

## Emergency measures in response to drought crisis

São Paulo, Brazil

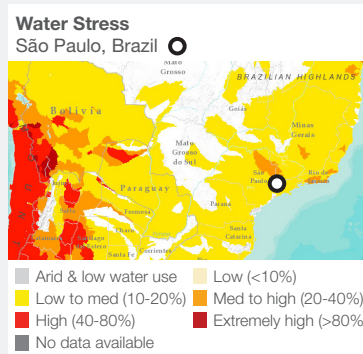
### water scarcity impact

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

volumetric impact  
**600 000 000 m<sup>3</sup>/yr**

programme cost  
**\$ 165 000 000**

estimated unit cost of water  
**5 ¢/m<sup>3</sup>**



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

**Confidence level**  
● Low ● Medium ● High

**Water Scarcity Impact Key**  
● Main ● Minor

**Credits**  
We would like to acknowledge We would like to acknowledge Monica Porto of the State Water Resources and Sanitation Department and Dante Pauli and Jerson Kelman of Sabesp for their input in the preparation of this case study.

### Project Overview

In 2014 Brazil's largest city, São Paulo, experienced the worst drought on record. The city is serviced by six separate dam systems. Cantareira, the largest of these, serves ten million people in the Metropolitan area which is 50% of the total population. During the 2014 drought, available flows were half those experienced in the 1953 drought, previously the worst on record.

In response the city's water company, Sabesp, undertook major works on the water supply system including interconnecting the six major dam systems and reducing pressure throughout the distribution network. The company also launched an incentive scheme to reduce the household water use. Overall, these actions reduced use in the Metropolitan area by 600 000 000 m<sup>3</sup>/year.

The majority of investment required was provided by Sabesp with some loan financing by the Federal Government and the International Bank for Reconstruction and Development (IBRD).

### Key Elements

- Demand management measures in the form of discounts to consumers who demonstrated a reduction in water use.
- Pressure reduction across the distribution network.
- Intra-catchment transfers and new low level intakes to improve security of water supply.

### Key Outcomes

- The discount incentive scheme reduced domestic water use by 19% amounting to 270 000 000 m<sup>3</sup> per annum.
- Pressure management in the pipe distribution network reduced use by 23% amounting to 330 000 000 m<sup>3</sup> per annum.
- Through the series of interventions implemented, Sabesp is able to match water supply and demand. However, this position is fragile and further interventions are required to ensure the long term water supply.



São Paulo, Brazil

## Intervention Features

- Municipal leakage detection and repair
- Tariffs and incentives
- Pressure management in municipalities
- Water metering in municipalities

## Project Levers

### (1) Economic Incentives

The following discounts were automatically applied to consumers' water bills:

- 30% discount for households with a reduction in use of greater than 20%.
- 20% discount for households with a reduction in use of 10-20%.
- 10% discount for households with a reduction in use of up to 10%.

### (2) Water Metering

All households in São Paulo are metered. This provided Sabesp with the baseline required to monitor reductions in household water use.

### (3) Pressure Management

Volumes of non-revenue water were reduced by replacing old pipes, altering water pressure, and providing guidance on the appropriate installation and management of water meters.

### (4) Financing

The required interventions were almost entirely funded through Sabesp's reserve funds. The Federal Government and IBRD provided some loan support.

### (5) Intra-catchment transfers

The Cantareira catchment was particularly affected by the 2014 drought. In order to reduce demand from the dam, seven intra-catchment transfers were established. As a result, the population served by the Cantareira dam was reduced by 50%.

## Outcomes and Challenges

Water supply in São Paulo is in a fragile state of equilibrium with the supply and demand balance heavily reliant on the return of normal levels of precipitation. The dam system currently holds less than four months' reserves. Should São Paulo experience an additional drought year in 2015, it is likely that further measures will be required.

Rainfall in 2014 was 300-400 mm below normal levels causing reservoir levels to fall to between 3-5 % of storage capacity and below the intake level. Sabesp is currently pumping water from below the intake level in order to access reserves.

Pressure management in the water distribution network has led to problems across São Paulo. Many consumers on the top floors of high rise buildings no longer receive water at sufficient pressure for practical use. Building owners will need to address this issue, altering their water supply systems to function according to the new water pressure.

Approximately three million people in São Paulo live in informal settlements and their water use is unaccounted for. Understanding and managing this source of non-revenue water is important for Sabesp's overall future resource planning.

In addition to the large scale investments required, Sabesp's revenue has decreased as a result of the reduced water use of domestic customers. This has impacted the company's financial stability. Net profit fell by almost two thirds from 2014 to 2015. In June 2015, the São Paulo Regulatory Agency authorised an increase in Sabesp's water and sewerage tariff of 15.2% in order to recover some of the investment made during 2014.



Above: Dried out bed of the Cantareira dam system (©Sabesp)