

## Emergency water demand management Beaufort West, South Africa

water scarcity impact

Reduced withdrawal	●
Reduced consumption	●
Improved water quality	●
Increased productivity	●
Net basin benefit	●

volumetric impact  
**730 000m<sup>3</sup>/yr**

capital cost  
**\$3 500 000**

estimated unit cost of water  
**40 ¢/m<sup>3</sup>**

**Water Stress**  
Beaufort West, South Africa

Arid & low water use
  Low (<10%)
  Low to med (10-20%)
  Med to high (20-40%)
  High (40-80%)
  Extremely high (>80%)
  No data available

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**Water Stress Map:**  
Gassert, F., M. Landis, M. Luck, P. Reig, and T. Shiao. 2013. "Aqueduct Global Maps 2.0."

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**Confidence level**  
 Low Medium High

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**Water Scarcity Impact Key**  
 Main Minor

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**Credits**  
 We wish to acknowledge the input of J. Smit of the Municipality of Beaufort West in the preparation of this case study.

### Project Overview

Beaufort West is a town with a population of 35 000 on the main road between Johannesburg and Cape Town. Average rainfall is only 265mm/yr with a high level of variability and given the town's heavy dependence on water stored in a single dam on an ephemeral river there was always the risk of a water crisis developing. By the end of the 2008/09 rainy season water reserves were low and in November 2009 the town's main water source, the Gamka Dam, ran dry. Causes contributing to this situation included low rainfall, uncontrolled water consumption (up by 44% in six years), insufficient planning and the high cost attached to new water resource development options. The critical situation forced action and by the time the town emerged from the crisis it had been transformed into a model of water conservation and demand management. By the end of the crisis two new pieces of water infrastructure had materialised; expansion to the existing small groundwater well field and most significantly a water reclamation plant designed to save up to 2 000m<sup>3</sup> of water per day or 28% of the town's overall water demand.

### Key Elements

- Sudden and deep water crisis acting as a catalyst for action including the raising of funds.
- Reduced water consumption through public awareness campaign.
- Reduced consumption through pressure reduction.
- Aggressive water tariff structure.
- Severe water restrictions.
- Water scheduling.
- Construction of waste water reclamation plant.

### Key Outcomes

- Addition of two new water sources to guarantee a stable water supply; groundwater and a waste water reclamation plant producing potable water.
- Change in the water conservation mentality of the townspeople including the acceptance of reclaimed waste water as a source of potable water.
- Improved management of the town's water resources.
- Country-wide awareness of the importance of water demand management and conservation in a water-stressed country.



Beaufort, South Africa

### Intervention Features

- Wastewater recycling for potable use
- Municipal leakage detection and repair
- Water tariff management
- Stakeholder engagement

### Project Levers

#### (1) Sudden and deep water crisis acting as a catalyst for action:

Water consumption had been increasing steadily in Beaufort West, by around 7% per year between 2001 and 2007. In addition, irrigation in the area had increased supporting an impression that water was relatively plentiful. This was despite the fact that step tariffs were in place to punish excessive use and regular awareness campaigns. Only when the Gamka Dam ran dry and the supplies to some consumers stopped completely did action start, firstly to overcome the crisis and secondly to put in place sustainable solutions for the future.

#### (2) Reduced water use through public awareness campaign:

A major awareness campaign was critical. It included the widespread use of pole mounted signs, pamphlets delivered to every household and extensive coverage in the local and national press and on radio and television. There were also regular community meetings and visits to schools to improve understanding and to catalyse action. The awareness campaign underpinned the other measures aimed at reducing consumption.

#### (3) Reduced water use through pressure reduction:

Water savings in the water distribution network of nearly 50% were achieved through the reduction of pressure in water delivered to 4 000 households. Reduction of the pressure from 5 to 1.5 bar resulted in leakage reduction by 45.6%.

#### (4) Aggressive water tariff structure and severe water restrictions:

The existing progressive step tariff was replaced by a “step drought” tariff in April 2009 followed by a much tougher drought tariff in July 2010. Consumers exceeding 15m<sup>3</sup> per month were faced with a surcharge of 200%. This was on top of a \$20 fine imposed in November 2009 for using more than 12m<sup>3</sup> in month which then rose to \$140 in June 2010. Consumers who used more than 35m<sup>3</sup> in a month were “named and shamed” in the local newspaper.

#### (5) Water scheduling and tanker service:

Water scheduling started in November 2010 as reservoirs ran dry and only 80% of the network could be serviced. One month later this was down to 65%. Water was cut for 48 hours for 2 000 households at a time and a tanker and bottle service was put into operation. Empty beverage and food tankers on the Johannesburg-Cape Town route were filled with water for Beaufort West. Up to 450 000m<sup>3</sup>/day, were pumped directly into the network. Despite frequent burst pipes, water demand was reduced by 59% compared to the previous December.

### Outcomes and Challenges

The main outcome of the crisis was the construction of a waste water reclamation plant for potable water with a capacity of 2 000m<sup>3</sup>/day. With this in place in January 2011, 28% of the current demand of around 7 100m<sup>3</sup>/day could be met. The relatively high cost of this water could be accepted by the consumer because of the awareness of the value of water that the crisis had created. This awareness was the other main outcome of the crisis. The challenge will be to maintain this awareness now that a much less precarious water supply situation has been established. This includes the establishment of a groundwater well field able to supply more than half of the town’s demand for short periods of time as required.



Above: Water reclamation Plant; Gamka Dam on 18 November 2011 (© JCL Smit)