# Managing water for future cities

POLICY PERSPECTIVES

2014

OECD

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*"We are on a collision course with nature! Households, farmers, industries and ecosystems are increasingly competing for their daily water needs. Groundwater is being exploited faster than it can be replenished and is becoming increasingly polluted. By the middle of the next century, over 40% of the world population - 3.9 billion people - could be living in areas under severe water stress as climate change adds to the pressure from economic and population growth.*

Angel Gurría, OECD Secretary-General

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**Wakayama, Japan cityscape**

# MANAGING WATER FOR FUTURE CITIES

## KEY QUESTIONS

- How can OECD cities contribute to water resources management, minimising pressure on freshwater resources upstream and downstream? What are the potential benefits for the community?
- How can OECD cities ensure sustainable financing to renew existing infrastructures for water supply and sanitation and to adjust urban drainage to shifting rain patterns?
- How can water governance in OECD cities reflect the need to engage with stakeholders at different scales (including the watershed) and from different horizons (such as urban planning)?
- How to ensure that water regulation in OECD cities contributes to wider water policy objectives?
- How to overcome barriers to the diffusion of innovation, particularly relating to the retrofitting of existing infrastructures?
- What are the potential benefits of improved co-operation between cities and their rural environment in water management? How can these benefits materialise?

# 1 Introduction

The OECD has embarked on a major project to provide governments with guidance on how to address the economic and governance challenges in water management in future cities. The project builds on recent OECD work on the economics and governance on water, in particular regarding managing water for green growth, financing, water governance, economic regulation, private sector participation in water services, adaptation to climate change, and water security.

The project focuses on OECD cities. While cities attract a lot of attention globally, the emphasis has usually been on cities in developing countries and BRIICS. However, OECD cities face distinctive water management challenges that require specific attention and policy responses. Obviously, different cities will face different challenges. Some cities are expanding rapidly, while others are shrinking. Water demand is increasing in some cities, and decreasing in others. This state of flux in many cities provides a number of opportunities to rethink the way that water is addressed in city design and infrastructure development.

The OECD project will help governments at national, regional and city level to make more informed policy choices on financing, governing and regulating urban water management to better achieve economic, social and environmental objectives. The project will also provide a multilateral forum in which OECD and partner economies share experience in addressing the challenging issues associated with urban water management.

***OECD cities face distinctive water management challenges that require specific attention and policy responses.***

**Walking in the rain, Boston, USA**



# 2 Project outputs

The project will produce a report that will be launched at the 7th World Water Forum in Korea in April 2015. Selected case studies on innovative urban water management, to be collected on a voluntary basis from pioneer cities, will help inform and document the analysis and highlight good practices for both OECD and non-OECD cities.

An international conference will be held as part of this project at OECD headquarters in 2014. The aim of the conference is to exchange good practices and to develop policy guidance for OECD members. The conference will seek to refine key messages from the project for delivery to the 2015 World Water Forum in Korea.

The project is expected to result in the following outcomes:

- Informed policy choices by countries and cities on financing, governing and regulating urban water management to better achieve economic, social and environmental objectives.
- A multilateral forum in which OECD and partner economies share experience in addressing the challenging issues associated with urban water management.
- Contribute to implementing solutions that were highlighted at the 6th World Water Forum in Marseille.

This Policy Perspectives presents the ambition and expected deliverables of the project.


# 3 Background

More than half of the world's population currently resides in cities and urbanisation is projected to continue increasing. By 2050, 86% of the OECD population will be living in urban areas, with an increasing concentration in large cities of one million or more inhabitants. This will have inevitable consequences on the way water is managed across administrative and hydrological boundaries.

Countries are already confronted with significant challenges to protect cities from water risks and to secure financially sustainable water and sanitation services to city dwellers. This situation requires a concerted effort, putting water supply and sanitation policies in the wider context of institutional arrangements and water resources management, and strengthening the interface between cities and the surrounding rural environment. The significant urban water investments being made, or which need to be made, require OECD members to think carefully about how to manage urban water cost-effectively and to learn from the experience of others in addressing the demand and supply sides of the urban water management challenge.

***By 2050, 86% of the OECD population will be living in urban areas, with an increasing concentration in large cities of one million or more inhabitants.***

Future demographic and economic trends have important implications for household and industry access to urban water and sanitation services:

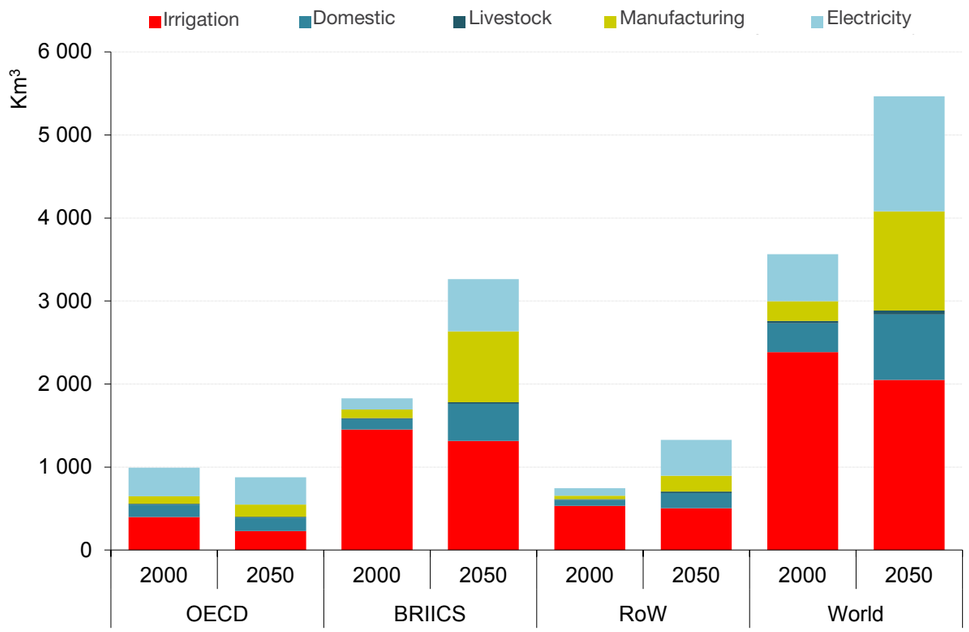
- Demand for water is projected to increase by 55% by 2050 (Figure 1). As a result, city-dwellers and urban industries are increasingly competing with other water users for access to water resources. If not properly managed, this competition can have undesirable social, environmental and economic consequences.
- Cities are increasingly at risk of floods and droughts, especially as a result of increasing climate variability. The value of assets at risk is particularly high in OECD cities, although the capacity to respond is also often high.
- In OECD countries, diffuse pollution is leading to increasingly inadequate water quality in a number of catchment areas, generating additional costs in ensuring access to safe water.



## OECD cities face a distinctive set of issues

- While access to water services is usually good in OECD cities, renewal of existing infrastructure is lagging well behind with the result that networks are ageing, with potential consequences for the economic costs of maintenance, and on health and the environment.
- Infrastructures conceived and built several decades ago may be maladapted to emerging challenges. Urban drainage is often not adapted to heavy rains: where rainwater is collected in sewerage systems, heavy rains can lead to sewer overflow and wastewater being released in the environment without treatment.
- The financial context in many OECD cities is dire as water investment needs are rising while the traditional sources of finance are under severe constraints. Revenues from water tariffs are affected by the decline of water consumption in many OECD city centres due to drives for higher levels of water efficiency and changes in industrial structures of cities. Taxes from central governments are increasingly scarce in many countries where fiscal consolidation is a priority. Transfers from the international community (such as official development assistance and European structural funds) are increasingly constrained.
- Retrofitting existing water infrastructure creates challenges in terms of how to adapt existing infrastructures with new technologies at least cost for the community in order to meet current and emerging demands.

Figure 1. **Global water demand: Baseline scenario, 2000 and 2050**




Note: This graph only measures "blue water" demand (see Box 5.1) and does not consider rainfed agriculture. The country groupings BRIICS and RoW are explained in Table 1.3 in Chapter 1.
**Source**: OECD (2012), OECD Environmental Outlook to 2050; output from IMAGE. DOI: http://dx.doi.org/10.1787/9789264122246-en.

From an institutional perspective, public sector rationalisation and territorial reforms (e.g. mergers and amalgamation of administrative regions) have an impact on the allocation of roles and responsibilities in the water sector and the scale at which water is being managed (from local to metropolitan). Poor institutional and regulatory frameworks can have dramatic impacts, in some cases sparking vicious circles of under-investment, or favouring expensive technological options at the expense of soft or cheaper options, such as improved water demand management or environmentally friendly innovations.

Cities can contribute to water resources management, ecosystems and biodiversity conservation, through their design and the infrastructures they rely upon (smart water systems, green roofs, more permeable surfaces, etc.). The way in which water is managed in cities has consequences both for city dwellers and for the wider community. Water management in cities dictates water availability (in both quantity and quality) upstream and downstream for other users. It thus also influences the environmental, economic and social development of territories and countries.

Integrating broader water resources management, the design of water infrastructures, and the operation of water services into urban planning is becoming increasingly important and highlights the imperative of addressing the key urban-rural water linkages. Making the best use of innovative technical and non-technical solutions (including new technologies and techniques, business models, stakeholder engagement, green infrastructure, regulatory arrangements) to respond to the above challenges at least cost is key to ensuring adequate levels of water security and water services.

***Sustainably managing urban water, and maintaining, renewing and expanding urban water infrastructure will require major reforms to improve the economic and institutional framework for water utilities and to enhance the enabling environment for attracting sources of finance and reducing investment needs.***

# 4 Project modules

The project consists of a number of modules that will draw on empirical data collected through surveys, selected case studies of cities at the forefront of adaptive urban water management, and lessons from international best practice. Each of these interlinked modules will provide robust economic analysis, develop policy relevant messages and suggest recommendations to local and national decision-makers. The modules will cover:

- **Financing urban water.** This module will provide policy guidance on how governments can effectively meet the financial needs to sustainably manage urban water, and maintain, renew and expand urban water infrastructure. Meeting such needs will require major reforms to improve the economic and institutional framework for water utilities and to enhance the enabling environment for attracting sources of finance and reducing investment needs. This work will help governments to better understand and address commercial, political and institutional issues associated with urban water financing and the contribution of economic instruments and innovative financing mechanisms. The project will collect key examples from selected cities to identify the obstacles to the efficient use of available funding and the mobilisation of additional sources of finance, including from the private sector.

Warsaw University, Poland

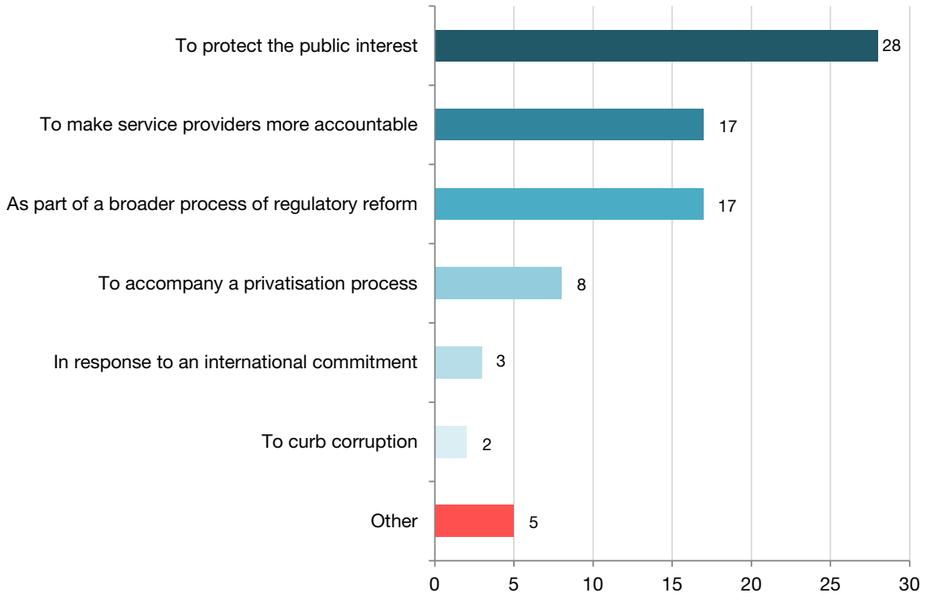
- **Governing urban water.** This module will provide evidence on the relationship between governance structures for managing water in cities and the performance of water policy outcomes in terms of access, quality, reliability, equity, and sustainability. Relying on an extensive survey across 70+ OECD cities, it will cluster cities according to future urban trends and governance features, map who does what within the water chain and beyond (spatial planning, energy and urban development), draw lessons from good practice in managing interdependencies across people, places and policies, and provide guidance on how to overcome territorial and institutional fragmentation. Specific attention will be devoted to pioneer cities with forward-looking adaptive governance strategies to cope with future climate, regional and demographic trends. The intended objective is to support policy coherence and effective water management beyond administrative boundaries and sectoral silos.

- **Regulating urban water.** Countries and cities regulate the dimensions of urban water services (the network, quality, service delivery, pricing etc.) in different ways. One recent trend is the development of dedicated regulatory bodies for drinking water and wastewater services (Figure 2). Building on a survey across 30 dedicated water regulatory agencies and recent OECD work on the governance of economic regulators, this module will shed light on the governance arrangements of these dedicated regulatory agencies in order to promote effective and efficient water service delivery and better responsiveness of service providers to urban population needs.

- **Eco-innovation and urban water.** Government policy has a strong role to play in increasing the amount and pace of eco-innovation in urban water delivery that is critical to the improved management of urban water. This module will focus on the economic and institutional aspects of water-efficient spatial design, smart water systems, distributed water systems, and green infrastructure. It will address policy blockages to the uptake of innovations, and identify economic and regulatory policies that can encourage water innovations in cities. It will build on case studies from OECD cities, which have managed to retrofit existing infrastructures and incorporate innovative approaches.

- **Managing the urban-rural water interface.** The interdependencies between cities and the broader river basin within which cities are located are critical in terms of the linkages with agriculture, the use of green infrastructure in the watershed, institutional arrangements for watersheds and cities, impacts on biodiversity, and economic instruments for managing water allocations. The work will build on current OECD work on flood risk management, and groundwater depletion and pollution and on an analytical framework to identify and assess urban-rural linkages and partnerships in functional areas. The module will explore existing bottlenecks as well as positive drivers for more integrated approaches, at the relevant territorial level and beyond administrative boundaries.

Figure 2. **Main reasons to justify the establishment of a water regulator**
(Number of regulators / over 30 answers)




**Source** OECD Survey on Applying Better Regulation in the Water Service Sector (2014).

## Further reading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Main River, Frankfurt am Main

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