

# **Groundwater Assessment and Management for Sustainable Water-Supply and Coordinated Subsurface Drainage**

*A Guidebook for Water Utilities and Municipal  
Authorities*

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# Preface

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Groundwater beneath cities is important. Water utilities and private abstractors use it as a secure source of water-supply, and municipal authorities have to cope with it when using underground space for buildings, facilities and transportation infrastructure. However, these agencies often pay little attention to groundwater once their wells are installed or subsurface construction is completed. This Guidebook aims to highlight what water utilities and municipal governments can do to improve groundwater assessment, management and monitoring to avoid many ‘nasty surprises’.

Groundwater, especially from deeper aquifers, is a critical resource for enhancing urban water-supply security under climate change stress. But to achieve its use sustainably will require effective promotion of an appropriate level of adaptive resource management and protection, according to local circumstances. Moreover, groundwater conditions at shallower depths are an essential issue when it comes to sound sanitation planning.

In recent times, municipal governments have made much more use of urban subsurface space (especially down to 15-metres depth) for construction – notably of deep basements, vehicle parking spaces and transportation routes. Traditionally the drainage and stability of such structures was achieved through individual site investigation and design, but today a more coordinated approach is needed to manage shallow groundwater conditions. And these conditions are often aggravated by a rising shallow water table due to the urbanisation process itself and as a result of the impact of climate change.

This **Guidebook** is divided into three complementary parts:

- **Part A is intended primarily for the guidance of managers, engineers and scientists in water utilities, water resource agencies and municipal sanitation**, working to improve urban water-supply resilience, with its inevitable requirement to get more involved in groundwater management. Part A is divided into two sections, which deal respectively with undertaking essential diagnostic procedures and with formulating strategic actions.
- **Part B is intended primarily for guidance of engineers, planners and managers in municipal government authorities** working to improve the design and execution of subsurface urban infrastructures to avoid potentially-costly subsurface drainage issues, structural instability and groundwater flooding problems arising from shallow and/or rising water tables. Part B is divided into two sections which deal respectively with the characterisation of problems and with essential steps in taking more integrated action.
- **Part C presents a series of 6 city case histories of groundwater management actions**, identifying the key issues that needed attention in each case and the institutional arrangements that facilitated action being taken.





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