

# Foreword

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## BACKGROUND

While most of us now live in places called cities, our experience of city or urban life varies profoundly according to how wealthy we are, our age, gender, class or ethnic background, and whether we live alone or as part of more extensive family and kinship networks. Of course these factors also shape our experience of life in other non-city settings, but the urban dimension is significant to the extent that Louis Wirth (1938) spoke of 'urbanism as a way of life'. However we define them, our cities have been growing because increasing numbers of people choose to live in them: they choose to move to them from other places and they choose to remain in them (Glaeser, 2011). This is not of course to suggest that these choices are always freely made or free from significant constraints, but cities continue to offer the prospect of a better life than other places and while the precise nature of this prospect varies over time and between places, it usually involves a series of material benefits that do not exist or are much less prevalent elsewhere. As Saunders observes in his book, *Arrival City* (2010), migrants from rural areas in developing and fast-growing countries are attracted to cities because of the economic opportunities they offer and by material benefits such as reticulated water, reliable power supply, public transport, decent housing and maybe also by more ephemeral and cultural attractions. The fact that for many recent migrants to the rapidly growing cities of the world these opportunities and benefits are not as accessible as they had hoped does not typically deter subsequent migrants or prompt many migrants to leave cities in general, even though they might move to another city.

The promise of access to safe, reliable and proximate supplies of water has always been a major factor in the attractiveness of urban areas and cities (Mumford, 1961) and, somewhat paradoxically, the inability to provide this often provides a vivid illustration of the failure of urban systems, especially in those parts of cities where recently arrived migrants tend to cluster. The failure to provide potable water, to dispose properly of storm and wastewater, and to protect against flooding in the *favelas*, slums and shantytowns of rapidly growing cities represents one of the

most visible manifestations of the broken promise of urbanism. In their work to develop valid and reliable indicators of poverty and deprivation, Nandy and Gordon (2009) include measures of sanitation (for example, no access to toilet facilities of any kind) and reliance on surface water sources (that also require walking more than 30 minutes to access them) as two important indicators of the threshold of 'severe deprivation'. Although extreme poverty and deprivation tend to be especially prevalent among rural populations in developing countries, they are increasingly clustered in parts of cities, including in parts of cities of the so-called 'developed world'.

So, effective provision of the full range of water services has always been an important element in making cities attractive places to move to and to remain living in (Troy, 2008), as well as in determining the extent of poverty and deprivation within them. Water in cities has therefore always had both negative and positive connotations and the amenity value of water in cities is becoming increasingly significant, especially in cities of the developed world. Whereas we once built our cities on rivers and coasts because of the dominance of water-based modes of transport and the need to maximise the value of this mode in exporting and importing goods and products, urban development now tends to be driven more by the perceived recreational and amenity benefits of water frontage. In many cities, additional water frontage has been created by the construction of canals as part of large scale residential developments: my home city of Gold Coast in South East Queensland, Australia boasts a more extensive network of canals than Venice and this type of water frontage is estimated to add to the value of a residential property (Benson et al., 2000). However, as the likelihood and measurable impact of flooding increases as a consequence of climate change, so this water frontage premium is likely to diminish and may at some point have a negative impact on the value of property.

Demands made on municipal governments to protect riparian and coastal property from processes of erosion and inundation, exacerbated by climate change, are likely to persist at the same time as planning restrictions on urban development in these areas are resisted. A recent report of the problems facing the Indonesian capital, Jakarta, show the multi-dimensionality of contemporary urban water management where one part of the city faces a growing problem of more frequent and severe flooding as a result of sea-level rise, while another is having to deal with reduced water supply from local bores as groundwater is extracted as part of the process of rapid and extensive urban development (Roberts, 2012). As with most forms of urban development, there are costs and benefits associated with any new development and the distribution and experience

of them is also uneven. In overcrowded cities it can be difficult to resist development pressures even when they are in flood-prone areas. The short-term benefits enjoyed by some, including developers taking profits and residents having somewhere to live, may well be outweighed by the long-term costs experienced by those same residents who eventually have to deal with the costs of flood damage and by municipal governments faced with the high costs of post-disaster recovery.

Researchers are not immune from these pressures and we can be reasonably certain that studies on flood risk and the detailed mapping of its likely impact within cities will remain a politically contentious exercise in which many seem to prefer to follow 'when ignorance is bliss, 'tis folly to be wise'.

Historically water has always been a source of significant urban conflict. Often this conflict has been over the control of waterways and seaways, driven by strategic concerns over access or its denial. The Suez Canal crisis of 1956–57 is one of the best illustrations of this type of conflict in recent times, while port blockades have throughout history served as important elements of wider conflicts and wars. However, freshwater conflicts in and around cities are even more commonplace as access to and the control of potable water supplies lies at the heart of the processes of urbanisation, of the governance of cities and of urban politics more generally. Roman Polanski's 1974 film, *Chinatown* captures vividly the deadly politics of the so-called California Water Wars in the first quarter of the twentieth century (Kahrl, 1982) and illustrates also how these conflicts in many respects divide between those around the competition for scarce water resources – as in the western states of the USA – and the management of unwanted water in the form of floods and stormwater, more prominent on its eastern seaboard and Gulf states.

These conflicts are, of course, common in many other countries of the world and have been for centuries. In its wide-ranging review of urban water conflicts, the International Hydrological Programme of UNESCO (2006) distinguished between economic, environmental, social and political manifestations of these conflicts and showed how some are typically more prevalent in certain cities than in others. For example, in Buenos Aires conflicts tended to focus on the economic challenge of charging market rates to supply potable water to an urban population of which a large number could not afford pay such rates; in many Indian cities the conflict is more often about scarcity and the quality of water supplied to urban populations; while in many European cities debate and dispute tend to be around the environmental impacts of urban water supply on surrounding catchments. The social or public health consequences of poor-quality urban water supplies represent important problems for

urban governments in most cities of the developing world and occasionally for those of developed world cities as well. Across the world, perhaps the biggest political challenge is posed by the existence of different jurisdictions and by the incompatibility of administrative boundaries with those based on more natural processes, such as a water catchment. In some cases political tensions arise from what we might call the vertical arrangement of jurisdictions. The Australian federal system in which local, state and commonwealth governments each have a slightly different interest in water management provides a good example of the challenge of vertical integration. Horizontal conflicts on the other hand typically occur between equivalent jurisdictions, be they within or between countries. Again Australia offers a good illustration of the competition between states that control different parts of the Murray-Darling Basin, while the Jordan River Basin represents a more long-standing site of water conflict between the countries of Israel, Syria, Lebanon and Jordan and the West Bank under the control of the Palestinian Authority.

The International Hydrological Programme of UNESCO (2006) has identified at least seven sources or forms of conflict over water, although again the pattern of these varies substantially in different urban settings. These seven forms of conflict help frame an important research agenda for a better understanding of how to create more sustainable urban water environments.

### **The Extent, Quality and Continuity of Drinking Water Services**

The remarkable achievement of most developed countries in providing reliable supplies of safe drinking water to all urban households is testimony to the successful combination of infrastructure engineering, a welfare economic regime that ensures this supply is affordable to most urban households and the application of a set of water quality standards that have minimised the incidence of water-borne diseases. There are of course growing problems of affordability, not least as a consequence of urban populations accepting that potable water can and should be used for a range of activities (for example, flushing toilets, washing cars, watering lawns and gardens and so on) that do not require that quality of water. As personal and household habits change in ways that often result in greater water consumption – showering daily, washing clothes and kitchenware daily in machines, operating swimming pools and so on – so the demand for urban water continues to grow. At the same time the ability to meet this demand is becoming compromised by the changing rainfall patterns associated with climate change and hence the storage capacity of natural aquifers and man-made reservoirs.

There are encouraging signs though, for example during the recent drought in South East Queensland, Australia, significant reductions in household rates of water consumption were achieved with relatively little public protest or anxiety and even though dam levels are now high and a regional water grid completed, low consumption targets have been maintained and achieved.

Future research is needed on ways of promoting and securing behaviour change in relation to water consumption, exploring a variety of mechanisms including price and direct charging as well as non-market mechanisms including visible consumption monitors.

### **The Extent and Quality of Wastewater Collection and Treatment**

Municipalising the collection and treatment of wastewater usually marks a significant moment in the evolution of any city. While individual and commercial approaches can work well in some circumstances, they typically struggle to cope with the externality effects of those who cannot afford to or choose not to use these services and simply dump their wastewater (and usually other waste material) to the detriment of the wider environment and the public as a whole. The intensification is associated with urban growth and increases with residential densities which in particular usually call for more collective approaches to the management of wastewater. Subsequent challenges include the ability to scale up these facilities, especially in the face of rapid growth, and to begin to consider the uses to which treated wastewater can be put. Again research is needed on the perceptual and behavioural dimensions of wastewater reuse, especially if it is to supplement potable supplies. Bio-chemical research is also called for to explore potential productive uses of wastewater as part of the treatment process.

### **The Control of Urban Stormwater**

Processes of urbanisation invariably involve the transformation of pervious landscapes into impervious environments in which all precipitation becomes something that has to be managed through drainage systems. This presents fiscal as well as engineering problems for municipal governments and while it may sometimes seem that cities in developed countries are better able to cope with these problems, the fiscal challenge of paying for such infrastructure can be considerable. Existing research into the capacity of stormwater management systems to cope during prolonged periods of low rainfall is important and should be extended, not least in exploring the capacity for city-wide systems to become

more decentralised at certain times as climatic and other environmental factors demand.

### **The Environmental Impact of Cities on their Surrounding Catchment Areas**

As the film *Chinatown* illustrates, cities are rarely self-sufficient in water and there is, therefore, an inevitable political dimension to managing water catchments and supply at a regional (and often international) scale. City governments must engage politically with their neighbours and often also with other tiers of government to plan and manage supply and especially to deal with the environmental impacts of such accommodations beyond their jurisdiction. The research agenda required is both long term and wide-ranging as many of the impacts of aquifer depletion or of dam construction will not become apparent for some time or within the relatively arbitrary boundaries of municipal or regional governments.

### **Financing of Investment in Water Technologies and Infrastructure**

As mentioned above, the fiscal challenge of paying for essential urban infrastructure, including water systems is one of the greatest problems confronting contemporary urban governments. In times of neo-liberal logic, the case for collectivising the costs of services that benefit all can be difficult to establish, especially when a strong imperative exists to minimise local taxation and public expenditure unless it is self-evidently and uncontroversially supportive of economic growth. Similarly, the promise of privatisation has seen much of urban water infrastructure come under the control of corporations whose primary obligation is to their shareholders rather than to the wider urban citizenry. While these arrangements can deliver high-quality services, affordability can become a problem and open the door again to the public health dangers of less than wholesale access to good quality urban water services.

### **Charging, Tariffs and Cost Recovery**

There is always a cost to providing urban services and it is an important task for urban governments to determine how best to recoup those costs. Some methods are closely linked to consumption patterns, for example in the metering of domestic water consumption with charges made according to usage, while others are not as in the case of water rates being paid according to the rateable value of a property. In some cases the effects of consumption-based charges are mitigated according to need or ability to pay, in others the inability to pay leads to an inability to consume.

With water consumption this can, however, have wider social impacts, which might be judged unacceptable. For example, it might be deemed unacceptable for a household to be disconnected from an urban water supply system if this meant that toilets could not be flushed or standards of personal hygiene not maintained. In essence, a greater public good in this case is considered to outweigh the tolerance of an individual's inability (or perhaps even disinclination) to pay. Research on metering and charging systems that are capable of making subtle distinctions between individual consumers is needed, as well as on the epidemiological impacts of small numbers of individuals or households not participating in water consumption regimes that offer both individual and public health benefits.

### **The Freedom of Urban Dwellers to Use (or not) Urban Water Services**

In addition to the public health consequences of enforced or voluntary non-participation in urban water services, there is an economic dimension. The provision of large scale, citywide water infrastructure is expensive and in order to benefit from economies of scale it is often imperative that all residents participate in both the consumption of the service and the payment or charging regime. Allowing individuals to opt out can undermine the financial viability (or perhaps profitability) of the arrangement, although the argument against opting out is often couched in public health rather than economic terms. Research within the framework of behavioural economics is needed to explore the extent to which individuals and households can be persuaded to remain within municipal or collective systems of provision and how they might be persuaded to do so.

### **Summary**

Against this research agenda this book sets out to tackle many of the problems and issues raised. It does so on three fronts: first by establishing the importance of urban water environments in rapidly growing cities; second by considering and evaluating the risks presented by climate change and population growth in particular to the achievement of sustainable urban water environments; and third by putting forward strategies that offer the prospect of creating more sustainable environments, including the development of more effective infrastructure for managing stormwater.

This book will not be the last word on the myriad challenges facing urban governments in trying to create more sustainable water systems in their cities. However, it makes an important contribution to contempo-

rary debate in this field, combining empirical rigour and serious scholarship with practical policy proposals and is welcomed for rising to this challenge.

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