

**UN HABITAT**  
FOR A BETTER URBAN FUTURE

**Already today, half the world's population lives in urban areas. By the middle of this century all regions will be predominantly urban, with the tipping point anticipated to be reached in Eastern Africa slightly after 2050.**

This unprecedented urban expansion poses an array of critical, water-related challenges, from access to basic services to environmental and human security. Urban expansion directly affects water availability and quality, as growing cities have a greater per capita demand for water and tend towards unwieldy institutional setups. This can often result in pollution and a mounting exposure to water-related disasters and health risks (WWAP, 2009b, p. 1).

But despite the continuing growth of megacities – which require natural resources and create waste in quantities not seen in human history – most of the world's urban populations live in cities with fewer than 500,000 inhabitants. The growth of these small and mid-size cities will have significant impacts on water resources in coming decades. And while access to water supply and sanitation services in most established or formal urban areas is believed to be better than in rural areas, most of today's urban growth is occurring in informal urban areas, where residents have little access to safe drinking water or to adequate sanitation services, increasing the danger of water- and sanitation-related diseases. (WWDR3<sup>1</sup>, p. 31).

1. WWDR3: World Water Assessment Programme, 2009a. The United Nations World Water Development Report 3: Water in a Changing World. Paris, UNESCO and London, Earthscan.

*Messages for urban mayors, leaders and high-level decision makers*

# Water

## for sustainable urban human settlements

Safe drinking water and adequate sanitation services are vital to human health. They offer other important benefits as well – some easily identifiable and quantifiable, such as costs avoided and time saved, as well as other less tangible benefits that are more difficult to measure, including advantages in terms of convenience, increased well-being, and personal dignity, privacy and safety.

In cost-benefit analyses, the major benefits of improving access to water and sanitation derive from the time savings associated with the closer location of facilities. Easy access translates into increased production, higher school attendance and more leisure time.

Freshwater ecosystems support food production and the production of goods such as textiles for clothing, as well as economic and recreational activities including navigation (WWDR3, p. 91). They regulate environmental flows, purify wastewater and detoxify wastes, regulate climate, provide protection from storms, mitigate erosion and offer cultural benefits; in particular aesthetic, educational and spiritual.

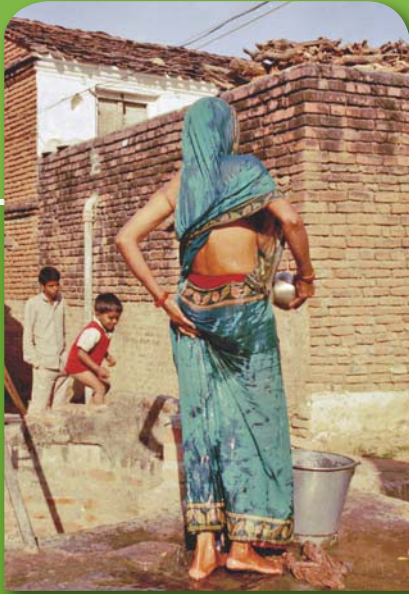
An investment in the water sector is an investment in all the MDGs, not just Target 10. The impact of water sector investments directly targeted at poor consumers is anything but subtle. A safe water supply immediately improve people's health and saves them time, which they can use for studying or improving their livelihoods so that they can earn more, eat more nutritiously, enjoy healthier lives, and contribute to the local (and national) economy. In addition, improved sanitation protects the poor from socially and physically degrading surroundings, health risks, and exposure to dangerous environmental conditions.

### Key messages

Over the past few decades, several regions of the world have experienced notable progress in various aspects of water management, including improving access to water resources and related services. However, rapid population and economic growth, urbanization, and the underperformance of existing water assets mean that there are still significant shortfalls in meeting these needs.

Today, half of the world's people live in urban areas, and urban populations are still growing rapidly in many regions. Integrated water resources management strategies, and strategies to respond to water-related risk, are vital. These growing urban human settlements cannot become sustainable without ensuring reliable access to safe drinking water and adequate sanitation.





## Keeping up with urban growth

### Providing access to drinking water and sanitation services to a fast-growing urban population

With only five years to go until the MDG target date of 2015, 884 million people still do not use an improved source of drinking water, according to the March 2010 report of the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP, 2010), and 2.6 billion continue to lack access to basic sanitation.

The world is no doubt on course to reach the target for water supply, but will fall short by nearly a billion people in sanitation.

## Water problems are urban problems

Two main water problems are affecting the sustainability of human settlements in different regions: the lack of access to water and sanitation, and increasing water-related disasters. These problems have incommensurable consequences on human health and well-being, safety, the environment, economic growth and development.

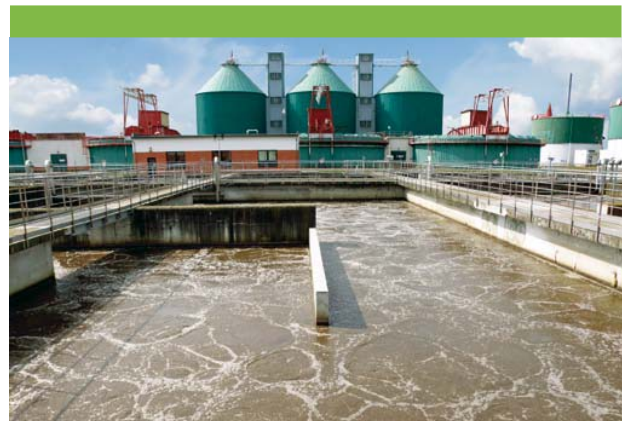
Though water supply and sanitation coverage increased between 1998 and 2008, the growth of the world's urban populations jeopardizes those results. For example, partly because of rapid increases in the urban population, a growing number of people in urban areas defecate in the open (JMP, 2010, p. 22).

Severe water-related disasters such as floods, droughts, tsunamis, windstorms, landslides, storm-surges, waterborne diseases and epidemics have escalated since the turn of the 21st century. In addition, climate variability and change is already affecting water resources and their management in various regions.

Mayors, local and regional leaders and high-level decision makers must acknowledge the urgency of the water-related problems facing various regions of the world, as well as the innovative work being done in many countries.

Leaders and high-level decision-makers need to step forward and commit themselves to making a real difference by bringing water to the top of the political agenda and to work together to solve the water problems of our fast growing cities.

This is imperative in order to support efforts for development and poverty reduction!



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## A heavy burden on the poor especially women and children:

**Burdens associated with inadequate coverage and inefficient service delivery fall heaviest on the most vulnerable and the poorest.**

Poor citizens, especially women and children, are also the most excluded from decision-making. Lack of access to safe sanitation affects women not only in terms of their health but also in terms of their dignity and safety. Women and girls especially find their productivity impaired by their social roles, which often include and the costly and time-consuming tasks of collecting and storing water.

Because of the lack of access and the poor quality of services, low tariffs often do not help the poor, who are less likely to be connected in the first place and rely on informal vendors.

Some 1.4 billion people are classified as poor: 44% in South Asia, about 24% each in sub-Saharan Africa and East Asia, and 6.5% in Latin America and the Caribbean (WWDR3, p. 84). Those figures are expected to rise over the next few decades with projected urban expansion.

The urban poor often live in informal settlements following rapid urban growth, in situations lacking many of life's basic necessities: safe drinking water, adequate sanitation services and access to health services, durable housing and secure tenure. Affordable, safe, piped water is available to only a small share of low-income urban dwellers. Financing of improvements to water services is the key to expanding access, but the illegal status of the large majority of slum dwellers is often a barrier to access to finance or support. Many informal settlements are also in flood-prone areas and are especially vulnerable to environmental hazards. Thus, large populations of slum dwellers live at high risk of disease.

New urban settlers need access to water and wastewater services. Yet many are lucky if these are supplied water through formal services via the municipal government. In more typical cases, they are served informally by vendors who regularly charge exorbitant rates for water of often questionable quality. Achieving a more equitable access to water is a critical task facing municipal leaders (WWDR3).

The costs of inadequate water supply and sanitation are high: 1.6 million children die every year from diarrhoea, mainly as a result of inadequate sanitation, water supply and hygiene. And the economic costs of lost time in fetching water and environmental degradation from wastewater pollution are also high – for example, this has been estimated at more than 1.4 percent of GDP in Bangladesh, 1 percent in Colombia, and 0.6 percent in Tunisia (World Bank, 2010).

## Financing the water sector

Although water is often described as a 'gift of nature', harnessing and managing water for human and ecological needs entail financial costs. These costs are often widely ignored, underestimated or underfunded, with the result that important functions and assets are neglected and underprovided, while existing assets and services deteriorate. Three functions are involved in water management, each with associated costs (WWDR3, p. 56):

- Water resources management and development, including watershed and river basin development, storage, flood-risk management, environmental protection and pollution abatement.
- Water services to municipalities and households, commerce and industry, agriculture, and other economic sectors, including the costs of wastewater treatment, rehabilitation, operations and maintenance and inadequate infrastructure.
- Integrative functions, such as water sector policy development, research, monitoring, administration, legislation (including compliance and enforcement) and public information.

To function properly, the water sector must cover all costs – not just those of major physical infrastructure – in a sustainable way. That means ensuring reliable, predictable finance from government revenues (taxes), the sale of water services or long-term aid commitments.

The sector suffers from a tendency to invest in the creation of new assets and facilities, while neglecting the management and maintenance of those assets over time. Financial dependence on higher

tier funds further weakens local jurisdiction and leads to waste and a disregard for the requirements of customers and citizens. Higher tier support, ostensibly aimed at the poor, is often misdirected, and generic subsidies frequently fail to reach the people who need them most. Rigid policy and legal frameworks also often work to deny the actual and potential roles of large- and small-scale private-sector providers and financiers, and deprive the sector from the full contributions and innovations they could provide.

These realities have left the sector inefficient, costly and out of touch with those it is supposed to serve.

**Estimated investment towards the MDG targets for water supply and sanitation, at \$15 billion a year, is only half of what is needed to meet the MDG targets, even without sewage treatment.**

'The greatest challenge lies in building competent, efficient, business-like and service-oriented institutions. Sustainable service provision is only possible where customers themselves cover the costs of operation and maintenance; capital cost recovery is not always possible, but often requires predictable public subsidies.' (World Bank, 2010).

As the feasibility of meeting MDG Target 10 becomes a reality in various countries, an interesting possibility is raised: that political leaders in these countries might be able to set more ambitious targets than those included in the the MDGs, and so work towards sustainable goals that will lead their countries to higher levels of socio-economic development. With the recognition of what is possible, sustainable growth becomes a matter of resolve.



## Recommendations and policy options

The principal challenge lies not in technological aspects (hardware component) of water supply and sanitation, but more in soft components, especially:

- (1) leadership and commitment;
- (2) the need for an appropriate policy environment and legal and regulatory framework (including local government financing);
- (3) capacity development of service providers;
- (4) innovative financing mechanisms that may prove attractive to potential investors, especially from the private sector, which would increase water sector investment while ensuring the active participation of all affected stakeholder groups – not only from the water sector but also from health, education, and other sectors concerned.

*Secretariat of the 1st Asia-Pacific Water Summit, 2008, p. 188*

The effects of rapid urbanization and industrialization are especially apparent in China, where increasing subsidence has led to extensive environmental and economic damage in more than 45 cities, more than 11 of which have experienced cumulative subsidence of more than 1 metre. Tianjin experienced related economic losses from 1959 to 1993 estimated at \$27 billion.

Shanghai took drastic measures in 1965, when subsidence since 1920 reached as much as 2.63 metres. Pumping has been reduced by 60%, and users are asked to inject the same quantity of water into aquifers in winter as they withdraw in summer.

While pumping-related subsidence has been controlled, drainage for construction and compaction of foundation layers have been causing subsidence rates of up to 10 millimetres a year since 1990.

*(WWDR3, Box 12.4, p. 217).*

## Urbanization and water resources depletion and pollution

Urban settlements are the main source of point-source pollution. More than 80% of sewage in developing countries is discharged untreated, polluting rivers, lakes and coastal areas. Even in some developed countries, treatment of urban wastewater is far from satisfactory.

‘Urban wastewater constitutes a significant pollution load and is particularly hazardous when mixed with untreated industrial waste – a common practice. Many large cities still have no treatment plants or plants quickly become under-sized as urban population growth outpaces investments’ (WWDR3, p. 141).

The perils and challenges facing water will call for thinking beyond the traditional sector compartments. Water professionals need to understand that the keys to many of the solutions to their problems are held by decision makers across the spectrum of other parts of society and the economy. Likewise, recognizing water as ‘the lifeblood’ implies that all major decisions, wherever they are taken, should factor in their potential impact on water.

In addition to the sociological and health implications, increasing population density in urban settlements presents serious environmental impacts. The transformation of natural land surfaces into impervious surfaces such as streets, parking lots and buildings blocks rainwater and snowmelt from reaching the soil. It also increases the flow velocity of water, carrying pollutants into receiving water systems and further degrading water quality. This urban drainage effect increases the frequency of flash floods, causing casualties and infrastructure damage (WWDR3, p. 31).

Aquatic ecosystems have significant economic benefits, including their role in flood control, groundwater recharge, shoreline stabilization and protection, nutrition cycling and retention, water purification and preservation of biodiversity. They also provide benefits in terms of recreation and tourism (WWDR3, p. 91).

Improving the health and function of urban aquatic systems is vital for ensuring health, sanitation, and overall quality of life in fast-growing urban areas. In the urban setting, the protection of valuable systems should be coupled with the restoration of degraded systems. Concerted efforts to improve waterways and bodies of water are an important strategy for contributing to human development in cities.

## Deaths and losses due to water-related disasters

Severe water-related disasters such as floods, droughts, tsunamis, windstorms, landslides, storm-surges, waterborne diseases, and epidemics have escalated since the turn of the 21st century.

More intense droughts in the past decade, affecting an increasing number of people, have been linked to higher temperatures and decreased precipitation. Droughts are also frequently a consequence of the mismanagement of resources and the neglect of risk management. As well as droughts, extreme floods can result in many deaths, especially in developing countries, and developed countries are likely to lead to billions of dollars in damages.

The dominant drivers of these upward trends are socioeconomic factors, such as population growth, land-use change and greater use of vulnerable areas.

Considering that the majority of natural disasters in many regions are water-related (especially those caused by tropical cyclones), the current trend of increasing loss of life and livelihoods triggered by floods and other water-related disasters is a major impediment to sustainable development and poverty reduction. The expected increase in the severity of water hazards due to climate change will further exacerbate the damage, both in human and economic terms, especially when combined with existing vulnerabilities such as ill-performing social, cultural, political, and management structures.

The WWDR3 points out that yearly economic losses from extreme events rose tenfold between the 1950s and 1990s in inflation-adjusted dollars (p. 213).

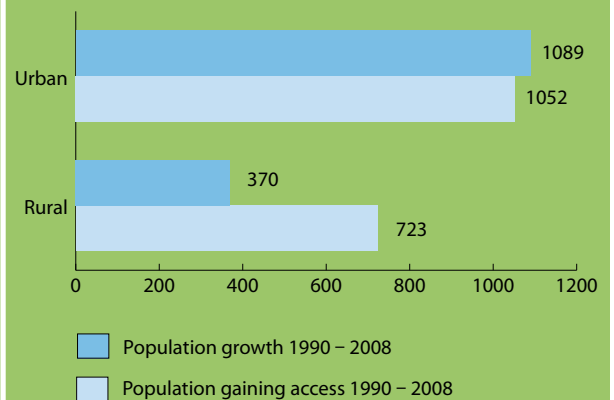
### Forecasting & Warning Systems (FWS)

Experience shows that effective prevention strategies would greatly contribute to reducing both human and economic losses, as opposed to investments in response and recovery. In this context, the development of well-functioning forecasting and warning systems (FWS) is a prerequisite for communities' disaster preparedness and adaptation. To this end, it is necessary to undertake a consolidated review on the currently available FWS in different countries/regions and develop appropriate FWS within the parameters of available technologies and resources. The utilization of real-time satellite data could prove useful in different regions where the availability of real-time data is scarce and thus needs to be promoted.

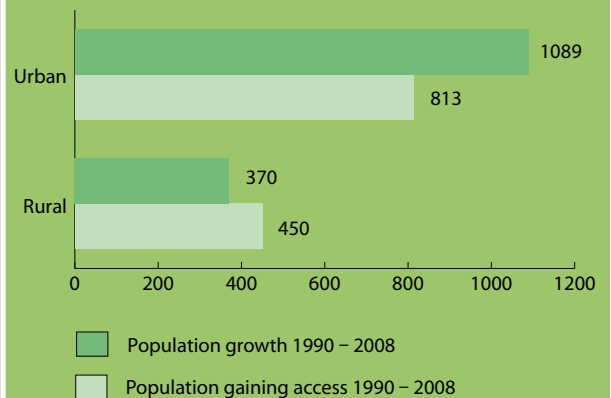
(Secretariat of the 1st Asia-Pacific Water Summit, 2008, p. 194)



Of almost 1.8 billion people who gained access to **improved drinking-water** in the period 1990–2008, 59% live in urban areas. In urban areas, however, the increase in coverage is barely keeping pace with population growth.



Of the approximately 1.3 billion people who gained access to **improved sanitation** during the period 1990–2008, 64% live in urban areas. However urban areas, though better served than rural areas, are struggling to keep up with their population growth.



Source: JMP, 2010



**The Asia-Pacific region is the most vulnerable in the world with regard to water-related disasters that hinder sustainable development and poverty reduction.**

Between 1960 and 2006, over 600,000 casualties of water-related disasters were recorded in the Asia-Pacific region, accounting for over 80% of casualties of water-related disasters worldwide, in addition to US\$ 8 billion worth of economic damage during the same period.

Rapid population growth in the Asia-Pacific region over the past decade has forced more people to live in floodplains and other vulnerable areas and has led to ever-increasing demands for water supply, security and sanitation services, which require greater investment in water projects.

In certain countries, investment in improved access to safe drinking water and decent sanitation facilities; allocation and conservation of water resources; adequate management of wastewater including its safe recycling; and construction of flood control and irrigation facilities, have led to increased economic growth; a healthier, more robust economy and an overall reduction in poverty.

## **Building multi-stakeholder partnerships to achieve sustainable service delivery for all**

While national and local governments are primarily responsible for water and sanitation services, they also often depend on partnerships with others – from the private sector, NGOs, user groups, research institutions, community-based organizations and others – to reach high levels of service coverage, especially among poorer communities.

In most cities, local authorities are expected to ensure basic services. But while the rights-based approach demands they promote, respect and fulfil the right of people to receive these essential services, local authorities are not always in a position to provide the services by themselves. The key is to be open to multi-stakeholder participation and community-led initiatives. Collaboration at different levels is crucial to achieve the mutually accepted goals of sustainable service delivery for all, targeting especially the poor, the sick, the elderly and other marginalized groups (Secretariat of the 1st Asia-Pacific Water Summit, 2008, p. 199). Participation in planning, budgeting, technology choices, the setting of goals, and monitoring are key areas that need to be opened up for collaborative action.

## **Coping with climate change**

Adaptation to possible increased risks due to climate change is a new and common challenge to all countries, and one that governments must recognize as a national priority. These challenges demand a concerted approach – at various levels and by different sectors.

The number of typhoons and cyclones has been increasing throughout the world, as have the number and expanse of drought-affected areas. Densely populated urban areas where adaptive capacity is relatively weak are especially at risk. Water-related disaster risk management and the expansion of facilities for water resources development, water supply, irrigation, wastewater treatment and recycling need to be promoted with community participation.

Adaptation and mitigation can act as complementary response measures that should be combined to reduce the risks of climate change.

Adapting to the effects of climate change and increasing climate variability must therefore be given the highest priority towards securing limited water resources and reducing the impacts of water-related disasters. Especially in urban areas, comprehensive and collective efforts are needed to manage water-related disasters within the context of integrated water resources management (IWRM) and to optimize the use of limited financial resources and capacities.

Responses must focus on reducing human vulnerability while protecting and restoring ecosystems. Governments, national and local, must prepare for climate change impacts on water availability and adopt mitigation and adaptation strategies that provide benefits now. Effective responses will require improved governance and concerted efforts to build society's capacity to adapt, as climate change challenges our basic assumptions about food production, flood protection and resilience to drought.

Water plays a central and important role in adaptation to climate change, and as such must be given central priority in national strategies for sustainable development and public security.

## New technologies and system models

A number of techniques can help achieve a rapid and focused spread of water and sanitation services in human urban settlements, particularly among poor communities. The following are just some tools that might be successfully introduced:

- 1) GIS - to map urban and rural settlements to plan water and sanitation projects;
- 2) e-governance systems - promoting an open administration, transparent user charge collection, attention to customer complaints, and regular scrutiny of hot spots where special attention is needed to maintain service levels and quality;
- 3) systems to track leakages in piped networks;
- 4) new technologies for wastewater recycling - including membranes and filters;
- 5) local or on-site sewage systems and technologies;
- 6) rainwater harvesting techniques;
- 7) small piped networks;
- 8) simple water quality testing kits.

A wealth of experience gained in various regions of the world offers lessons that can profitably be used by all stakeholders, including governments, the private sector, and civil society organizations.

The range of technology and management choices must be broadened to include the development of innovative, low-cost technical approaches that can be implemented in poor communities.

For water supply, this should include approaches such as small piped water networks for urban fringes and densely settled rural areas, as well as innovative technologies to ensure adequate water supplies. The performance of existing water supply systems should also be improved through the rehabilitation of facilities.

With regards to urban sanitation, the promotion of appropriate community-based solutions in slums should be considered, in addition to upgrading and rehabilitating the ordinary sewerage systems to cope with rapid population growth and increasing water pollution.

## Building the capacity of local actors

Many governments fail to provide resources for local capacity development. Urban communities in less developed countries often have limited access to information, materials and tools; insufficient funds to support the knowledge-transfer process; and insufficient or inadequate human and organizational resources.

Adequate investment in capacity development enhances the ability to work with informed partners, work at scale, replicate good practices and innovate. It also enables local actors to provide the necessary support systems to follow through and ensure the continuity of an environmentally sustainable service delivery system (Secretariat of the 1st Asia-Pacific Water Summit, 2008, p. 199).

## Drawing investment to the water sector

While internal funds may not be available for cities in some countries, external agencies and institutions as well as the private sector can also provide financial support. New financing mechanisms could also be developed, especially for vital sewerage and sanitation works. These might include cost-sharing between governments and users, or drawing on additional resources accrued from recent rapid economic growth. Firm political will and a commitment to investing to improve urban water and sanitation services are paramount to achieving real reforms.

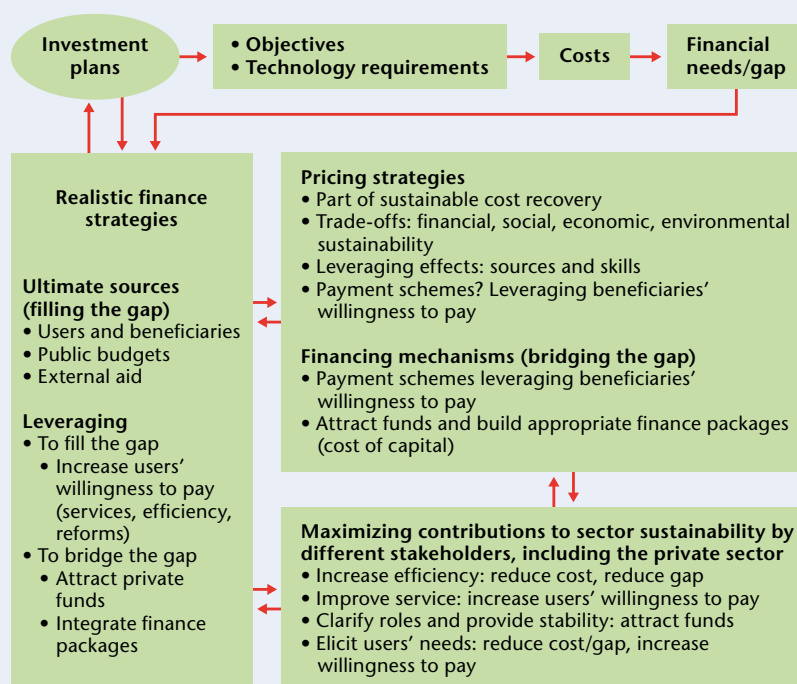
Capacity-development is also key to preserving and upgrading the environmental conditions of our scarce water resources.

Putting in place accessible investment environments and cost-recovery mechanisms, especially those that encourage small private-sector investments, can encourage potential investors. Successful practices include:

1. establishing more effective and diverse credit and financial-management systems that are accessible and affordable to the poor,
2. developing a regulatory regime that encourages investments by the private sector, and especially by local small-scale entrepreneurs.

In this respect, the introduction of Public-Private Partnerships (PPP) and financial mechanisms that assist local water operators should also be considered.

### Water investment requires a holistic approach - links between pricing, financing and stakeholders



Source: WWDR3, Figure 1.4 on page



## The way forward

The water problems of the world's cities are manageable. But it is time to put water and sanitation high on national, regional, and international agendas.

The world already has a reasonable level of knowledge, experience, and technology to solve its water problems for sustainable urban human settlements. Solutions may differ from one country to another, and even from one part of a country to another, because of differing physical, climatic, economic, social, environmental, legal and institutional conditions. But in all cases, cost-effective solutions will require significant additional investment funds, strong political will and appropriate capacity development at all levels.

Within governments, water use is decided by the interaction of decision-makers in the major socioeconomic sectors – health, education, agriculture, housing, industry, energy, economic development and environment. But to be most effective, decisions should be taken through an interactive process that also involves leaders in business (finance, industries, commerce) and civil society (community-based organizations and other non-governmental organizations). The water sector must ensure that these leaders outside the 'water box' know the constraints and options for water resources, and must help them implement their decisions efficiently and effectively (WWDR3, p. 4). These efforts are facilitated in the many countries that have adopted water resources management laws, policies or strategies that reflect links between water and other socio-economic sectors

There can be no sustainable urban settlements without an efficient water policy. Mayors, leaders in all sectors, and high-level decision-makers must acknowledge the role of water and take action NOW!

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### Water for Asian Cities

The Water for Asian Cities (WAC) programme is a collaborative initiative of UN-HABITAT, the Asian Development Bank (ADB) and governments of Asia. The programme was officially launched in Osaka, Japan during the third World Water Forum in March 2003.



UN-HABITAT and the ADB have signed a Memorandum of Understanding to promote pro-poor investments of USD 1.5 billion in water and sanitation in the Asian region by 2011.

The key objective of WAC is to support partner countries to achieve urban water- and sanitation-related Millennium Development Goals and targets and to promote access to safe drinking water and improved sanitation for sustainable urban human settlements in the region. WAC specifically promotes pro-poor WATSAN governance, urban water demand management, integrated urban environmental sanitation, and income generation for the urban poor.

### The United Nations World Water Development Report 3: Water in a Changing World

Coordinated by the World Water Assessment Programme, the 2009 *United Nations World Water Development Report 3: Water in a Changing World* is a joint effort of the 26 United Nations agencies and entities that make up UN-Water. The report brings together some of the world's leading experts to analyse the state of the world's freshwater resources: it monitors changes in our water supplies and in how we manage them, and tracks our progress towards achieving international development targets.

The *World Water Development Report* also provides decision makers with the tools to implement sustainable use of our water – offering best practices to help stimulate ideas and actions for better stewardship of this most essential resource.

An accompanying case studies volume, *Facing the Challenges*, examines the state of water resources and national mechanisms for coping with change in 23 countries and numerous small island developing states.



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Water for sustainable urban human settlements

United Nations World Water Assessment Programme

