SUSTAINABLE INFRASTRUCTURE: PUTTING PRINCIPLE INTO PRACTICE

GUIDING PRINCIPLE 2: RESPONSIVE, RESILIENT, AND FLEXIBLE SERVICE PROVISION

Infrastructure planning and development should be based on a good understanding of infrastructure service needs and informed by the diverse options available to meet those needs. This includes understanding and managing the changing demand, and meeting needs through renovating or rehabilitating existing infrastructure before investing in new infrastructure. Systems-level planning of infrastructure projects should promote synergies for improved connectivity, which can lead to improved productivity, efficiency, sustainability, and spill over benefits of investment. Flexibility and resilience should be built into infrastructure plans to allow for changes and uncertainties over time, and plans should be updated.

CASE STUDY: CITY WATER RESILIENCE APPROACH: CAPE TOWN'S 2015-2018 DROUGHT

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Location: Cape Town, South Africa

Organization: Arup

Partners: Arup, Stockholm International Water Institute (SIWI), 100 Resilient Cities, Alliance for Global Water Adaptation (AGWA), Organisation for Economic Co-operation and Development (OECD)

Donor: The Rockefeller Foundation & The Resilience Shift

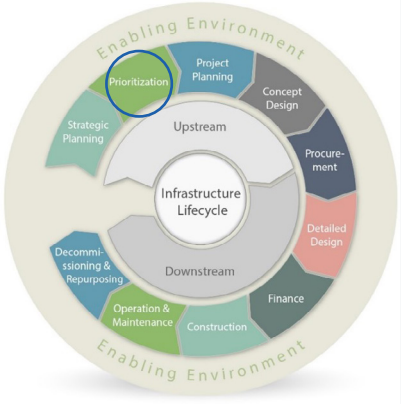


Photo: Empty dam near Cape Town, South Africa. Shutterstock

Need for Infrastructure Project/System:

Ensuring reliable access to water for all city residents has long been a challenge for Cape Town, South Africa, due to highly variable rainfall and the lack of a municipal water management plan and coordinated water governance system. Demands on water resources and infrastructure have further increased in recent years due to population growth, heightened economic activity, the invasion of exotic plant species, and increasing weather variability due to climate change. Cape Town's water situation hit crisis conditions as it entered a historic three-year drought beginning in 2015. By early 2018, the city almost reached "Day Zero," the point at which the city's municipal water supply would need to be shut off if action were not taken immediately. This crisis point was averted through a number of immediate initiatives by the City, primarily by managing demand through increased local awareness of the need to cut water usage, but it was evident that a more comprehensive response was needed.

Project Description:

The City Water Resilience Approach (CWRA) (see Figure below) was introduced in 2018 to help Cape Town build resilience capacity into its municipal water system. The CWRA exercise focused on addressing the ongoing drought as well as long-term planning to ensure the provision of high-quality water resources for all residents and protection from future water-related hazards.

The CWRA exercise began by assembling information on Cape Town's natural and manmade water assets to provide a full understanding of Cape Town's water system, including water governance. This information was used to provide a spatial analysis of the city's shocks and stresses. Next, over 120 Cape Town stakeholders from a wide range of sectors came together to create a framework to understand the city's water resilience strengths and challenge areas for improvement. The final framework covered 60 qualitative indicators and 40 quantitative indicators. Finally, through a visioning workshop, CWRA brought stakeholders back together to develop actions to respond to these challenge areas. They focused on figuring out who could lead and support each action, immediate next steps, costs and benefits, and measures of success.

As a result of this planning process and its input into wider action by the City on building resilience, Cape Town developed a Water Strategy: Our Shared Water Future – with the goal of making Cape Town a "water sensitive city" – and an associated implementation plan.

The Water Strategy helped Cape Town to survive its ongoing drought without the threat of reaching another Day Zero crisis point. The city's response comprised both increases in supply and reductions of demand. Water use through restrictions on household and business water use (including losses) reduced by over 40%. On the supply side, Cape Town initially explored large supply schemes, but the timeframes for delivery were not feasible. Instead, three temporary desalination plans were commissioned alongside additional abstraction from existing aquifers, as well as a water recycling plant.

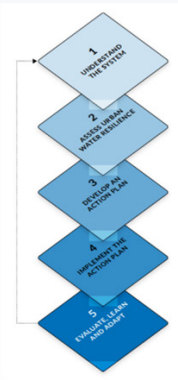
The City Water Resilience Approach was initially developed with eight cities including Cape Town and is now being implemented across six African city regions. Its particular strength is the involvement of all stakeholders to create shared understanding and a common governance model.

Challenges to Making Infrastructure Sustainable

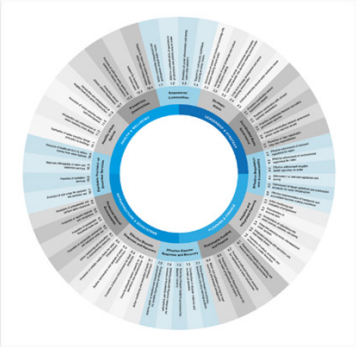
Technical and/or Programmatic Challenges– There was a lack of understanding of the catchment/basin (e.g. hydrology, water supply, urban and rural consumption patterns, etc.) and its governance (e.g. institutional roles and responsibilities). This limited the ability to address water stressors and shocks equitably and effectively.

Governance and/or Political Challenges– While household behaviour change is difficult, it is achievable with the right mix of incentives, restrictions and trust.

Financial and/or Economic Challenges – Water resource pricing and financing mechanisms must align with the necessity of reducing water consumption. The language used to change behavior matters: the "Day Zero" campaign affected enormous reductions in demand but at a cost to the city's reputation and economy.



City Water Resilience Approach



City Water Resilience Framework

OurWater Governance Tool

Figure: The five steps to city water resilience

Outcomes and Lessons Learned:

- Transparent and open communication with the public during crises is essential for building trust.
- Participation, especially for underserved or vulnerable communities, helps to gain a shared understanding of the challenges and build a foundation for shared action plans.
- Adaptability and creativity of the private sector in responding to crises can be leveraged to bring significant reductions in their own consumption, as well as influence behaviour changes among supply chains, staff and customers.

For Further Information:

- Sustainable Infrastructure: Responsive, Resilient, and Flexible Planning webinar recording (starting at 33:25)
- The Resilience Shift. (2020). Cape Town Water Resilience Profile (CWRA).
- The Resilience Shift. City Water Resilience Approach
- United Nations Environment Programme. (2021). International Good Practice Principles for Sustainable Infrastructure. Nairobi