

Urban groundwater

Groundwater protection and management in developing cities

by **Brian Morris**, *Wallingford*

It is predicted that, by 2010, half the world's population of 6500 million will live in towns or cities. Much of the increase will be concentrated in the developing world, which accounted for 85% of urban population growth between 1980 and 2000. The result is that, by the year 2000, about twice as many people were living in cities in developing countries (1900 million) as in the developed world (950 million). A high proportion of these urban dwellers depend on groundwater for day-to-day domestic, industrial, and commercial water supply.

The inexorable expansion of the world's urban population and the realisation that water resources are finite have forced a rethink by the authorities in some developing cities. With more than 150 countries signed up to Agenda 21, the manifesto which emerged from the 1992 Earth Summit in Rio de Janeiro, municipal authorities need to consider how sustainability can be introduced into their plans for infrastructural improvement, for example in developing their own Local Agenda 21 plans. Cities dependent on groundwater should feel this need most keenly, yet the pace of urban aquifer management remains slow. As a result, despite the apparently straightforward techniques required, for the hundreds of such cities in middle- and low-income countries, an aquifer protection policy developed locally to help a particular municipality manage its groundwater resource remains an unusual exercise.

It is against this background that a collaborative research project supported by the Department for International Development (DFID) was initiated in 1998 with partner organisations in

Kyrgyzstan (the Kyrgyz Scientific and Research Institute for Irrigation) and in Bangladesh (University of Dhaka).

The aims of the project have been to demonstrate the development of an aquifer protection policy using the two case study cities of Bishkek, capital of Kyrgyzstan, and Narayanganj, a growing city near Dhaka in Bangladesh. Experience from these case studies will inform guidelines to be developed by the BGS that other cities can use to develop sustainable management of their aquifers.

The key initial element of any such study is to develop an understanding of the groundwater setting and how the

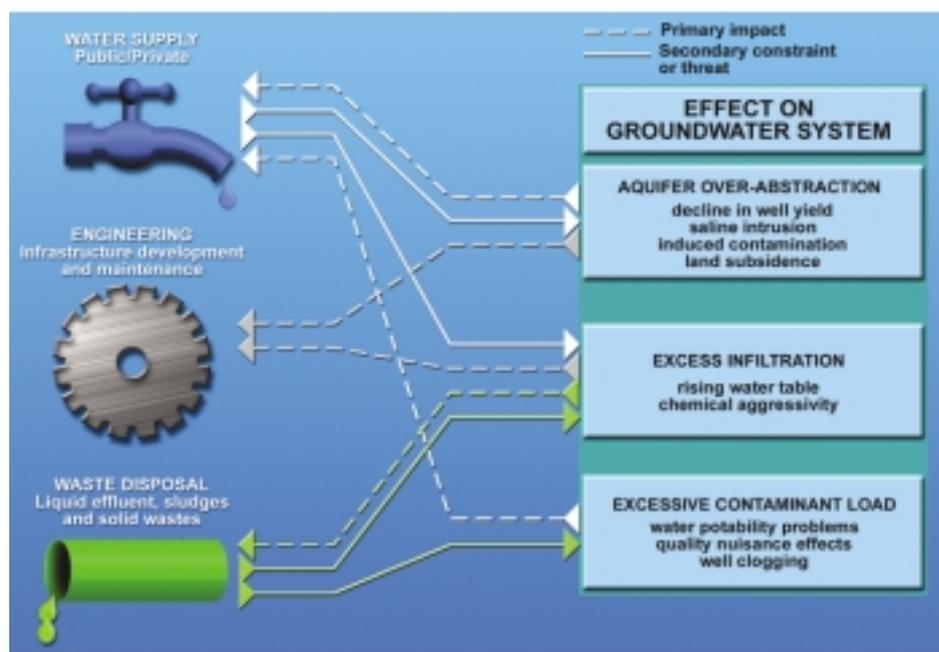
city's water supply, wastewater, and solid waste disposal infrastructure interacts with it. Then simple tools of groundwater pollution risk assessment can be applied. Maps showing aquifer vulnerability and potentially contaminating activities are often helpful aids in this process; together they provide the key visual aid of a groundwater resource planning map.

This is the starting point for the important process of engaging groundwater stakeholders — those individuals and institutions that are concerned with, or have an interest in, the city's groundwater resources and their management. Stakeholder analysis is also helpful, because no aquifer protection policy is likely to be successful without the support of key stakeholders who, by their nature, may have very different interests in the urban subsurface.

Together with such stakeholders, simple and sustainable aquifer protection policies appropriate to the city's own developmental, socioeconomic and hydrogeological setting are developed to guide urban decision makers.

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Stakeholder interaction through different urban services and facilities dependent on the underlying groundwater system.