

# Managing urban water under stress: the case of Sana'a, Yemen

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## Abstract

Lack of water management in the Sana'a Basin in Yemen has led to mining of groundwater and massive groundwater quality deterioration. In the last four years, management of wastewater has changed dramatically and entire city neighborhoods have been connected to a conventional sewer system. In this paper, the effects of this measure on long-term groundwater quality development of the aquifers underlying Sana'a and, more specifically, on water quality of the public supply peri-urban wellfields are analyzed. The results, obtained with a transient groundwater model, indicated that by 2020 the construction of the sewerage will have considerably reduced the area polluted by groundwater, but the process is slow. Furthermore, construction of the sewerage will hardly affect the groundwater quality of the wellfields, since flow is not directed towards most of the production wells. The Yemeni authorities should realize that less expensive sanitation alternatives are available, but they need user participation, which, in turn, would raise public awareness that water supplies and sanitation are not to be seen as solely a government responsibility.

*Keywords: urban groundwater, waste water management, ground water pollution, pollution control, sustainable water use, groundwater modeling.*

## 1 Introduction

The effects of wastewater infiltration (primary or secondary, diffuse or as a point source) on groundwater quality have been studied at various locations. One of the major problems with on-site sanitation is nitrate pollution of the

