the duds
Slaying the dragon

‘We have to figure out how to reward really talented teachers and how to dismiss ineffective ones’

Sunday Times, September 13 2009
Reporter Christine Seib, quoting Zeke Vandeerhoek regarding US project to attract and retain the best teachers
Slaying the dragon

Other factors:

- **Prioritise**
  - Given capacity constraints, focus on priorities, not “nice to haves”

- **Simplify**
  - Parts of the NWA are too complex and need to be simplified to be feasible

- **Trim bloated bureaucracy**
  - e.g. DWA too many directorates
Until the fat lady sings
Until the fat lady sings

“Alles sal regkom”

“..as almal sy plig doen”
Until the fat lady sings

“The prudent see danger and take refuge, but the simple keep on going and suffer for it”

Proverbs 27:12
The End!