Relevance

Sustained population growth has placed an enormous burden on global water supplies. In many regions, rapidly expanding cities requiring water for drinking, sanitation and industry compete with the agricultural sector that requires water to provide the very same burgeoning cities with adequate food. Groundwater is a particular concern as it represents over 95% of the world’s available fresh water reserves and continues to play a major supply role in many of the world’s cities. It is estimated that over 1.5 billion urban dwellers currently rely on groundwater and this number is likely increasing due to the generally modest cost of water-wells and the close, “well’s length” proximity of the resource.

Within 20 years, the global population is projected to rise from 7 billion to 8 billion with this entire growth taking place in urban areas. By 2050, the world’s urban population is expected to reach 6.3 billion at which time the world’s urban population will be the same as the world’s total population in 2004. Most of the growth will occur in developing countries, where relatively well-serviced population centres are surrounded by expanding stretches of under-serviced suburbs and peri-urban slums where groundwater is often the only source of water supply. Some peri-urban settlements support as many as 70% of the city population, many living in abject poverty with squalid, sub-standard, housing and no security of tenure. Since there is no international agreement on how to define “urban” limits, many suburban and peri-urban areas remain seriously neglected when it comes to urban planning and the provision of adequate water services. In many cases, there is simply no urban planning at all. Without the planning of urban space and infrastructure, opportunities to provide adequate water and sanitation services are seriously compromised. Left unaddressed, urban slums threaten both national and international security, human health, and environmental sustainability.

Scope

This thematic paper examines urban-rural tensions and opportunities for co-management. Focusing on rapidly growing cities in low- and middle-income regions of the world, it provides a macro view of how urban-rural tensions develop, and how appropriate structures of governance can reduce conflict and eliminate, or at least ameliorate, the problem. Discordance over water is no stranger to the urban environment and the addition of a rural dimension adds an unwelcome level of complexity to the task at hand. Studies in India suggest that conflicts typically arise due to:

- Quantity, with conflicts developing between sectors or users (e.g. agriculture vs. domestic; municipality vs. industries or private users; urban vs. peri-urban or rural).

1 This “digest” summarises the key findings of a more comprehensive review article that provides full acknowledgement to source materials. As such, the digest is intended for internal use only. It should not be distributed as a stand-alone document.
Quality, with conflicts arising from the threat of water that is unsafe to drink.
Access, with conflicts over water rights, price or simply physical accessibility to a water source.

In many respects, the rural-urban interface represents a veritable breeding ground for water conflict as it often forces into co-existence groups with diverse socio-cultural backgrounds and disparate needs and ambitions. Moreover, many of these groups tend to be informal and marginal. They lack community structure, have few legal rights and enjoy little or no political representation. As a result they are deprived of institutional support that could respond to their needs.

**Constraints and key things to know**

History shows that where urban water delivery services are positively planned, centralised systems of water service approach often fail. Where countries have adopted a “decentralised” approach, these have shown mixed success with affluent residents often enjoying significantly better access to water services than the poor or those from rural areas. In many cases, decentralization has failed because financial resources have tended to remain at the central level and the transfer of important decision-making responsibilities to district and village levels has not been followed by the transfer of funds for essential capacity development.

A compounding problem in the global effort to supply growing cities with adequate water services has been the failure to show respect for the fundamental differences that exist between surface water and groundwater as sources of supply. The “global urban water crisis” has been high on the global water sector agenda for more than twenty years and the lack of good water governance has been frequently cited as an underlying problem in urgent need of attention. However, virtually all the debates on global water policy that have raged at international water meetings in recent decades have remained transfixed on surface water issues with the role and importance of groundwater frequently ignored. Integrated Water Resources Management (IWRM) and its multi-faceted, integrative approach to water systems management has been widely publicised as the solution to the world’s water issues, but has not served us well in the urban areas of the world. This is because IWRM gives very little recognition to the vital function that groundwater plays in the global water cycle and the immense benefits that could be derived from the improved management of groundwater. A failure to recognise the unique and special attributes of groundwater represents one of the lost opportunities of IWRM.

To some extent, the neglect of groundwater reflects an “out of sight, out of mind” mentality which has promoted ignorance for water movement in the subsurface. However, neglect has also arisen because groundwater and surface water systems are spatially distinct and, in terms of water flow velocities, operate on totally different time scales. Reasons aside, the unfortunate consequence is that tools for urban water management rarely, if ever, incorporate an adequate understanding of aquifers either during the analysis stage or, just as importantly, during the subsequent management decision-making. For example, groundwater resources are highly dependent upon land-use in the main ‘aquifer recharge areas’ such that any change in land-use can significantly affect both the rates and quality of recharge. This means that groundwater governance cannot be adequately addressed without considering the processes that determine land-use. In urban areas land-use classification and control are generally the domain of municipal or local government, and the absence of mechanisms whereby water resource agencies can influence the process is a frequent governance weakness. Similarly, groundwater supply for many urban areas is obtained from peri-urban well fields such that rural land-use practices and the intensification of agricultural production (largely controlled
by national agriculture and food policy) exert a very strong influence on groundwater recharge rates and quality. There are currently no established procedures or incentives for the resource interests of an urban municipality to be assumed and maintained by a neighbouring rural municipality, such that adequate protection can be offered for the capture area of the external wellfield.

**Prospects and key recommendations**

Some excellent work has been conducted on groundwater governance during the past ten years, notably by the World Bank's Groundwater Management Advisory Team (GW-MATE) and others. This work has raised the profile of groundwater in the political arena and drawn attention to the widespread use of groundwater in many of the world's most impoverished cities. It has also provided blueprints for building appropriate governance structures, the parties involved and the various roles that must be played. These blueprints are founded on a realisation that current problems with urban groundwater management will be resolved only if governments work in association with groundwater users rather than attempting to regulate and control them.

Good urban groundwater governance and the development of appropriate groundwater management action plans must begin with a fundamental understanding of the resource setting. The resource setting will include both the hydrogeological conditions (aquifers, recharge rates, economic reserves and vulnerability to pollution) and the socio-economic situation (demand, users, and groundwater-use drivers such as well construction costs and energy subsidies). In turn, a sound knowledge of the resource setting will lead to the identification of various management measures related to:

a) the supply side (e.g. recharge augmentation and conjunctive use);
b) the demand side (e.g. water use tariffs), and
c) sustainable water quality (e.g. aquifer vulnerability mapping and pollution pressure control in well head protection areas).

It is essential that the technical capacity to deliver the necessary knowledge base is in place. National governments need to ensure state/provincial/municipal level agencies receive adequate funds to hire and retain the well trained professionals required to perform the necessary work. Whichever model of governance is adopted for urban groundwater management, there can be no substitute for a sound knowledge and understanding of the aquifer system.

Ultimately, good governance and the successful implementation of urban groundwater management plans require the establishment of appropriate institutional frameworks. These would normally include departments and agencies at the national and/or state level working interactively with regional and city governments. The latter would normally be obliged to help execute national/state policies while assuming various degrees of responsibility for the provision of water services and the development/implementation of water management plans. Many institutional models can be found and clearly, there is no “one-size-fits all”. GW-MATE operational experience lends favour to a decentralised approach to groundwater management that includes effective stakeholder participation. They warn, however, that attempts to modify legal provisions and organisational arrangements for groundwater governance can be politically difficult and time consuming, and suggest that in many cases a pragmatic, dual pronged approach is required that seeks to forge progress within the existing framework, while working in parallel on appropriate legal reforms.
Since a primary goal of groundwater management is to influence the behavior of individual groundwater users and potential polluters, the value and importance of stakeholder participation cannot be overemphasised. It is a critical instrument of groundwater governance in the broader sense and is especially appropriate in urban settings. This is because:

- Top-down management decisions taken unilaterally by regulatory agencies without broad social consensus are often impossible to implement; stakeholders need to feel a sense of ownership in groundwater management plans and share in the responsibility for all decisions that are made.
- Important groundwater management activities such as monitoring, policing and tariff collection can be carried out more efficiently and more economically through cooperation.
- Stakeholder participation facilitates the integration and coordination of decisions relating to groundwater resources, land use and waste management.

Very few groundwater-dependent cities obtain adequate water supplies from within city limits, but those that do have a dire need to maximise the quantity of the available resource while safeguarding water quality. Unfortunately, there is all too often a vacuum of responsibility and, therefore a lack of accountability, for urban groundwater. At best, responsibility for the sustainability of groundwater supply is divided between a number of organisations, none of which is normally willing, indeed capable of taking the lead necessary for coordinated management action. Typically these organisations include municipal water-service utilities, provincial/state government water-supply and public-health engineering departments, central and/or provincial/state/basin groundwater resource agencies and environment protection/pollution control agencies. Municipal water-service utilities are usually best equipped to handle the engineering of waterwell construction and operation, but rarely show interest in understanding and managing the resource base. It means that the criteria for waterwell siting and construction are normally based on efficiencies of cost and are not considered in terms of optimal use of the groundwater resource. It is often said that “urban groundwater tends to affect everybody, but is the responsibility of ‘nobody’.” This clearly needs to change. A much more integrated approach to urban water-supply, mains sewerage provision and land-use is required to avoid persistent and costly problems. It is important that solutions to issues in one sphere do not simply create problems in another.

Most groundwater-dependent cities are ultimately reliant on external aquifers over which they may have little, if any, jurisdiction or influence. Recognising the huge demand for groundwater in rural areas to meet agricultural needs, an unhealthy competition for the resource is emerging in many towns and cities, with those living at the rural-urban interface (RUI) and in peri-urban areas at the heart of the conflict. Not surprisingly, there are two diametrically opposed perspectives to this urban-rural issue and there is an urgent need for cities to work with peri-urban and rural communities to ensure that resources are adequately protected and that the needs of all parties are adequately met. While this can be achieved to some extent by broad stakeholder participation, the ultimate challenge will be to develop aquifer management plans that provide for rural-urban co-management. While co-management of urban and rural groundwater is a worthy goal with many potential benefits for all users, this would need very significant reform of current institutional arrangements together with a closer re-alignment of management objectives. Important first steps should include increased public awareness, concerted dialogue amongst stakeholders and data-sharing between agencies that have an interest in water management. The starting point for co-management and the resolution of urban-rural tension is co-operation.