

OECD WORK ON
WATER
2019-20



OECD WORK ON

Water

“Water policies around the world are in urgent need of reform. OECD work identifies the priority areas where governments need to focus their reform efforts.”

Angel Gurría, OECD Secretary-General





Contents

Overview of OECD work on water	4
OECD Council Recommendation on Water	6
1. Water for sustainable growth	8
2. Water quantity management	14
3. Water quality management	17
4. Managing water-related disasters	21
5. Water governance	26
6. Financing water resources and water services	34
7. Water and agriculture	41
8. Water and cities	44
9. Making water reform happen: National policy dialogues on water	46
10. Key water publications	52

Overview of OECD work on water

The global community increasingly understands how water defines growth and contributes to sustainable development. It also experiences how water risks can affect people's health and well-being, the environment and economies.

The OECD is working to help developed and developing countries meet the water challenge. With a multi-disciplinary team drawn from across the Organisation, the OECD contributes analyses to improve the information base, identifies good practices, and provides a forum for exchanging country experiences. OECD work focuses on water economics and governance:

- How to manage water so that it contributes to sustainable growth and development. How to finance water-related infrastructure and services. How to protect against water-related risks: risks of too much, too little, or too polluted water, and risks to the resilience of freshwater ecosystems.
- How to enhance effective, efficient and inclusive water governance. How to manage water across levels of government and scales. How to engage with stakeholders. How to regulate water services. How to strengthen capacity, especially at the subnational level. How to foster integrity and transparency.

THE ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The Organisation for Economic Co-operation and Development (OECD) is a multi disciplinary inter-governmental organisation, tracing its roots back to the post World War II Marshall Plan. Today, it comprises 36 member countries that are committed to democratic government and the market economy and the European Commission, with the major emerging economies increasingly engaged directly in the work.

The OECD provides a unique forum and the analytical capacity to assist governments to compare and exchange policy experiences, and to identify and promote good practices through policy decisions and recommendations.



BETTER POLICIES FOR BETTER LIVES

In addition to analytical work, the OECD works with selected regions and countries to facilitate the reform of water policies. This confirms OECD's aspiration to make reform happen.

The OECD has enhanced its convening power and capacity to structure discussion among stakeholders on water issues, by setting up the following international initiatives: the *Roundtable on Financing Water*, the *Water Governance Initiative*, and the *Network of Economic Regulators*.

The *OECD Council Recommendation on Water*, adopted by all OECD member states in December 2016, captures policy guidance developed by the OECD and can inspire water policy reforms in countries around the globe. Non-member countries are welcome to adhere to the Recommendation with a view to create a momentum for water policy reforms that contribute to water security and sustainable growth.

This brochure provides an overview of OECD work on water.

Key link:

OECD website on water: www.oecd.org/water

OECD Council Recommendation on Water

The OECD Council Recommendation on Water, adopted by all OECD member countries on 13 December 2016, forms a concise and coherent legal instrument providing high-level policy guidance on a range of topics relevant for water resources management and the delivery of water services:

- managing water quantity
- improving water quality
- managing water risks and disasters
- ensuring good water governance
- ensuring sustainable finance, investment and pricing for the water and water services.

The Recommendation captures the main messages that derive from over 40 years of OECD policy guidance on water to OECD members and non-OECD members. It sets out a number of measures to manage water for sustainable growth and development. Notably, it recommends that OECD member countries and countries which have adhered to the Recommendation set up and implement water policies that:

- are adjusted to local conditions, based on long-term water management plans and enhanced policy

coherence with climate change adaptation and across various sectors (e.g. land management, food and energy security, urban development, spatial planning, biodiversity protection)

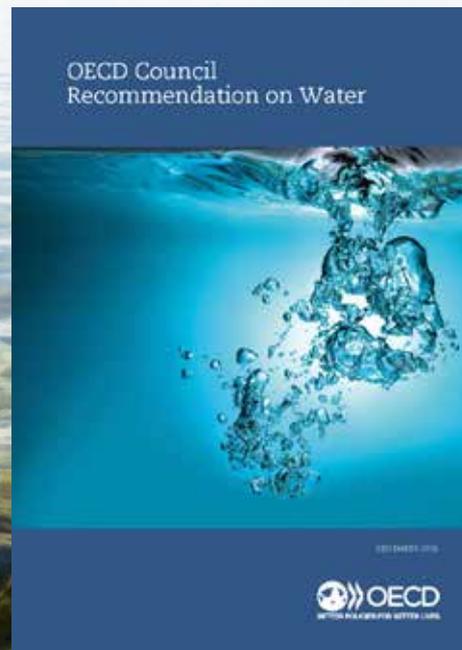
- combine water demand management with the promotion of water use efficiency and allocation regimes that are dynamic, flexible and adjustable to shifting circumstances at least social cost
- prevent, reduce and control water pollution through regulatory, economic and voluntary policy instruments that hold polluters accountable
- assess and prioritise water-related disaster risk reduction, and develop emergency management capabilities and financial protection strategies
- enhance the effectiveness and efficiency of, and trust and engagement in, water governance
- set up measures for the sustainable financing of water services, water infrastructures, water resources management and the protection of water-related ecosystems.

OECD work continues to seek i) adherence from non-member countries that consider the Recommendation to inspire or guide the reform of policies that contribute to water security and sustainable growth, and ii) develop a toolkit to facilitate the implementation of the Recommendation.

In 2019-20 the OECD will gather evidence of progress made towards the implementation of the Recommendation of the Council. A report will inform Council on new developments. It will compile valuable initiatives that converge towards the Recommendation and that can inspire other countries. It may guide future work that can facilitate implementation.

Key link:

OECD Council Recommendation on Water and forthcoming toolkit available at: www.oecd.org/water/recommendation



Water for sustainable growth

OECD work on water aims at developing policy recommendations to design and implement water policies that are fit for current and future challenges. Because of the long lead time of water cycles and water infrastructures, anticipation is essential. Long-term projections are captured in the *OECD Environmental Outlook to 2050*. More specific work focuses on managing water-related risks and the contribution of water security to food security, sustainable growth and development.

OECD Environmental Outlook to 2050

In 2012, the *OECD Environmental Outlook to 2050* provided a snapshot of the global state of water under business-as-usual conditions. It also highlighted the policies that could

change that picture for the better. Model-based projections shed light on what demographic and economic trends might mean for water if governments do not introduce new policies to manage freshwater resources with much greater care.

The Outlook has helped improve our understanding of the environmental challenges, the trade-offs that need to be made, and set out achievable solutions. In particular, the Outlook helped realise the issues related to competition to access water and the relative importance of pollution from point and diffuse sources, in OECD and non-member countries.



Did you know?

By 2050 over 40% of the world's population are likely to be living in river basins under severe water stress. Overall water demand is projected to increase by 55%.

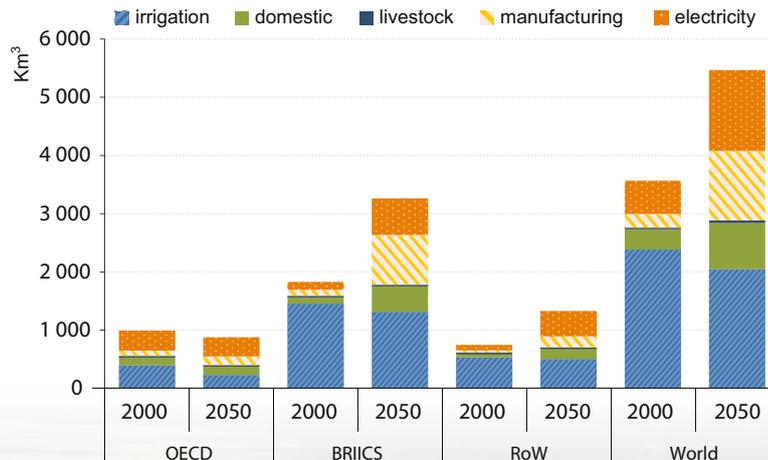
Surface water quality outside the OECD is expected to deteriorate in the coming decades, through nutrient flows from agriculture and poor wastewater treatment. The consequences will be increased eutrophication, biodiversity loss and disease.

Micro-pollutants (medicines, cosmetics, cleaning agents, and biocide residues) are an emerging concern in many countries.

Key link:

OECD Environmental Outlook to 2050 available at:
www.oecd-ilibrary.org/environment/oecd-environmental-outlook-to-2050_9789264122246-en

Global water demand: Baseline, 2000 and 2050



Note: This graph only measures blue water demand and does not consider rainfed agriculture.

Source: Environmental Outlook Baseline; output from IMAGE.

Water security and economic development

Water management is not merely an environmental issue. It is a development issue. The OECD-GWP Global Dialogue on Water Security for Sustainable Growth established how water security contributes to sustainable growth. This connection is highlighted by the role of water in the Sustainable Development Goals, with a stand-alone water goal and several references to water in other goals.

The Task Force on Water Security and Sustainable Growth demonstrated in their 2015 report *Securing Water, Sustaining Growth* that water resources can play a defining role in economic development. Water-related risks act as a drag on global economic growth, and the scale of the challenge that can be monetised is estimated to be in the order of USD 500 billion annually (excluding environmental risks).

Harnessing water to drive sustainable growth requires investments in water infrastructure, information and institutions. The Task Force argues that the most beneficial investments in water security are sequenced along strategic pathways. *Securing Water, Sustaining Growth* documents some of the pathways taken by cities, aquifers, and basins to water security. The 2013 OECD report *Water Security for Better Lives* explains why governments must promote a risk-based approach to water security. It proposes steps to implement

such an approach. This work helps establish water, and water security in particular, on the global development agenda and provides the justification for investment.

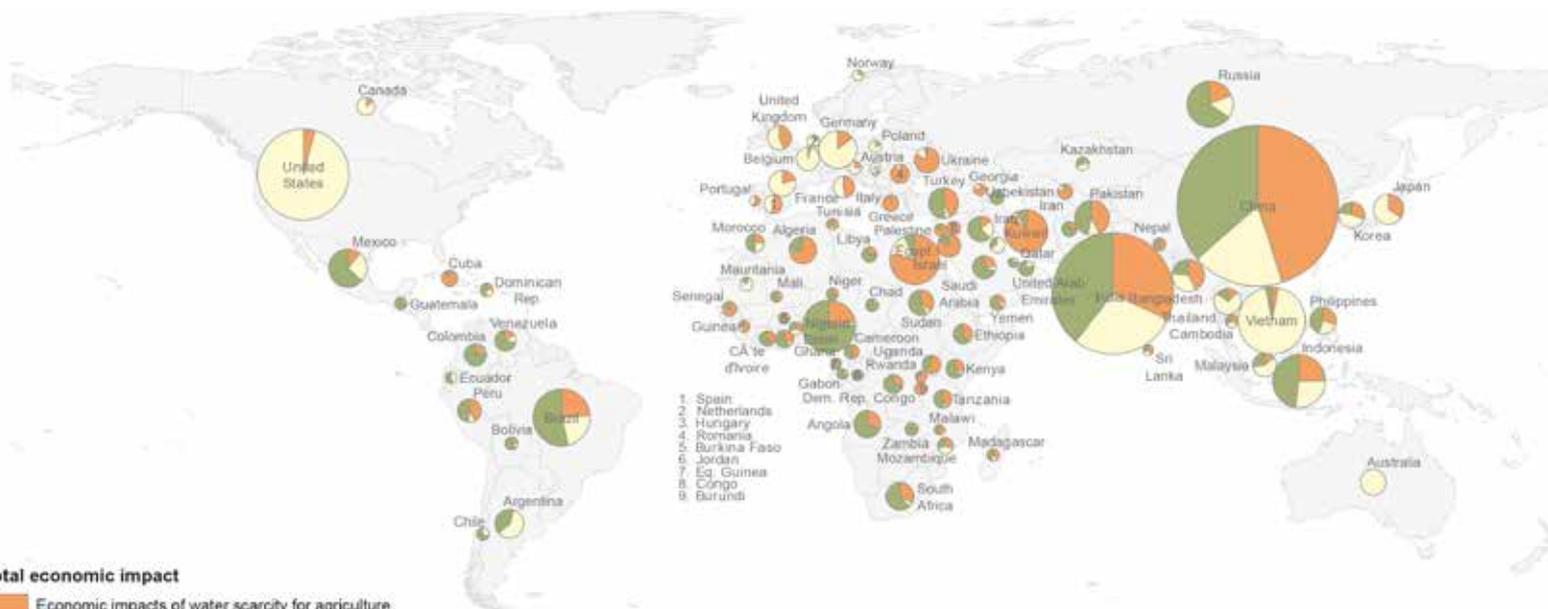
On the occasion of the 7th World Water Forum in 2015 held in Korea, a High-Level Panel launched the report and an accompanying Policy Statement endorsed by leaders in water from around the world. In particular, leaders call for enhanced action and investment in water along three lines: invest in water security; invest in risk management; and invest in knowledge, people and partnerships. These messages can inform the water policy agenda, but are also relevant to the development community and for infrastructure planning. A rethink of how investment projects are assessed and valued is required, to account for their contribution to sustainable pathways (see section 6 of this brochure on financing water resources and water services).

Key link:

Water for sustainable growth and the SDGs: www.oecd.org/water/sustainable-growth-and-sdgs.htm



Relative global economic impacts of water insecurity



Source: Sadoff et al. (2015), "Securing Water, Sustaining Growth", Report of the GWP/OECD Task Force on Water Security and Sustainable Growth.

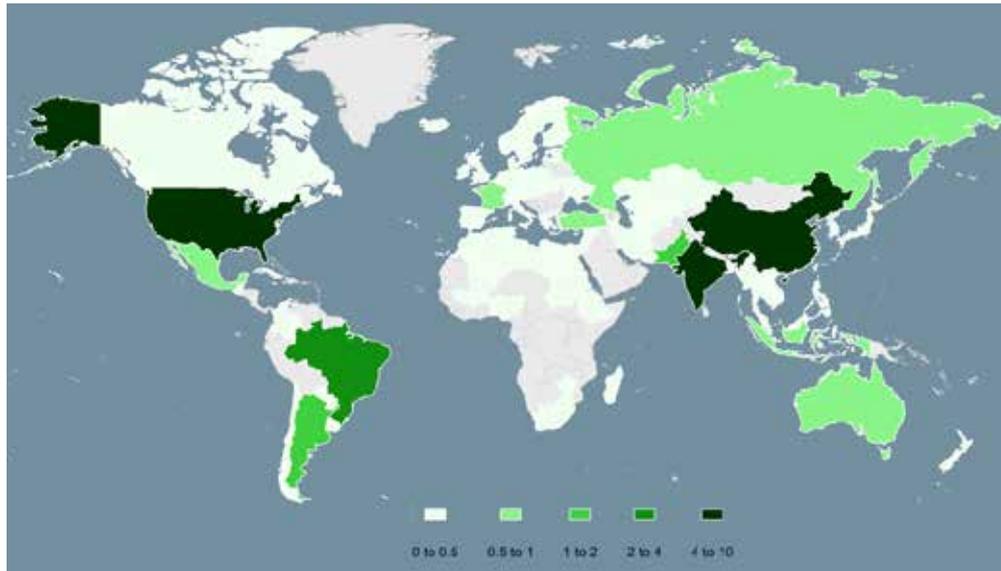


Water security and food security

Water security is intrinsically linked to food security. Agriculture is expected to face increasing water risks that will affect food production, markets, trade and ultimately food security. Targeted policy actions, focusing on agricultural

water risk hotspots, can provide more efficient and effective strategies to mitigate future water risks. The 2017 OECD report *Water Risk Hotspots for Agriculture* develops the use of such a targeted approach, provides an application at the global scale, and presents a policy action plan to mitigate the future impact of water risks on agriculture.

Future water risk hotspots for global agriculture production (2024-50 average)



Key link:

Water Risk Hotspots for Agriculture available at: www.oecd.org/publications/water-risk-hotspots-for-agriculture-9789264279551-en.htm

Note: The index can be interpreted as the expected share of overall global production of the key agriculture commodities likely to face high water without adaptation action risks in each of the 77 largest agriculture-producing countries.

Source: OECD (2017), *Water Risk Hotspots for Agriculture*, based on a review of 64 publications, projections from the AgLink-Cosimo and IMPACT models.

Data to support water-related policies

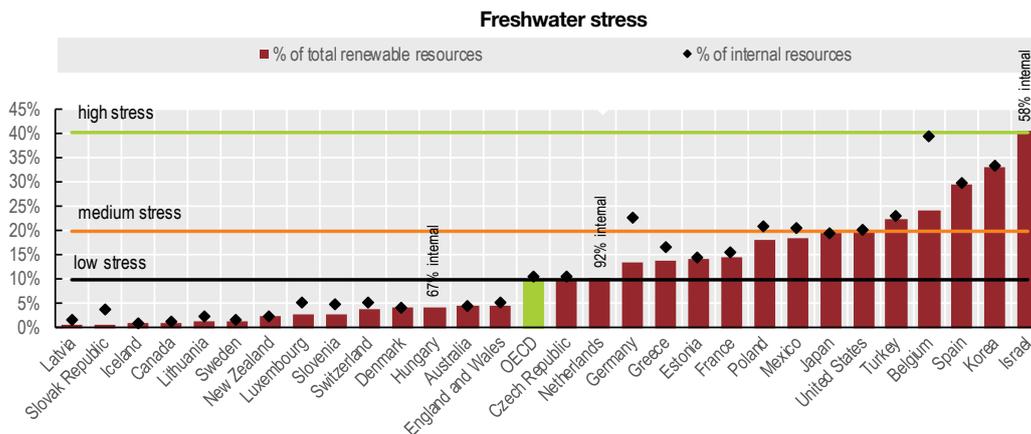
Quality data are indispensable for developing water policies, monitoring their implementation and informing about the results obtained. The OECD produces international water data to support its policy analyses and country reviews, and to calculate OECD and SDG indicators, such as water use efficiency and water stress.

The main vehicle for data collection is the OECD questionnaire on inland waters used jointly with Eurostat, and the coordinated UNSD/UN Environment questionnaire, which together provide a global country coverage. Continued efforts are made to improve the data, harmonise them at international level and fill gaps by better using available data and new data sources such as earth observation.

The establishment of global water accounts in line with the System of Environmental Economic Accounting is being explored.

The data collected relate to freshwater resources and their use; wastewater treatment and discharges; and the quality of rivers and lakes. Other data relate to policy instruments for water management. They are maintained in the OECD “Policy Instruments for the Environment” database that covers about 100 countries. They typically include information on abstraction and pollution charges and on tariffs for water-related services.

Water-related indicators feature in the OECD flagship report “Environment at a Glance” whose 2019 edition includes interactive graphics to compare countries and a thematic webbook on water resources (available in November 2019).



Key links:

Policy Instruments for the Environment database: <http://oe.cd/pine>

Main datasets are available on the OECD Statistical Platform: <http://dx.doi.org/10.1787/env-data-en>

Note: Data refer to gross freshwater abstractions as percentage of long-term average resources, and include provisional data.

Source: OECD (2019), "Water: Freshwater abstractions", OECD Environment Statistics (database).

2 Water quantity management

Allocation regimes determine who is able to use water resources, how, when and where. As competition to access water resources intensifies, water resources allocation is an important instrument to manage water for sustainable growth.

Well-designed water allocation regimes allocate water to where it creates the most value for society—economically, socially and environmentally. They can also adjust to changing conditions and preferences at least cost for society.

Well-designed water allocation regimes reflect the different capacities of water users to take and adapt to risks of scarcity. They provide incentives for investment and innovation in water use efficiency. For instance, reforms of water entitlements in the Murray Darling Basin in Australia, have triggered innovative responses from irrigators, freeing water for valuable uses.

However, many allocation regimes are strongly conditioned by historical preferences and usage patterns. They show a high degree of path dependency, which manifests in laws and policies, and in the design and operational rules of existing water infrastructures. As a result, water use is often locked-in to uses that are no longer as valuable today as they once were. For example, adequate flows to support ecosystem functioning are not secured in many basins, and many countries still apply very low, or no charges at all, for water abstraction, even though the value of water has increased as competition for the resource has intensified.

Key link:

Water Resources Allocation: Sharing Risks and Opportunities
available at: www.oecd.org/environment/water-resources-allocation-9789264229631-en.htm





The OECD has developed a Health Check, which countries can use to assess how robust prevailing water allocation regimes are.

As part of the 2017 publication *Groundwater Allocation: Managing Growing Pressures on Quantity and Quality*, a companion tool has been developed specifically for the allocation of groundwater. It builds on nine case studies (Denmark; Tucson, Arizona; Kumamoto, Japan; Mexico; the Upper Guadiana Basin, Spain; Texas; France; India; and North China) designed to show how groundwater allocation challenges are being addressed in diverse contexts.

A Health Check for improving water resources allocation

1. Are there accountability mechanisms in place for the management of water allocation that are effective at a catchment or basin scale?
2. Is there a clear legal status in place for all water resources (surface and ground water and alternative sources of supply)?
3. Is the availability of water resources (surface water, groundwater and alternative sources of supply) identified and possible scarcity well-understood?
4. Is there an abstraction limit ("cap") that reflects in situ requirements and sustainable use?
5. Is there an effective approach to enable efficient and fair management of the risk of shortage that ensures water for essential uses?
6. Are adequate arrangements in place for dealing with exceptional circumstances (such as drought or severe pollution events)?
7. Is there a process for dealing with new entrants and for increasing or varying existing entitlements?
8. Are there effective mechanisms for monitoring and enforcement, with clear and legally robust sanctions?
9. Are water infrastructures in place to store, treat and deliver water in order to allow for the allocation regime to function effectively?
10. Is there policy coherence across sectors that affect water resources allocation?
11. Is there a clear legal definition of water entitlements?
12. Are appropriate abstraction charges in place for all users that reflect the impact of the abstraction on resource availability for other users and the environment?
13. Are obligations related to return flows and discharges properly specified and enforced?
14. Does the system allow water users to reallocate water among themselves to improve the allocative efficiency of the regime?

Source: OECD (2015), *Water Resources Allocation: Sharing Risks and Opportunities*.

Zooming in on agriculture and water quantity management

Agriculture faces the enormous challenge of producing more with less water. Globally agriculture needs to produce almost 50% more food by 2030 and double production by 2050. This will likely need to be achieved with less water. At the same time, there will be growing pressures from urbanisation, industrialisation and climate change. In this context, it is critical that farmers receive the right signals to increase water use efficiency and improve agricultural water management, whilst preserving aquatic ecosystems.

In the 2010 report *Sustainable Management of Water Resources in Agriculture*, the OECD analyses the challenges of moving towards more efficient management of water resources in agriculture, and responding to growing food demands and the impacts of climate change.

Groundwater provides a highly important resource for agriculture to cope with increasingly variable water supplies. However, intensive use of groundwater for irrigation leads to the lowering of water tables, reducing its potential for future use. It can also generate multiple negative externalities, including salinity, stream depletion, or land subsidence that directly affect agricultural productivity, water users and the environment.

The 2015 OECD report *Drying Wells, Rising Stakes: Towards Sustainable Agriculture Groundwater Use* provides a comprehensive review of agriculture groundwater management instruments. It identifies a combination of policy measures to alleviate the negative effects of agricultural groundwater use and sustain the capacity of aquifers for the future. It emphasises in particular the need for governments to invest in groundwater information systems to properly manage groundwater, which remain incomplete and insufficient in many OECD countries. In regions with intensive groundwater use, the OECD recommends employing a “tripod” combination of regulatory, economic and collective action policy approaches, customised to local circumstances.



“If well managed, groundwater can and should act as a powerful climate adaptation option, a natural insurance mechanism, and not just a component of freshwater supplies.”

OECD (2015), *Drying Wells, Rising Stakes: Towards Sustainable Agriculture Groundwater Use*

3 Water quality management

After decades of regulation and investment to reduce point source water pollution (e.g. municipal wastewater collection and treatment), OECD countries still face water quality challenges (e.g. eutrophication) from diffuse agricultural and urban sources of pollution; that is disperse pollution from surface runoff, soil filtration and atmospheric deposition. In particular, agriculture's impact on water quality (mainly from nutrients, soil sediments and pesticides) over the past decade has been either stable or deteriorating, with only a few cases where significant improvements are reported. The relative lack of progress reflects the complexities of controlling multiple pollutants from multiple sources, their high spatial and temporal variability, associated transactions costs, and limited political acceptability of regulatory measures.

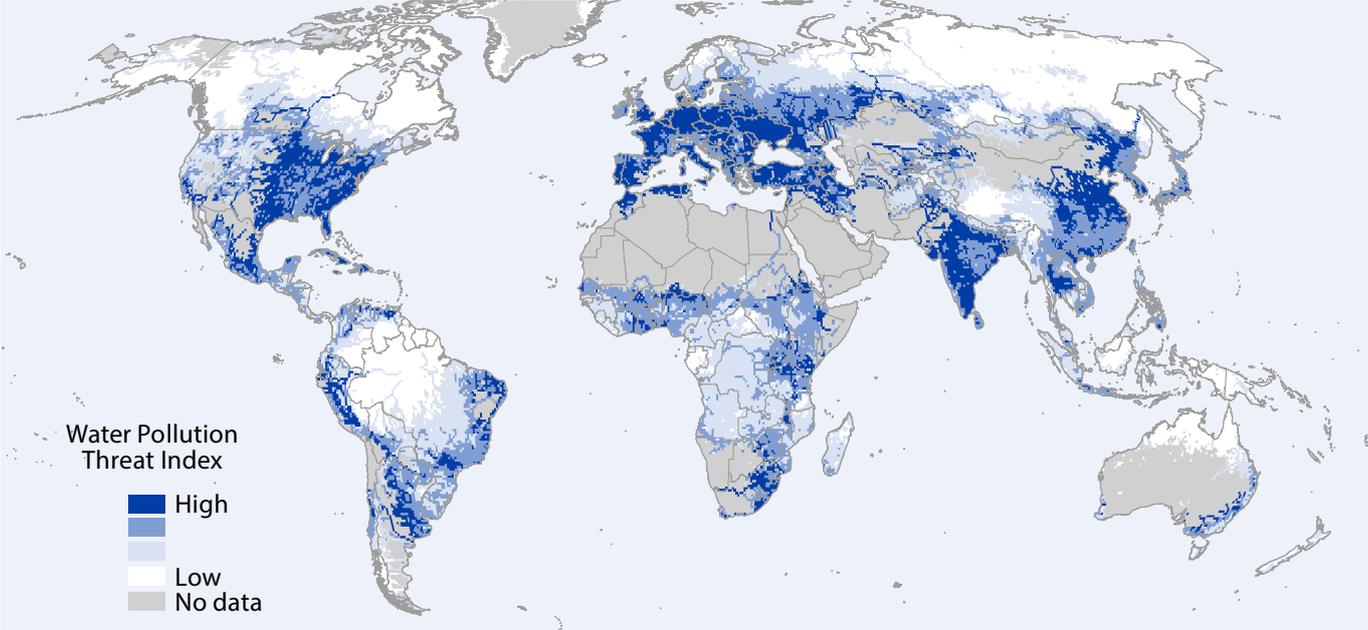
The OECD has analysed emerging policy solutions to address diffuse water pollution in member countries. The 2017 report *Diffuse Pollution, Degraded Waters: Emerging Policy Solutions* outlines the water quality challenges facing OECD countries today, presents a range of policy instruments and innovative case studies of diffuse pollution control, and concludes with an integrated policy framework to tackle diffuse water

pollution. An optimal approach will likely entail a mix of policy interventions reflecting the basic OECD principles of water quality management—pollution prevention, treatment at source, the polluter pays and beneficiary pays principles, equity, and policy coherence. The choice and design of policy instruments should build upon one of three management options:

1. Manage land use practices and inputs of proxies.
2. Reward or penalise polluters collectively.
3. Manage estimated diffuse emissions via modelling.

The 2012 OECD report *Water Quality and Agriculture: Meeting the Policy Challenge* also identifies several recommendations to encourage the sustainable management of water quality in agriculture. In particular, the report calls for better enforcement of existing standards, removal of perverse support mechanisms that degrade water quality, and recommends a holistic approach, using a mix of policy instruments to tackle the complex issues associated with agricultural water pollution.

Global distribution of water pollution hazard, 2000



Note: Map includes the effects of nutrient and pesticide loading, mercury deposition, salinisation, acidification, and sediment and organic loading.
Source: Sadoff et al. (2015), *Securing Water, Sustaining Growth*; based on data from Vörösmarty et al. (2010).

Policy instruments to address diffuse water pollution and protect freshwater ecosystems

Water-related risk	Regulatory instruments	Economic instruments	Voluntary or information-based instruments
Water pollution	<p>Water quality standards</p> <p>Mandatory best environmental practices and restrictions on inputs</p> <p>Pollution discharge permits</p> <p>Non-compliance penalties – non-renewal of resource permits or greater restriction on current permits</p> <p>Non-compliance fines</p>	<p>Pollution taxes (on inputs)</p> <p>Pollution charges (on outputs)</p> <p>Water quality trading</p> <p>Payment for ecosystem services</p>	<p>Information and awareness campaigns</p> <p>Farm advisory services for improved farming techniques (to minimise negative impacts on water quality)</p> <p>Contracts/bonds (e.g. land retirement contracts)</p> <p>Best environmental practices (or good management practices)</p> <p>Environmental labelling – products that meet certain environmental standards can be marketed and sold at a premium and/or subsidised</p>
Risk to the resilience of freshwater ecosystems	<p>Minimum environmental flows (also for pollution dilution)</p> <p>Specification obligations relating to return flows and restrictions on discharges in drought conditions</p>	<p>“Buy-backs” of water pollution allowances to ensure adequate water quality for ecosystem functioning</p>	<p>Information and awareness campaigns</p> <p>Voluntary surrender of pollution discharge allowances</p>

Source: OECD (2017), *Diffuse Pollution, Degraded Waters: Emerging Policy Solutions*.



Zooming in on the management of contaminants of emerging concern in freshwater

Contaminants of emerging concern (CECs) comprise a vast array of contaminants that have only recently appeared in water, or that are of recent concern because they have been detected at concentrations significantly higher than expected, and/or their risk to human and environmental health may not be fully understood. Examples include pharmaceuticals, microplastics, industrial and household chemicals, personal care products, pesticides, and their transformation products.

The 2019 OECD report *Pharmaceutical Residues in Freshwater: Hazards and Policy Responses* helps to close the science-policy loop. It provides policy guidance to cost-effectively reduce pharmaceuticals in freshwater, and their associated risks to human and environmental health. Voluntary participation alone will not deliver; economic and regulatory drivers from central government are needed. Ultimately, a life-cycle approach combining a policy mix of source-directed, use-

orientated and end-of-pipe measures, involving several policy sectors, is required to effectively deal with pharmaceuticals across their life-cycle.

OECD work on CECs continues in 2019-20, with a focus on policies to mitigate microplastics from the textile and tyre sectors in freshwater and marine environments. The programme of work includes an inventory of prevailing policy responses in member states, and exploration of how new science and screening methods can inform and support innovative policy responses.

Key links:

OECD (2019), *Pharmaceutical Residues in Freshwater: Hazards and Policy Responses* available at: www.oecd.org/env/resources/pharmaceutical-residues-in-freshwater-c936f42d-en.htm

OECD (2017), *Diffuse Pollution, Degraded Waters: Emerging Policy Solutions* available at: www.oecd.org/environment/diffuse-pollution-degraded-waters-9789264269064-en.htm

OECD website on water quality and quantity: www.oecd.org/water/water-quantity-and-quality.htm

Did you know?

Pharmaceuticals are essential for human and animal health. However, they are increasingly recognised as a contaminant when their residues enter freshwater systems and affect environmental and human health. For example: endocrine disrupting pharmaceuticals can cause reproduction toxicity in fish and increased risk of breast or prostate cancer in humans; and the overuse of antibiotics is linked to antimicrobial resistance – a global health crisis.



4 Managing water-related disasters

The economic and social costs of water-related disasters are high and increasing. In 2017 three of the strongest and costliest hurricanes hit the northern Atlantic, leaving damages of more than USD 245 million in their wake. The severity of droughts continues to increase - in 2018 over three million people were affected by them in Kenya alone. Across Europe hot and dry summers are causing increasingly severe heatwaves and drought conditions that affect farmers and health systems across the continent. The impacts of climate change are expected to increase both the frequency and the severity of water-related disasters.

The OECD's work on climate-change adaptation and disaster risk management supports countries' efforts to prepare for the effects of a changing climate and related disaster risks by providing impartial analysis, policy advice and supporting the sharing of experiences between the public and private sectors. It seeks to assist countries in their efforts to design an enabling environment for adaptation action and disaster risk management measures adopted by all responsible stakeholders. The OECD's work on water-related disasters focusses on governance, finance, and agriculture.

It contributes to international discussions by way of various different platforms such as the OECD High-Level Risk Forum.

Key links:

OECD work on climate adaptation:
www.oecd.org/environment/cc/climate-adaptation

OECD work on risk governance:
www.oecd.org/governance/risk



The governance of water-related disasters

The OECD High-Level Risk Forum provides a venue for risk managers from governments and the private sectors to discuss governance mechanisms that reduce water-related disaster risks. In 2014 an OECD Council Recommendation on the Governance of Critical Risks was adopted to establish a benchmark for a whole-of-society effort to better assess, prevent, respond to, and recover from the effects of extreme events.

The OECD Policy Toolkit on the Governance of Critical Infrastructure Resilience proposes practical steps to focus resilience efforts on where the potential of disruptions by water-related risks can create the most damaging cascading consequences.

To address the particular vulnerability of coastal regions to the impacts of climate change, the OECD developed the report *Responding to Rising Seas* that reviews how OECD countries can use their national adaptation planning processes to respond to this challenge. Specifically, the report examines how countries approach shared costs and responsibilities for coastal risk management and how this encourages or hinders risk-reduction behaviour by households, businesses and different levels of government. The report outlines policy tools that national governments can use to encourage an efficient, effective and equitable response to ongoing coastal change. It

is informed by new analysis on the future costs of sea-level rise, and the main findings from four case studies (Canada, Germany, New Zealand and the United Kingdom).

OECD Recommendation on the Governance of Critical Risks

The OECD Recommendation on the Governance of Critical Risks calls on OECD member countries to:

- Identify and assess risks, taking interlinkages and knock-on effects into account. This helps set priorities and inform allocation of resources.
- Invest more in risk prevention and mitigation such as in protective infrastructure, but also non-structural policies such as land use planning.
- Develop flexible capacities for preparedness, response and recovery, which help manage unanticipated and novel types of crises.
- Establish transparent and accountable risk management systems that learn continuously and systematically from experience and research.

Key link:

OECD Recommendation on the Governance of Critical Risks:
<https://www.oecd.org/gov/risk/recommendation-on-governance-of-critical-risks.htm>

The financial management of water-related disasters

Flooding is one of the most common, wide-reaching and destructive natural perils causing, on average, more than USD 200 billion in damages annually. The financial management of flood risk presents a significant policy challenge in many countries, requiring careful consideration of the relative effectiveness of various tools for managing flood risk, from investments in risk prevention and public awareness, to the use of risk transfer tools to protect against significant post-disaster costs. The OECD report *The Financial Management of Flood Risk* applies the lessons from the OECD's guidance and analysis of disaster risk financing practices to the specific case of floods.

The fiscal impact of water-related disasters on a government's budget can be sizeable. Expenditures for the government arise from both explicit and implicit commitments to compensate for disaster losses. The joint OECD/World Bank report *Fiscal Resilience to Natural Disasters* identifies the most important sources of disaster costs for governments. Damages to public infrastructure assets and related service disruptions are among the largest sources of the costs governments assume, and they are also the most difficult to control. The report also shows that many of such costs arise through claims made by subnational government agencies, state-owned enterprises or other partners that own or operate infrastructure assets and services. The report recommends countries to design clear framework rules for a government's post-disaster financial assistance.

Moreover, it recommends countries to include the assessment of disaster related contingent liabilities in fiscal risk management frameworks and to manage remaining fiscal risks through multi-pronged financial protection strategies.

OECD Recommendation on Disaster Risk Financing Strategies

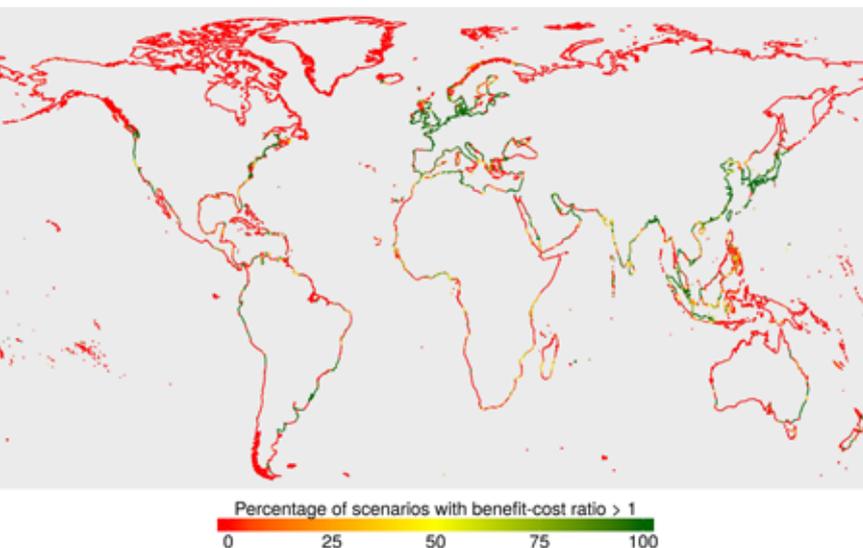
The OECD Recommendation on Disaster Risk Financing Strategies provides guidance on the development of strategies for the financial management of disaster risks. It provides a set of high-level recommendations for designing a strategy for addressing the financial impacts of disasters on individuals, businesses and sub-national levels of governments, as well as the implication for public finances. It specifically targets issues related to the financial management of disaster risks, while recognising the importance of an integrated approach to disaster risk management and the contribution of risk assessment, risk awareness and risk prevention to the financial management of disaster risks, complementing the OECD Recommendation on the Governance of Critical Risks.

Key links:

The Financial Management of Flood Risk
www.oecd.org/environment/financial-management-of-flood-risk-9789264257689-en.htm

Fiscal Resilience to Natural Disasters
www.oecd.org/governance/fiscal-resilience-to-natural-disasters-27a4198a-en.htm

Economic robustness of coastal protection globally



Note: This map shows where it is economically robust to invest in coastal protection, under five scenarios of 21st century global mean sea-level rise (from 0.3m to 2.0m). The results show that coastal protection is economically robust across all scenario combinations for 13% of the world's coastline, which account for 90% of the global coastal population. Conversely, it is robust not to protect 65% of the world's coastline, which corresponds to a small fraction of global coastal floodplain population (0.2%). For the remaining 22% of the world's coastline, the optimal adaptation strategy varies across scenarios.

Source: Lincke, D. and J. Hinkel (2018), "Economically robust protection against 21st century sea-level rise", *Global Environmental Change*.

Managing water-related risks in agriculture

Agriculture is expected to be the most economically affected sector by climate change, most notably due to an increase in rainfall variability. Long-term changes in precipitation, changes in crop water requirements, and the increasing frequency of extreme weather events are expected to affect crops and livestock production systems in many regions. As countries develop climate adaptation policies in agriculture, water management will play a key role in increasing agriculture's resilience to climate change.

The 2016 OECD report *Mitigating Droughts and Floods in Agriculture: Policy Lessons and Approaches* proposes a policy framework to overcome market, policy and behavioural failures. The report *Managing Weather-Related Disasters in Southeast Asian Agriculture* applies this framework to evaluate policies in place in Myanmar, the Philippines, Thailand and Viet Nam.

The 2017 OECD report *Water risk hotspots for agriculture* analyses the type of risks, from scarcity to risk related, projected for the sector. It identifies

regions particularly exposed to these risks and assesses the possible impacts these risks may have on agriculture production and food prices. The report recommends that government take a strategic approach to risk, prioritizing responses in water risk hotspot areas.



OECD's contribution to international discussions on water-related disasters

The OECD supports several international discussions on water-related disaster risk management:

- As a founding member of the United Nations High Level Experts and Leaders Panel on Water and Disasters (UN-HELP), the OECD provides policy support to ensure that water-related disasters stay high on the international policy agenda.
- In support of the G20 work on quality infrastructure, the OECD developed a background report on Climate-Resilient Infrastructure, which highlights the needs and ways countries can integrate a resilience lense, including to water-related disasters, when conceiving and maintaining infrastructure assets over time.
- The OECD also supports countries in their implementation of the UN Sendai Framework for Disaster Risk Reduction, especially on their efforts towards improving risk governance.

Key links:

www.oecd.org/publications/mitigating-droughts-and-floods-in-agriculture-9789264246744-en.htm

www.oecd.org/publications/managing-weather-related-disasters-in-southeast-asian-agriculture-9789264123533-en.htm

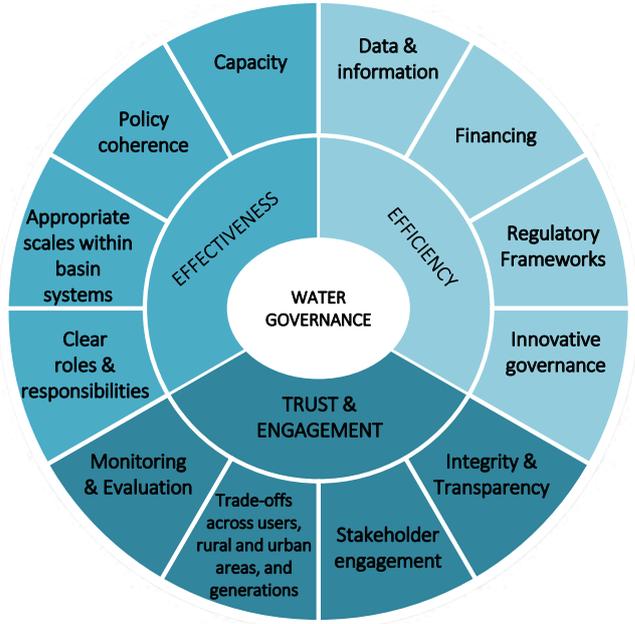
5

Water governance

Managing water for all is not only a question of resource availability, policy design and money, but also a matter of good governance. Water governance is a means to an end rather than an end in itself. It is defined as the set of rules, practices, and processes (formal and informal) through which decisions for the management of water resources and services are taken and implemented, where stakeholders articulate their interest and decision-makers are held accountable.

Water management holds intrinsic characteristics that make it highly sensitive to and dependent on multi-level governance. Water connects across sectors, places and people, as well as geographic and temporal scales. Hydrological boundaries and administrative perimeters rarely coincide. Water policy is complex and strongly linked to multiple domains that are critical for growth and well-being: health, environment, agriculture, energy, spatial planning, and poverty alleviation. To varying degrees, countries have decentralised water policy, resulting in a strong need for co-ordination to manage interdependencies across levels of government.

OECD Principles on Water Governance



Source: OECD (2015), *OECD Principles of Water Governance*, www.oecd.org/governance/oecd-principles-on-water-governance.htm.

Often the technical and institutional solutions to the water crisis are well-known. The real challenge lies in implementing these solutions, tailoring them to local contexts, overcoming obstacles to reform, and bringing together the main actors from different sectors to join forces and share the risks and tasks. Policy responses will only be viable if they are coherent, if stakeholders are properly engaged, if well-designed regulatory frameworks are in place, if there is adequate and accessible information, and if there is sufficient capacity, integrity and transparency.

The OECD has developed standards and implementation tools for all countries regardless of their institutional setting, water availability or degree of decentralisation, to understand whether water governance systems are performing optimally and help to adjust them where necessary.



Did you know?

The number of ministries and public agencies with core prerogatives in water policy ranges from 2 to 15, depending on OECD countries.



OECD Principles on Water Governance

The OECD Principles on Water Governance, approved by the OECD Regional Development Policy Committee and welcomed at ministerial level in June 2015, set standards for more effective, efficient and inclusive design and implementation of water policies. The Principles were developed by the OECD Water Governance Initiative, through a bottom up approach. To date, they have been endorsed by 170+ stakeholder groups or governments: all OECD Member Countries, 7 Non-Member Countries and 140 Stakeholder Groups, gathered in a *Global Coalition for Good Water Governance*.

The *OECD Principles on Water Governance* seek to enhance water governance systems that help manage “too much”, “too little” and “too polluted” water in a sustainable, integrated and inclusive way, at an acceptable cost, and in a reasonable time-frame. They consider that governance is good if it can help to solve key water challenges, using a combination of bottom-up and top-down processes while fostering constructive state-society relations. It is bad if it generates undue transaction costs and does not respond to place-based needs.

The 12 Principles are organised around three mutually reinforcing and complementary dimensions of water governance: how you hit the targets (effectiveness), at the least cost (efficiency) and with whom (trust and engagement).

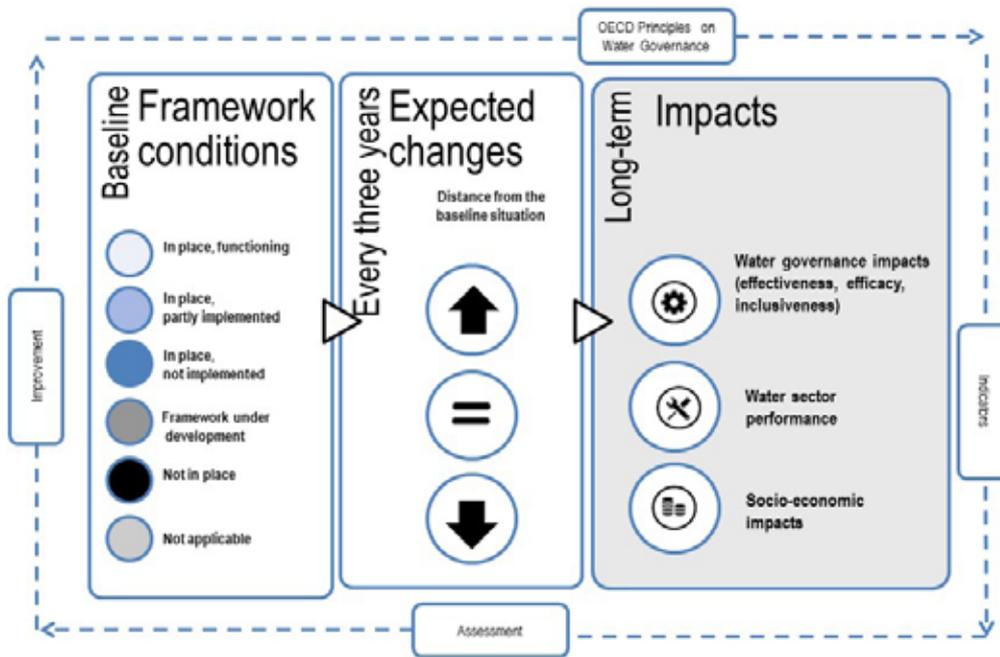
Three years after the adoption of the Principles, the OECD developed tools to support their implementation through: the OECD Water Governance Indicator Framework, a self-assessment tool to assess the state of play of water governance policy frameworks (what), institutions (who) and instruments (how), and their needed improvements over time; and a collection of 50+ water governance stories, to inspire policy makers, practitioners and other stakeholders in the design and implementation of water policies.



Key links:

OECD Principles on Water Governance:
www.oecd.org/governance/oecd-principles-on-water-governance.htm

OECD Global Coalition for Good Water Governance:
www.oecd.org/cfe/regional-policy/Global-Coalition-Good-Water-Governance-Flyer.pdf



Source: OECD (2018), Implementing the OECD Principles on Water Governance: Indicator Framework and Evolving Practices, OECD Studies on Water, OECD Publishing, Paris, www.oecd.org/governance/implementing-the-oecd-principles-on-water-governance-9789264292659-en.htm.

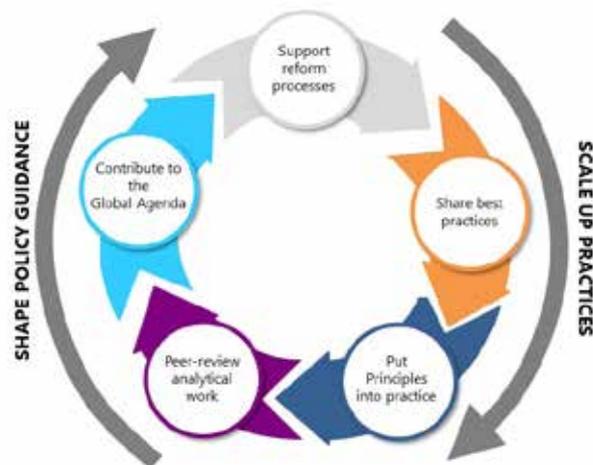
The OECD Water Governance Initiative

The OECD Water Governance Initiative was created on 27-28 March 2013 as an international multi-stakeholder network of 120+ members from the public, private and non-for-profit sectors gathering twice a year to share best knowledge and experience on water reforms, projects and policy. It has several objectives:

- Provide a **multi-stakeholder technical platform** to share knowledge, experience and best practices on water governance across levels of government.
- **Advise governments** in taking the needed steps for effective water reforms through peer-to-peer dialogue and stakeholder engagement across public, private and non-profit sectors.
- Provide a **consultation mechanism** to raise the profile of governance in the Global Water Agenda (Sustainable Development Goals, World Water Forum, Habitat III, COP, etc.).
- Support the **implementation of the OECD Principles on Water Governance** in interested countries, basins and cities by scaling up best practices, capacity development and the use of and further development of indicators.

- Foster **continuity on governance discussions**, in particular by supporting the Implementation Roadmap on Governance of the 7th World Water Forum (Korea, 2015), leading the water governance theme at the 8th Forum (Brazil, 2018) and the 9th Forum (Senegal, 2021).

Objectives of the OECD Water Governance Initiative



Source: OECD (2016), The OECD Water Governance Initiative, Brochure available at: www.oecd.org/cfe/regional-policy/water-governance-initiative.htm.

Stakeholder engagement

Decision makers will be forced to make tough choices for water governance about how to manage water for inclusive growth and environmental stability. Better engaging stakeholders both within and outside the water sector can help ensure these choices are the right ones, and are implemented effectively.

The 2015 OECD report *Stakeholder Engagement for Inclusive Water Governance* assesses the current trends, drivers, obstacles, mechanisms, impacts, costs and benefits of stakeholder engagement in the water sector. It builds on empirical data collected through an extensive survey across 215 stakeholders and 69 case studies collected worldwide. Findings highlight the shift of power across stakeholders; the arrival of new entrants that ought to be considered; innovative tools that have emerged to manage the interface between multiple players; and types of costs and benefits at policy and project levels. The report concludes with a framework of six basic principles for stakeholder engagement, a checklist for public action and a list of self-assessment questions for each.

OECD framework conditions for stakeholder engagement in water governance



Source: OECD (2015), *Stakeholder Engagement for Inclusive Water Governance*.

The governance of water regulators

The establishment of water regulators is both a recent and a consistent trend among OECD and non-OECD countries. A water regulator is generally established to protect the public interest as part of broader reforms to make service providers more accountable, to establish an independent price-setting process, and to bring regulatory expertise into the public sector.

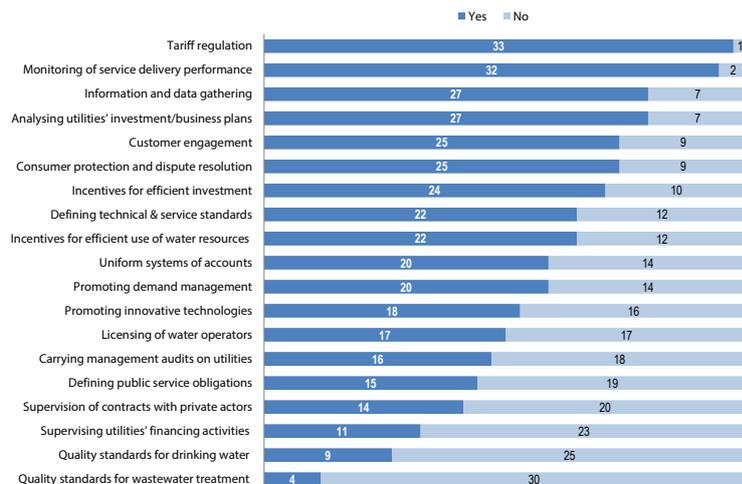
The establishment of a dedicated regulatory body for water services is seen as responding to the need of a complex sector – prone to market failures and where regulatory responsibilities are fragmented – by promoting transparency, policy coherence and co-ordination, continuity, predictability and credibility of decision-making (in particular concerning tariff setting) and accountability to users.

Ongoing OECD work builds on the *OECD Best Practice Principles for the Governance of Regulators* developed by the OECD Network of Economic Regulators to understand what it means to be a well-performing regulator.

A 2015 survey of 34 bodies shows that water regulators display legitimacy, clarity of roles and responsibilities, and accountability grounded in legislative instruments. They also show a strong culture of consultation but could improve the

evaluation of regulatory impacts. More focused OECD reviews support regulators directly. Examples include the report *Driving Performance at Ireland's Commission for Regulation of Utilities* (2018) that aims to strengthen the country's water regulator and, in Scotland, the OECD Peer Review of the Strategic Review of Charges 2021 for the water sector that documents and assessed the price-setting process for water infrastructure and services. A key focus of the process is to reflect consumer preferences and adopt a long-term strategic view (e.g. on climate, asset quality) based on transparent relationships with stakeholders.

Core regulatory functions carried out by water regulators



Source: OECD (2015), *The Governance of Water Regulators*.

Water governance in cities

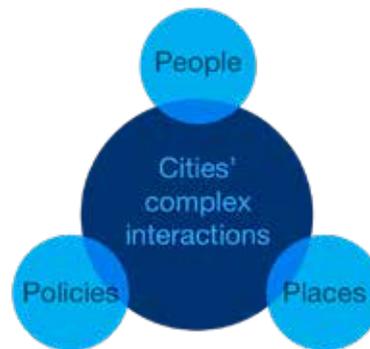
Current levels of water security and service delivery in developed, industrialised economies should not be taken for granted. Urban, demographic and climate trends are increasingly exposing cities to risks of having too little, too much and too polluted water. Tackling these challenges requires robust policies and governance frameworks to co-ordinate across multiple scales, authorities, and policy domains.

Building on a survey of 48 cities in OECD and non-Member countries, the 2016 report *Water Governance in Cities* analyses key factors affecting urban water governance, discusses trends in allocating roles and responsibilities across levels of government, and assesses multi-level governance gaps in urban water management. It provides policy responses structured around the “3Ps” co-ordination framework. It argues that a successful recipe for better water governance in cities lies upon effective co-ordination across policies, people and places, in order to favour inter-sectoral complementarities, enhance inclusive decision-making and favour co-operation between cities and their surroundings.

Key link:

Access the 48 City Profiles online at:
www.oecd.org/cfe/regional-policy/water-governance-in-cities-city-profiles.htm

The 3 Ps co-ordination framework for integrated urban water management



Source: OECD (2016), *Water Governance in Cities*.



Did you know?

92% of surveyed cities signalled that ageing or obsolete infrastructure is a major factor affecting water governance in cities.

Financing water resources and water services

The Roundtable on Financing Water

The Roundtable on Financing Water is a joint initiative of the OECD, the World Water Council, the Netherlands and the World Bank. It draws upon political leadership and technical expertise, with the ambition of facilitating increased financing of investments that contribute to water security and sustainable growth.

The Roundtable engages a diversity of actors – focused on finding novel ideas and solutions – governments and regulators in developed, emerging and developing economies, private

financiers (e.g. institutional investors, commercial banks, asset managers, impact investors), development financing institutions, bi-lateral donors, international organisations, academia and civil society organisations.

Current work focuses on three pillars:

1. Mapping financing flows and investment needs: We are working with the European Commission to project investment needs and financing capacities for water supply, sanitation and flood protection in the 28 EU member states by 2050. Further work at country level develops options for reducing the financing gap in 10 countries facing the greatest challenges.

Did you know?

The total economic value generated by wetlands in one particular natural park in Normandy, France ranges between EUR 2 400 and 4 400 per hectare. This suggests that policies which were considered too costly (such as land acquisition to protect catchments) actually make economic sense.



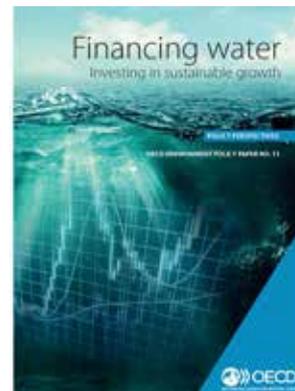
2. Blended finance for water-related investments: Blended finance can be an effective tool to mobilise additional commercial finance and contribute to strengthening financing systems for water-related investments. Further details on our report *Making Blended Finance Work for Water and Sanitation* can be found on the next page.

3. Strategic investment pathways: While financiers typically focus on the availability of a pipeline of “bankable” projects, governments should also situate these pipelines within broader investment strategies that contribute to water security and sustainable development pathways over the long term. On-going work will explore how better valuing water and taking a long-term and basin-wide approach to investment planning can reap benefits for economies, communities and the environment. A case study on the Kafue Flats in Zambia is currently ongoing.

The Roundtable on Financing Water is convening a series of regional meetings to delve deeper into the contextual factors that create barriers and opportunities for water-related financing. These include:

- A regional meeting focused on the Americas co-convened with the Inter-American Development Bank and the U. S. Government in Washington, DC in June 2019.
- A regional meeting focused on Asia co-convened with the Asian Development Bank in Manila in November 2019.
- A regional meeting focused on Europe co-convened with the European Investment Bank in 2020 (to be confirmed).

The summary records of previous Roundtable meetings and related work are available at the key link below.



Key link:

Roundtable on Financing Water: www.oecd.org/water/roundtable-on-financing-water.htm

“Investing in water security will drive sustainable growth. These investments must be well-planned, fit in with broader development agendas, benefit local communities and the environment, and be flexible enough to adapt to changing circumstances.”

Angel Gurría, OECD Secretary-General

Blended finance for water-related investment

Water flows as a prerequisite through all of the Sustainable Development Goals (SDGs). However, commercial finance flows to the water sector have generally been limited to date. Preliminary OECD data on amounts mobilised from the private sector estimates that development finance mobilised an additional USD 2.1 billion of private resources in 2012-17 for water and sanitation¹, which represents 1.4% of total finance mobilised in that period.

The OECD is identifying best practices and examining challenges in applying blended finance to water investments. Blended finance, defined as the strategic use of development finance for the mobilisation of additional finance towards sustainable development in developing countries², offers a promising approach to crowd in additional commercial finance in investments that contribute to achieving SDG6 and related goals.

In the 2019 OECD report *Making Blended Finance Work for Water and Sanitation*, the state and potential of blended finance for water-related investments are assessed, drawing on analysis from three sub-sectors:

- (1) Water and sanitation utilities;
- (2) Small-scale off-grid sanitation services; and
- (3) Multi-purpose water infrastructure and landscape-based approaches.

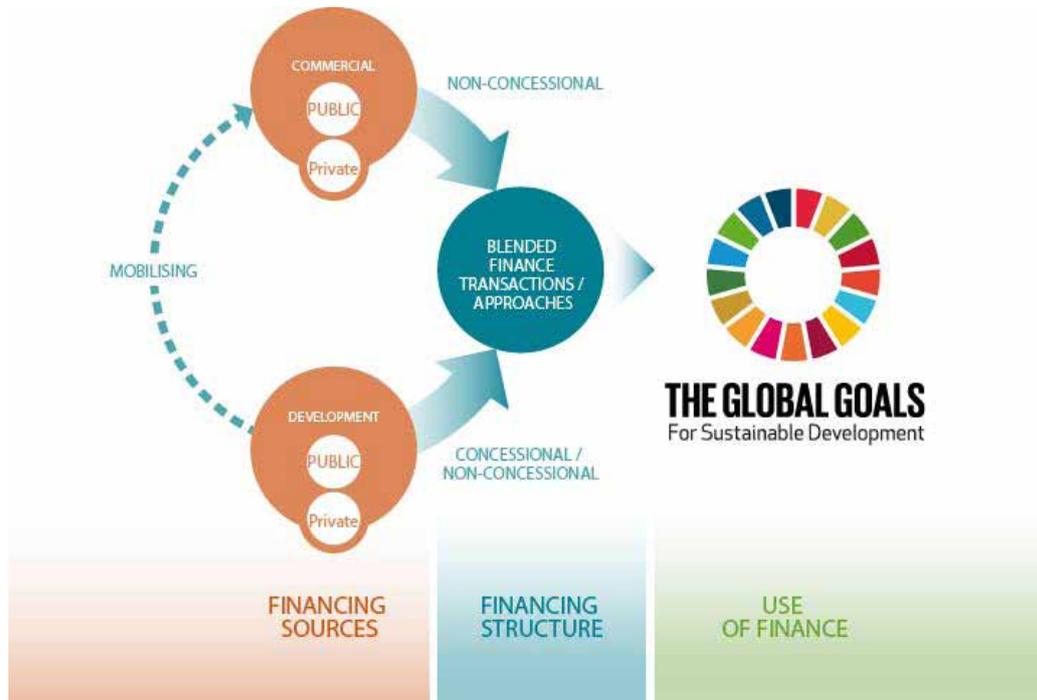
The report findings were presented at the Stockholm World Water Week in 2019.

Key link:

www.oecd.org/dac/financing-sustainable-development/development-finance-topics/blended-finance.htm

1. Data as of April 2019: <https://www.slideshare.net/OECDdev/amountsmobilisedfromthepriatesectorbydevelopmentfinanceinterventionsin201217>
2. OECD (2018), "Making Blended Finance Work for the Sustainable Development Goals", OECD Publishing, Paris.

Blended finance approach



Source: OECD (2018), "Making Blended Finance Work for the Sustainable Development Goals", OECD Publishing, Paris.

Aid flows for water supply and sanitation

The OECD collects and regularly updates statistics on aid for water supply and sanitation. The data collection is based on a standard methodology and agreed definitions which ensures that data can be used to analyse trends and compare the efforts of donors.

Data cover flows from members of the OECD Development Assistance Committee (DAC), non-DAC providers of development assistance, and multilateral agencies including the World Bank, regional development banks, UN agencies and other agencies such as the Arab institutions or Global Environment Facility. The coverage improves from year to year.

In addition to aid flows, non-concessional developmental flows for water extended by bilateral development finance

institutions and multilateral agencies are collected through the Creditor Reporting System. Data collection has also started from private charitable foundations.

OECD analysis provides insight on how and where aid for water is spent. Regular statistical briefs cover the following aspects:

- Monitoring trends
- Commitments versus disbursements
- Geographical allocation of resources
- Nature of projects financed
- Water and climate change
- Water and gender equality



Did you know?

Total official finance flows to developing countries for water and sanitation have increased by 5% annually in the last decade, reaching USD 14.3 billion in commitments on average per year in 2014-15¹.

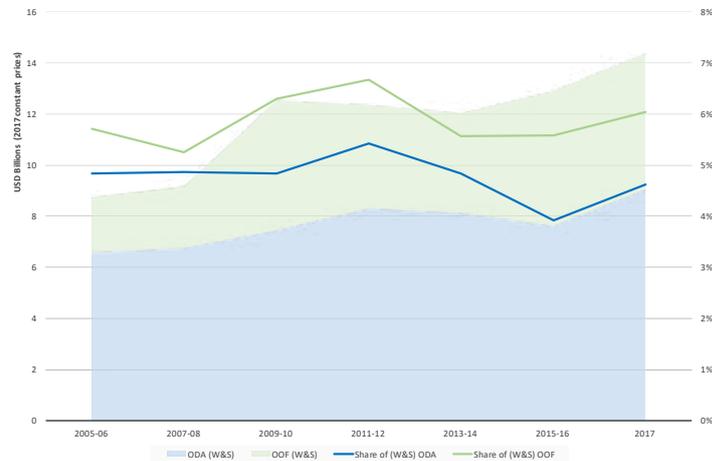
¹ Total official finance flows to water and sanitation refers here to ODA and OOF flows from DAC members, Arab providers of development co-operation and multilateral agencies' outflows.



As shown in the figure, Official Development Finance for the water and sanitation sector surpassed USD 14 billion in 2017. ODA represented 63% of the total (USD 9.0 billion), while Other Official Flows (OOF) accounted for 5.3 USD billion. Both components grew in absolute terms with respect to 2005-06, when they amounted to USD 6.6 billion ODA and USD 2.1 billion OOF. In relative terms, the shares of ODA and OOF for water and sanitation of total ODA and OOF remained stable in the range 4% to 5% for ODA and 5% to 6% for OOF.



Development Finance for Water Supply and Sanitation, 2005-17



Source: Figures are based on OECD statistics (2018) available on <https://stats.oecd.org/qwids>.

Key link:

All information related to aid flows for water, including statistical briefs, standard statistics and access to the online database is available at:
www.oecd.org/dac/financing-sustainable-development/development-finance-topics/water-relatedaid.htm

Private sector participation for water supply and sanitation services

Providing an adequate framework for private sector participation in the financing, development and management of water and sanitation infrastructure is a key challenge. In 2009 the OECD, working with non-OECD countries and stakeholders, developed a *Checklist for Public Action*, building on the 2007 *OECD Principles for Private*

Sector Participation in Infrastructure. The checklist helps governments to assess and manage the implications of private sector participation in the water sector and has proved useful in helping countries identify key areas for reform. Experience drawn from applying the checklist in a range of countries has pointed to the need for countries to assess their frameworks for private sector participation. There is also a strong demand to share tools and access good practice.



The OECD Checklist for Public Action has been used to carry out assessments of private sector participation in the water sector in Egypt, Lebanon, Mexico, the Russian Federation and Tunisia.

The checklist highlights a set of principles across five key policy areas:

- Deciding on the nature and modalities of private sector participation.
- Providing a sound institutional and regulatory environment for infrastructure investment.
- Ensuring public and institutional support for the project and choice of financing.
- Making the co-operation between the public and private sectors work in the public interest.
- Encouraging responsible business conduct.

Key link:

www.oecd.org/investment/investment-policy/water.htm

7 Water and agriculture

There is a large, complex and dynamic set of linkages between agriculture and water. Irrigated agriculture makes a substantial contribution to the growth in agricultural production across many countries. Yet, agriculture can have significant impacts (both positive and negative) on water ecosystems, and both agriculture and water are becoming increasingly vulnerable to climate change.

In most OECD countries, agriculture is a major consumer of water and a significant source of diffuse water pollution. While agriculture often suffers the most from droughts, it can also help reduce the impact of floods on the rest of the economy. OECD's examination of these linkages focuses on economic and policy analysis, supported by economic and environmental data. Overall, OECD work is seeking to provide policy advice to governments that could help move agriculture onto a sustainable path in the overall management of water systems.

Governments should consider the use of a mix of policy instruments at the farm, watershed and national levels to improve agriculture's water use, reduce its impacts on water resource and bolster farmers' resilience to water risks while ensuring that existing agriculture policies are consistent with these objectives.

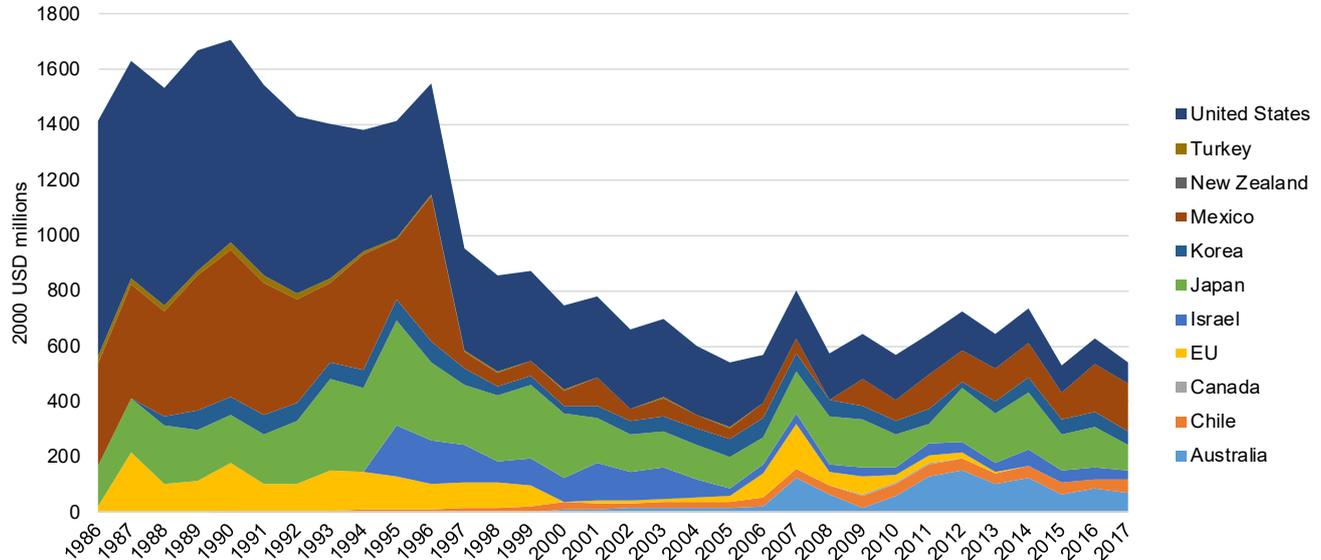
The knowledge of policy responses to the water challenges faced by agriculture, does not, however, guarantee their effective introduction and implementation. Changing policies can be a difficult process that governments often overlook.

The 2018 report *Reforming Water Policies in Agriculture* identifies lessons from eight past reforms in OECD countries aiming at improving agriculture water use and reduce agriculture's water pollution. The 2019 report *Navigating Pathways to Reform Water Policies in Agriculture* builds on these lessons and extensive consultation to propose a theory of change and identify five necessary conditions to an effective reform pathways. These conditions are found to be applicable to challenging policy changes : charging water use, reforming subsidies that negatively impact water resources, regulating groundwater use, and reducing non-point source pollution.

Key link:

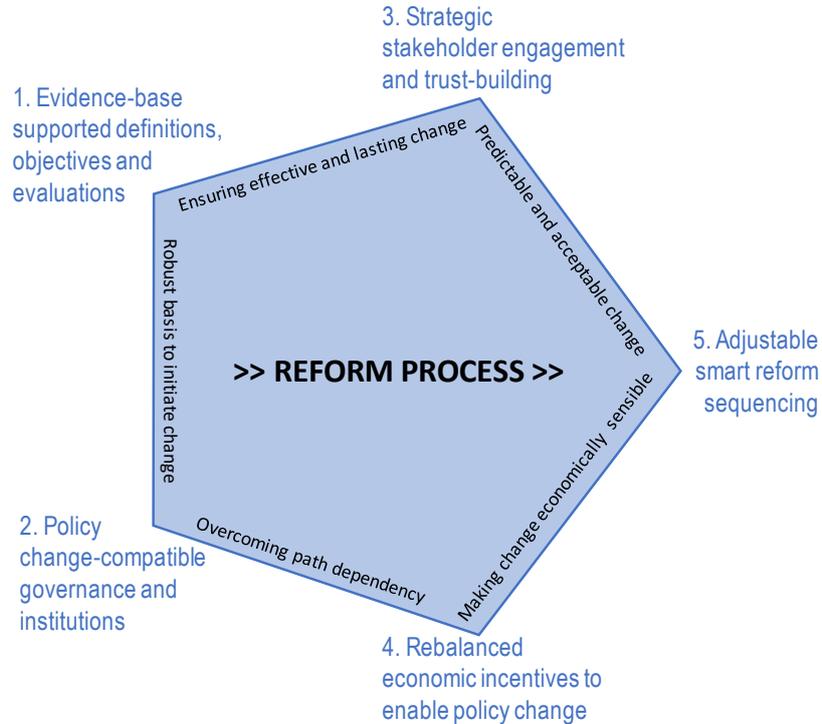
<https://www.oecd.org/agriculture/topics/water-and-agriculture>

Policy changes on water in agriculture evolve over time: Irrigation support transfers in selected OECD countries



Source: Gruère and Le Boëdec (2019).

Five necessary conditions to facilitate policy changes on water in agriculture



Source: Gruère and Le Boédéc (2019).

8 Water and cities

Cities are major contributors to national economies and play a key role as nodes in global markets. But cities can only develop sustainably when they provide reliable water supply and sanitation services to city dwellers, and manage risks of too much, too little and too polluted water.

In OECD countries, cities have achieved high levels of protection against

droughts, floods and water pollution, and a vast majority of city dwellers enjoy reliable water services. This remarkable performance derives from distinctive combinations of infrastructures, business models and institutional arrangements. However, whether and how such combinations are fit for future challenges is unclear.

The economic, social and environmental costs of water security are increasing, driven by urban growth, competition among water users, urban and agricultural pollution, and climate change. Existing infrastructures are also ageing and need to adapt to new contexts. In addition, city dwellers have rising expectations as regards to the quality of water services and water security.



The 2015 OECD report *Water and Cities: Ensuring Sustainable Futures* establishes that cities that effectively manage water for future challenges combine:

- **Innovation.** Technical innovation is burgeoning in cities, but is not fully exploited. Cities would benefit from having wide latitude to explore technologies that fit local contexts, often in combination with non-technical innovation.
- **Financing.** The financial conundrum in OECD countries is changing rapidly, with rising investment needs to renew ageing infrastructures, declining water demand in city centres, and fierce competition to access public finance. Tariff structures and business models need adjusting accordingly.
- **Rural-urban linkages.** The urban-rural interface can contribute a great deal to OECD cities' water security, now and in the future, at least cost to society. National governments should provide incentives and institutional mechanisms to foster the use of co-operative

arrangements benefiting cities, surrounding communities, and ecosystems.

- **Governance.** Three issues deserve particular attention: stakeholder engagement; dedicated regulatory agencies; and metropolitan governance. The OECD explores good international practice, drawing on dedicated networks of stakeholders and practitioners.

OECD cities will not be in a position to respond to all the future water challenges on their own. A number of initiatives by other tiers of governments, clustered around three categories – regulation (on land use, reclaimed water and public procurement), resource provision (e.g. information and education) and incentives (e.g. financial) – will also contribute to urban water management. Governments can use urban policies and infrastructure financing to promote water-sensitive urban design, especially in high-risk regions. The interplay between national and local initiatives on water management will shape the cities of the future, including their capacity to thrive and contribute to bettering the lives of their residents.

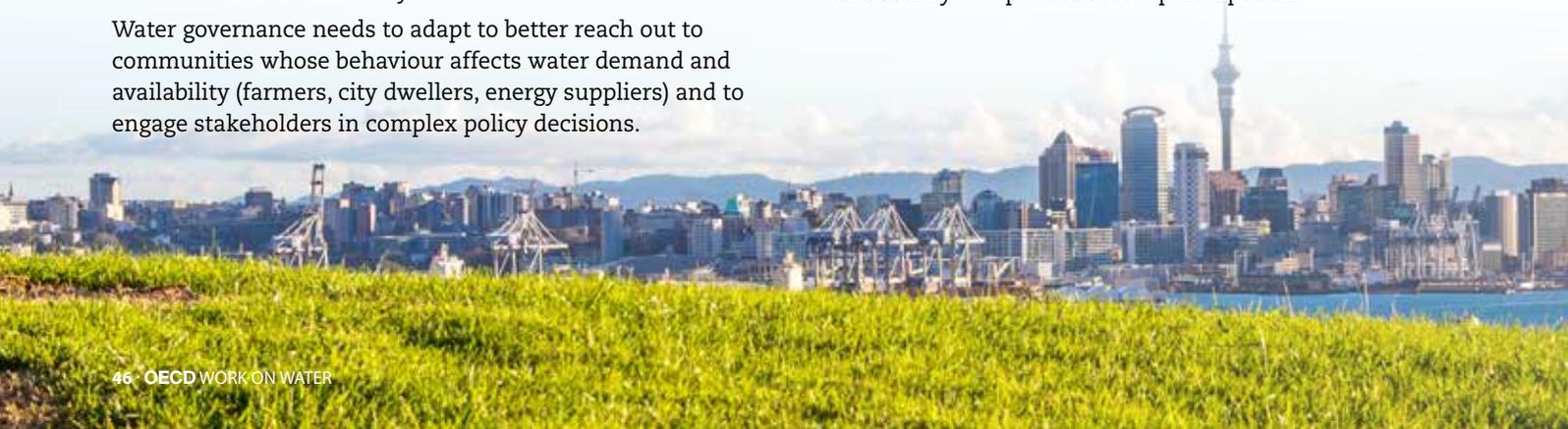
Making water reform happen: National policy dialogues on water

OECD analyses confirm that water management needs to change in most OECD and non-member countries:

- Fiercer competition to access limited and more variable water resources puts more pressure on allocation regimes.
- More uncertainty about the future availability of water challenges the way water services and infrastructures are designed and operate.
- New technologies and innovative management practices generate opportunities to deliver better services at least cost for the community.

Water governance needs to adapt to better reach out to communities whose behaviour affects water demand and availability (farmers, city dwellers, energy suppliers) and to engage stakeholders in complex policy decisions.

The OECD is committed to supporting governments in their efforts to reform policies that influence the availability, use and management of water. The OECD has worked directly with a number of countries to support national policy dialogues, helping to make water reform happen. National policy dialogues are a structured process for stakeholder engagement supported by robust and tailored analytical work and lessons learnt from international experience. The dialogues have been undertaken in a range of countries focussing on various elements of water policy reform, including financing and pricing, governance, allocation, water security and private sector participation.



National policy dialogues in Eastern Europe, the Caucasus and Central Asia (EECCA)*

The OECD assists the EECCA countries in adopting a more integrated approach to water management, applying robust economic and financial analyses and improving multi-stakeholder participation. It also helps in identifying and removing some of the key obstacles to effective and efficient water management, while reflecting countries' level of socio-economic development.

This work is part of the EECCA component of the European Union Water Initiative (EUWI), for which the OECD is a strategic partner, together with the United Nations Economic Commission for Europe (UNECE). Funded by the European Union and with co-financing from Germany, Norway and Switzerland, the

programme includes the EUWI+ project. EUWI+ supports the six countries of the EU's Eastern Partnership to improve river basin management and bring their legislation closer to the EU *water acquis*. National Policy Dialogues jointly facilitated by the OECD and UNECE and fed by robust analytical work, often lead to practical implementation of policy advice.

The OECD focuses on the economic aspects of water resources management (policy coherence, managing water for growth and making the best use of economic instruments for water management), and on the financial sustainability of water supply and sanitation services (strategic and mid-term financial planning and financial support mechanisms to the sector). The UNECE focuses on the co-operation related to the trans-boundary waters.

Key link:

www.oecd.org/environment/outreach/partnership-eu-water-initiative-euwi.htm

Tools for strategic financial planning that have facilitated reforms in EECCA include:

- Strategic financial planning for water supply and sanitation at national or regional level.
- Financial planning tool for water utilities.
- Multi-year investment planning tool for municipalities.
- Guidelines for the development of performance based contracts for water utilities.
- Toolkit for benchmarking water utility performance.

* The EECCA countries are: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, the Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

National policy dialogues on water in EECCA - Eastern Europe, the Caucasus and Central Asia

UKRAINE

- Bilateral treaty signed with Moldova on water co-operation.
- National targets developed for the Protocol on Water and Health.
- Recommendations provided for the geographical organisation of water supply and sanitation services.

REPUBLIC OF MOLDOVA

- Bilateral treaty signed with Ukraine on water co-operation.
- Draft Government Order produced on the establishment of river basin councils.
- Targets set under the Protocol on Water and Health and a Clearing House set up.
- National Financing Strategy on WSS developed. Significant additional public and donor spending followed.
- Recommendations on improving domestic financial support mechanisms for WSS developed.

RUSSIAN FEDERATION

- Federal legislation amended for Private Sector Participation in Water Supply and Sanitation (Federal Laws on Concession Agreements and on Water Supply and Sanitation).
- Recommendations on improving the use of economic instruments for water management in the Republic of Buryatia (Lake Baikal basin) developed.

GEORGIA

- New Water Law drafted (based on the EU WFD) along with several bylaws.
- Bilateral water co-operation agreement on the Kura river under negotiation with Azerbaijan.
- National Financing Strategy developed for urban water supply.

ARMENIA

- National Financing Strategy developed for rural WSS to meet MDG targets.
- One pilot river basin management plan developed.
- Pilot project on Payments for Ecosystem Services developed.

AZERBAIJAN

- National Water Strategy drafted and submitted to the Government.
- Bilateral water co-operation agreement on the Kura River under negotiation with Georgia.

KAZAKHSTAN

- NPD launched in June 2013 focusing on setting national targets for water and health, and the economic and financial dimensions of water management.
- Recommendations on sustainable business models for rural WSS developed.
- Joint Kazakh-Russian assessment of water resources in the transboundary Ural river and Kigac tributary of Volga river drafted in 2016.

KYRGYZ REPUBLIC

- Clear and realistic targets for WSS in the National Strategy for Sustainable Development.
- Creation of a government agency, with clear responsibilities for WSS.
- Strengthened capacity to use economic policy instruments for water management.
- River basin council established for the Chu River and RBMP being developed.
- Targets adopted for the Protocol on Water and Health.

TURKMENISTAN

- Accession to the Water Convention in 2012.
- New Water Code drafted and submitted to Parliament for adoption in 2016.

TAJIKISTAN

- Development of Water Sector Reform Programme supported, institutional changes already occurring.
- Transboundary water diplomacy efforts launched with Kyrgyzstan and Afghanistan.
- Targets set for the Protocol on Water and Health.
- Capacity of the Anti-Monopoly Agency strengthened to regulate water tariffs.

Supporting the implementation of Mexico's 2030 Water Agenda

Mexico's 2030 Water Agenda, designed by the National Water Commission of Mexico (CONAGUA), advocates for a new paradigm for more efficient management of water resources and services.

The OECD worked with Mexico to provide an evidence-based assessment, analytical guidance and customised policy recommendations in support of its water policy reforms. The process was based on OECD tools, methodologies and frameworks, and involved high-level peer reviewers and experts from Australia, Brazil, Italy and the United Kingdom. The process was useful to engage stakeholders, particularly as the Head of State and senior officers at the Mexican Water Commission changed during the course of the project.

The 2013 report *Making Water Reform Happen in Mexico* was handed over to the President of Mexico right after his election to serve as a reference for major policy reforms. It is also being used by donors to target their co-operation.



Did you know?

The Mexican government is expected to invest 51 billion pesos annually over the coming 20 years to meet the water reform challenge.



National policy dialogue on water in the Netherlands

Two-thirds of the Dutch territory, more than half of the population and two-thirds of the economic activity, are at risk of flood. As a result, water management has long been a national security issue for the Netherlands. Due to this unique situation, and centuries of concerted effort and dedicated ingenuity to “keep feet dry”, the Dutch have become a global leader in water management.

However, in the face of broader administrative reforms, fiscal tightening and increasing water challenges due to climate change, a number of key questions have emerged: how fit is the current system to meet future challenges? Are the current water governance and institutional arrangements effective and resilient? Is the Dutch society willing and able to pay the rising costs of water management? Can the Dutch “polder” approach effectively address issues related to the quality of the rivers and lakes, and cope with increasing risks of both floods and scarcity in the country?

To shed light on these questions, the OECD-Netherlands Policy Dialogue on Water Governance was set up. The 2014 OECD report *Water Governance in the Netherlands: Fit for the Future?* flags issues which could shape an agenda for future water policies in the Netherlands.

National policy dialogue on water in Brazil

Water is abundant in Brazil, but unevenly distributed across regions and users. Brazil faces at the same time severe droughts and an overabundance of water. For example, the 2015 drought in the São Paulo region occurred at the same time the Amazon region suffered severe flooding. Future economic, demographic, and climate trends make these issues more critical, as they affect rainfall variability, availability and demand, and increase the number of people and assets at risk.

The OECD report *Water Resources Governance in Brazil* captures the main messages and sets an action plan. It was launched in December 2015 in Brasilia.

The OECD and the National Water Agency (ANA) have engaged in follow-up work, with a focus on the design and reform of water abstraction and pollution charges, so that they contribute to water policy objectives and to broader policy priorities, including sustainable growth and adaptation to climate change. A final report is due at the end of 2017.

Did you know?

Brazilian experience suggests that setting water abstraction or pollution charges at low level, with a view to raise them later, is a failed approach. Low charges do not deliver visible benefits to water users, hindering users' willingness-to-pay and making any further increase in water charges challenging.

Water Policy Dialogue in Korea

In 2016, the OECD and the Ministry of Land, Infrastructure and Transport (MoLIT) embarked on a policy dialogue aimed at advancing the water agenda under the responsibility of MoLIT, with a focus on enhancing water use efficiency in Korea.

The policy dialogue focuses on three key areas:

- Economic instruments under the remit of MoLIT and K-water.
- The promotion of innovation, in particular the smart water management initiative.
- Water allocation regimes.

The water policy dialogue outlined the remarkable capacity in Korea to develop water resources so that they support rapid economic growth and urbanisation. It also highlighted a growing push towards demand management and smart technologies that can help make the best use of available water resources and assets.

The dialogue unveiled specificities of water management in Korea, in particular the well-entrenched objective to supply water under the same conditions across the country. This explains why charges for water or river water and tariffs for multiregional services do not reflect local conditions. The report was released in September 2017.

Did you know?

To cope with future water scarcity challenges, driven by rapid ageing of the population, a changing climate, and fiscal consolidation, Korea would benefit from a renewed emphasis on water use efficiency, the deployment of Smart Water Management and a reform of water allocation regimes.

A new dialogue started in 2017, spearheaded by the Ministry of Environment, leading a whole-of-government approach. The dialogue focused on the management of the water-food-energy-land nexus, and on the role of basin organisations.

Tailored recommendations derived from an analysis of the state of play in Korea and international good practices. They covered:

- co-ordinated planning across areas of the water-food-energy-land nexus
- future-proofing water policies and management
- policies for water quality management
- governance; in particular how to enhance basin-level water management in Korea and to engage with stakeholders.

These are very exciting times to review water policies in Korea, as the government reorganises responsibilities in this domain and reorients policies towards making the best use of available resources and assets, with less emphasis on augmenting supply.

10

Key water publications



OECD (2019 forthcoming), *Water Governance in Argentina*.

This report examines to what extent the current water governance framework in Argentina is adequate to cope with on-going and future water challenges, in an integrated and co-ordinated manner in order to turn water policies into a key pillar for Argentina's sustainable development. In particular, it analyses current and future water risks hindering sustainable development, and provides policy recommendations to strengthen multi-level governance, basin management and regulatory frameworks.



OECD (2019 forthcoming), *Policy Perspectives for the Irrigation Sector Reform in Tajikistan*.

This OECD Policy Perspective presents key messages from studies conducted to strengthen the economic dimensions of irrigation sector reform in Tajikistan. The work aimed to help create economic incentives for much needed improvements of irrigation efficiency and water productivity to move towards financial sustainability of Tajikistan's irrigation sector. Recommendations include a wider use of economic instruments in policy making through integration of economic analyses in the key stages of the river basin management planning cycle and also a policy framework for the reform of irrigation water supply tariffs to promote efficient water use and improve cost recovery.



OECD (2019), *Pharmaceutical Residues in Freshwater: Hazards and Policy Responses*.

Pharmaceuticals are essential for human and animal health but they are increasingly recognised as a contaminant to environmental and human health when their residues enter freshwater systems: psychiatric drugs alter fish behaviour; endocrine disrupting pharmaceuticals cause reproduction toxicity in fish and increased risk of breast or prostate cancer in humans; and the overuse of antibiotics is linked to antimicrobial resistance – a global health crisis. The situation is set to worsen with growing use of pharmaceuticals projected with economic growth, ageing populations, advances in healthcare, and increased livestock and fish production. This report helps to close the science-policy loop. It provides policy guidance to cost-effectively reduce human and veterinary pharmaceuticals in freshwater, and their associated risks to human and environmental health.

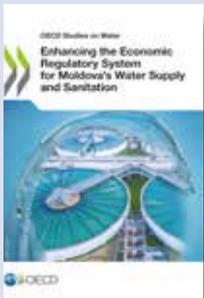
www.oecd.org/environment/pharmaceutical-residues-in-freshwater-c936f42d-en.htm



OECD (2019), *Making Blended Finance Work for Water and Sanitation: Unlocking Commercial Finance for SDG 6*.

Blended finance can unlock additional commercial finance for water and sanitation and contribute to delivering on the Sustainable Development Goals (SDGs), in particular on SDG 6 ensuring availability and sustainable management of water and sanitation for all. This publication takes a commercial investment perspective and provides insights into three subsectors: (1) water and sanitation utilities, (2) small-scale off-grid sanitation and (3) multi-purpose water infrastructure and landscape-based approaches. The publication draws out recommendations for policy makers and practitioners to apply and scale innovative blended finance approaches where most appropriate.

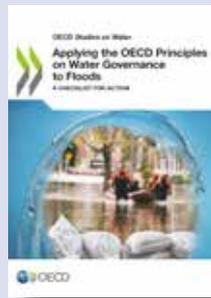
www.oecd.org/environment/making-blended-finance-work-for-sdg-6-5efc8950-en.htm



OECD (2019), ***Enhancing the Economic Regulatory System for Moldova's Water Supply and Sanitation.***

This report aims to support the development of a sound economic regulatory system for the water supply and sanitation (WSS) sector in the Republic of Moldova. The prevailing policy framework calls for drastic developments in WSS to modernise and optimise WSS systems and improve operational efficiency (non-revenue water, staff-output ratios etc.) – in line with domestic and international commitments (including the Association Agreement with the European Union, the Sustainable Development Goals, the Paris Agreement and the national WSS strategy). This report outlines ways and means for strengthening the capacity of the Moldovan government to provide sound regulation and that of WSS operators to deliver higher standards of service while ensuring the affordability of WSS services.

www.oecd.org/publications/enhancing-the-economic-regulatory-system-for-moldova-s-water-supply-and-sanitation-8696bde7-en.htm



OECD (2019), ***Applying the OECD Principles on Water Governance to Floods.***

This report uses the OECD Principles on Water Governance as a tool for multi-stakeholder policy dialogue and practical assessment of the performance of flood governance systems. It applies the Principles to flood-prone contexts to help strengthen governance frameworks for managing the risks of “too much” water. A checklist is proposed as a self-assessment tool for stakeholders in flood management, based on lessons learned from 27 case studies that feature practical experiences and highlight common features and key challenges in flood governance.

www.oecd.org/governance/applying-the-oecd-principles-on-water-governance-to-floods-d5098392-en.htm



OECD (2019), *Responding to Rising Seas: OECD Country Approaches to Tackling Coastal Risks*.

This report reviews how OECD countries can use their national adaptation planning processes to respond to this challenge. Specifically, the report examines how countries approach shared costs and responsibilities for coastal risk management and how this encourages or hinders risk-reduction behaviour by households, businesses and different levels of government. The report outlines policy tools that national governments can use to encourage an efficient, effective and equitable response to ongoing coastal change. It is informed by new analysis on the future costs of sea-level rise, and the main findings from four case studies (Canada, Germany, New Zealand and the United Kingdom).

www.oecd.org/env/responding-to-rising-seas-9789264312487-en.htm



OECD (2018), *Managing the Water-Energy-Land-Food Nexus in Korea*.

This report assesses the key bottlenecks within the water-energy-land-food nexus in Korea, and proposes policy recommendations and governance arrangements to future-proof environmental integrity and enhance sustainable growth. The increasing pressure caused by urbanisation, industrialisation, population growth and climate change in Korea has led to more land consumption and augmented water supply, at the expense of the environment and at a high cost for public finance. Korea has engaged with the OECD via a national policy dialogue to explore best practices from the wider international community to better manage the nexus at the river basin scale.

www.oecd.org/environment/managing-the-water-energy-land-food-nexus-in-korea-9789264306523-en.htm



OECD (2018), **Reforming Water Policies in Agriculture: Lessons from Past Reforms.**

This OECD paper assesses past reforms addressing water quantity or water quality constraints in agriculture in selected OECD countries. The analysis shows that exogenous factors and reform design features that may facilitate the adoption of reforms. The geographical scale and scope of a reform, the dynamic pattern of reform pathways, and compensation for farmers, also contribute to shape the reform's outcome. There are however trade-offs between the effects of these factors on the reform's ambition, effectiveness, efficiency, and flexibility.

<https://doi.org/10.1787/1826beee-en>



OECD (2018), **Policy Perspectives on Financing Water: Investing in Sustainable Growth.**

This paper summarises key messages about the economic case for water investment, the barriers to investment and the financing gap. It charts a course for action to better value water and to facilitate water investment at scale. The Roundtable on Water Financing, a joint initiative of the OECD, the World Water Council and the Netherlands, will continue to deepen the evidence base and broaden engagement on these issues.

www.oecd.org/water/Policy-Paper-Financing-Water-Investing-in-Sustainable-Growth.pdf



OECD (2018), **Managing Weather-Related Disasters in Southeast Asian Agriculture.**

OECD (2018), Managing weather-related disasters in Southeast Asian agriculture. The report reviews policy approaches to droughts, floods and typhoons in Myanmar, the Philippines, Thailand and Viet Nam in an effort to identify good practices and strengthen the resilience of the agricultural sector. The study assesses the risk exposure of this sector to weather-related disasters and reviews risk management policies using an OECD policy framework on the mitigation of droughts and floods in agriculture as a benchmark. The analysis reveals several priority areas to strengthen the resilience of the agricultural sectors in the four countries.

www.oecd.org/agriculture/managing-weather-related-disasters-in-southeast-asian-agriculture-9789264123533-en.htm



OECD (2018), **Implementing the OECD Principles on Water Governance.**

Water and its improved governance are critical for economic growth, social inclusiveness and environmental sustainability. Three years after the adoption of the OECD Water Governance Principles, this report takes stock of their use and dissemination. It provides a water governance indicator framework and a set of evolving practices for bench-learning, building on lessons learned from different countries and contexts.

www.oecd.org/governance/implementing-the-oecd-principles-on-water-governance-9789264292659-en.htm



OECD (2018), **Strengthening Shardara Multi-Purpose Water Infrastructure in Kazakhstan.**

More than 8 000 large multi-purpose water infrastructures (MPWIs) around the world contribute to economic development, as well as water, food and energy security, encompassing all human-made water systems including dams, dykes, reservoirs and associated irrigation canals and water supply networks. Focused on the specific case of the Shardara MPWI located in Low Syr-Darya Basin, South Kazakhstan and Kyzyl-Orda oblasts (provinces) of Kazakhstan, this report looks at the choice and design of MPWI investment strategies that ensure a high economic return on investments and potential bankability, based on application of a computer model and lessons learned from 15 international MPWI case studies.

www.oecd.org/environment/strengthening-multi-purpose-water-infrastructure-in-shardara-mpwi-kazakhstan-9789264289628-en.htm



OECD (2018), **Facilitating the Reform of Economic Instruments for Water Management in Georgia.**

This study assesses the use of economic instruments for water resources management in Georgia and considers options for reform following the 2014 signature of an Association Agreement with the EU committing to alignment with the EU's Water Framework Directive. This includes the systematic use of economic instruments, including water pricing, to recover the cost of water services provided to households, industry and farmers, among other measures.

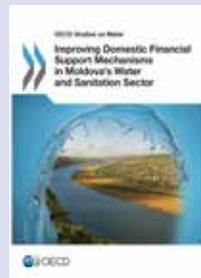
www.oecd.org/environment/facilitating-the-reform-of-economic-instruments-for-water-management-in-georgia-9789264281776-en.htm



OECD (2017), **Water Charges in Brazil.**

This report examines the current system of water abstraction and pollution charges in operation in Brazil. It assesses the current system's implementation challenges and provides possible solutions. The report explores how water charges can be both an effective means for dealing with water security issues, and a tool for enhancing economic growth and social welfare. Specific analysis is put forward for three case studies in the State of Rio de Janeiro, the Paraíba do Sul River Basin and the Piancó-Piranhas-Açu River Basin. The report highlights that water charges need to operate in conjunction with an effective water regulatory regime and concludes with an Action Plan based on practical steps and recommendations for its implementation in the short, medium and long-term.

www.oecd.org/cfe/water-charges-in-brazil-9789264285712-en.htm



OECD (2017), **Improving Domestic Financial Support Mechanisms in Moldova's Water and Sanitation Sector.**

This report analyses several options for streamlining and strengthening domestic financial support mechanisms (DFSMs) in terms of both supply and demand, discusses different scenarios and recommends a number of actions to ensure effective DFSM implementation, notably: 1) sufficient investment for the implementation of targets and obligations set in the national strategies, the Association Agreement with the EU, as well as Moldova's international commitments (water-related Sustainable Development Goals, and the "Water-to-all" commitment); 2) the financial sustainability of operators; and 3) the affordability of WSS services for end-users, especially low-income segments of the population.

www.oecd.org/environment/improving-domestic-financial-support-mechanisms-in-moldova-s-water-and-sanitation-sector-9789264252202-en.htm

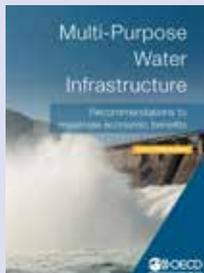


OECD (2017), **Reforming Sanitation in Armenia.**

This report assesses the state of Armenia's sanitation services, which are in poor shape, and proposes ways forward for reforming the sector by: ensuring equitable access by all and identifying solutions that work for the poorest and most remote communities; generating economies of scale and scope, and reducing both investment and operational costs for the efficient delivery of sanitation services; and moving towards sustainable cost recovery for the sanitation sector, by identifying how much funding can be mobilised from within the sector and how much external transfers are required. The state of Armenia's sanitation services are inadequate, with 51% of the population in rural areas using unimproved facilities, causing direct damage to the environment and exposing inhabitants to health risks, and better access but degraded sewerage-system infrastructure

in urban areas, posing health hazards due to potential cross-contamination between sewage and drinking water. According to preliminary estimates, EUR 2.6 billion of investments will be required to meet Armenia's sanitation needs, with approximately EUR 1 billion needing to be spent in the next 7 to 10 years. Given the country's current economic situation, this investment will have to be spread over time and targeted to avoid further deterioration of infrastructure and increase of the financing gap.

www.oecd.org/governance/reforming-sanitation-in-armenia-9789264268982-en.htm



OECD (2017), **Multi-Purpose Water Infrastructure.**

This policy perspective explores the complexity in designing, financing, regulating and managing MPWI projects, with the aim to inform policy and decision making and make MPWI schemes more attractive from inception. It identifies key issues related to managing MPWI, lessons learned from international experience and possible solutions to the challenges. It examines several principles, approaches and instruments to enhance the sustainability of MPWI, drawing on international experience and an OECD study conducted in Kazakhstan where a computer based hydro-economic model was used to inform decision making.

www.oecd.org/environment/outreach/policy-perspectives-multi-purpose-water-infrastructure.pdf



OECD (2017), **Groundwater Allocation: Managing Growing Pressures on Quantity and Quality.**

Groundwater allocation determines who is able to use groundwater resources, how, when and where, directly affecting the value (economic, ecological, socio-cultural) that individuals and society obtain from groundwater, today and in the future. This report focuses on how allocation regimes for groundwater, or conjunctively managed surface and groundwater systems, can be designed to bring about the desired policy outcomes, in terms of economic efficiency, environmental effectiveness and social equity. The report provides practical policy guidance for groundwater allocation in the form of a “Health Check”, which can be used to assess the performance of current arrangements and manage the transition towards improved allocation.

www.oecd.org/environment/groundwater-allocation-9789264281554-en.htm



OECD (2017), **Water Risk Hotspots for Agriculture.**

This report discusses the use of a hotspot approach to target and respond to future water risks for agriculture. It identifies countries and regions that concentrate water and agriculture production risks, assesses the impacts water risks could have on agriculture in these regions and on markets and on food security. The report analyses the role of government, farmers and companies, and develops a plan for governments to mitigate these risks and impacts.

www.oecd.org/publications/water-risk-hotspots-for-agriculture-9789264279551-en.htm



OECD (2017), **Diffuse Pollution, Degraded Waters: Emerging policy solutions.**

The report outlines the water quality challenges facing OECD countries. It presents a range of policy instruments and innovative case studies of diffuse pollution control. It concludes with a policy framework to tackle diffuse water pollution. An optimal approach will likely entail a mix of policy interventions to incentivise reductions in diffuse pollution risks, fund water quality improvements, and reflect the basic OECD principles of water quality management – pollution prevention; treatment at source; the polluter pays and beneficiary pays principles; equity; and policy coherence.

www.oecd.org/environment/diffuse-pollution-degraded-waters-9789264269064-en.htm



OECD (2016), **Co-operative water management in the Kura River basin.**

The basin of the river Kura is shared by Armenia, Azerbaijan, Georgia, the Islamic Republic of Iran and Turkey. The river is 1,515 km long; it originates in Turkey, on the north slope of the Allahuekber Mountains, and discharges to the Caspian Sea. This Policy Highlight focuses on the benefits of co-operative water management in Georgia and Azerbaijan, which are neighboring countries hosting a significant stretch of the Kura River.

https://issuu.com/oecd.publishing/docs/cooperative_water_management_in_the



OECD (2016), **OECD Council Recommendation on Water.**

The OECD Council Recommendation on Water captures the main messages that derive from a 2-year consultation process with OECD member countries and stakeholders, in particular members of the OECD Water Governance Initiative. The Recommendation provides a unique source of policy guidance on water management, government and financing that help address the pressing water security issues that central and subnational authorities need to respond to.

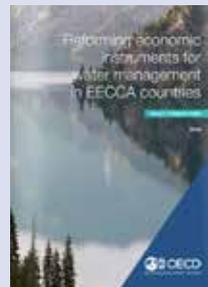
www.oecd.org/water/recommendation



OECD (2016), **Policy Perspectives on water, growth and finance.**

This piece of work sketches an OECD perspective on financing investment in water security and sustainable growth. It takes stock of recent developments on these issues, in particular the reports *Securing Water, Sustaining Growth and Water: Fit to Finance?*, and related work. It defines a programme of work for the Roundtable on Financing Water, a joint initiative with the World Water Council and the Netherlands.

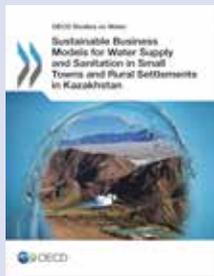
www.oecd.org/environment/resources/Water-Growth-and-Finance-policy-perspectives.pdf



OECD (2016), **Policy Perspectives on Reforming economic instruments for water management in EECCA countries.**

This policy perspective summarises key policy messages and recommendations on the role of economic instruments in addressing key water policy objectives including relevant Sustainable Development Goals in the Eastern Europe, Caucasus and Central Asia region.

https://issuu.com/oecd.publishing/docs/policy_perspective_economic_instrum



OECD (2016), ***Sustainable Business Models for Water Supply and Sanitation in Kazakhstan.***

The report analyses the effectiveness and efficiency of existing business models applied in Kazakhstan and compares them with approaches in the OECD countries. The report recommends reforms to ensure sustainability of operations and financing of water supply and sanitation in rural areas of Kazakhstan.

www.oecd.org/countries/kazakhstan/sustainable-business-models-for-water-supply-and-sanitation-in-small-towns-and-rural-settlements-in-kazakhstan-9789264249400-en.htm

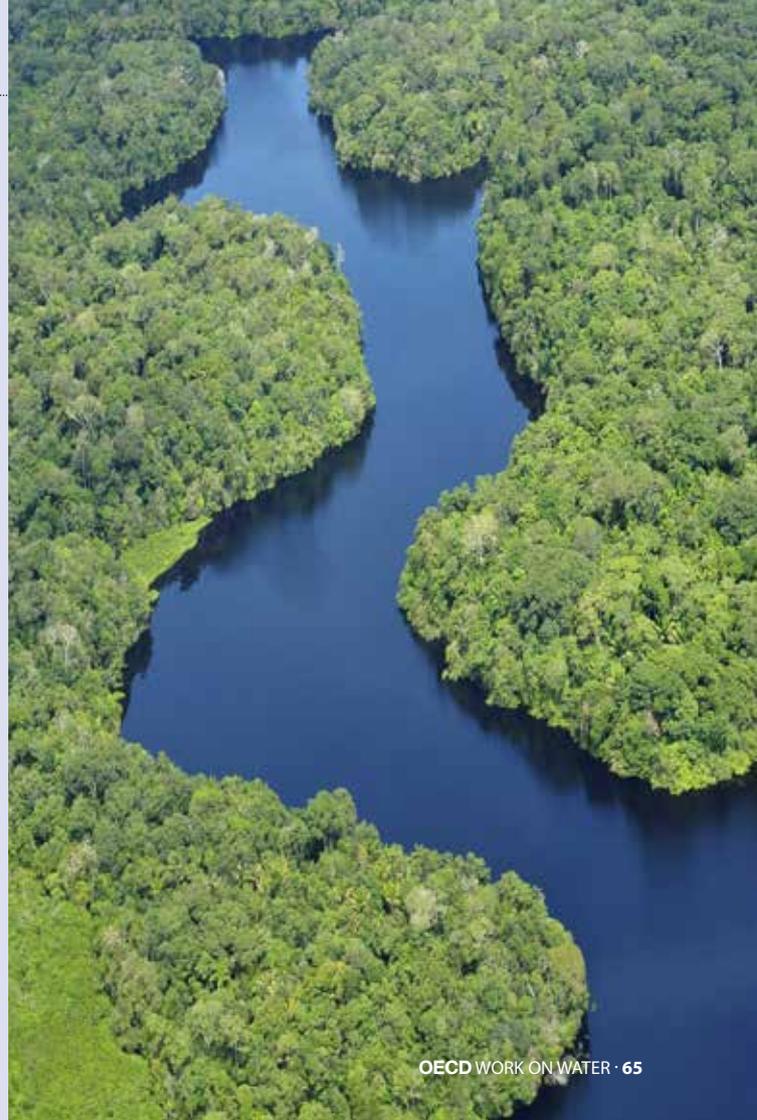


Photo credits

Front and back cover: Water © Dmytro Tolokonov / fotolia.com

Inside cover: River Dniester in the evening © Alexei Averianov / Dreamstime.com

Pages 4 & 5: Mer bleue par temps calme © Unclesam / Fotolia.com

Pages 6 & 7: Crystal clear water of Lake Taupo in the North Island of New Zealand © Dmitry Naumov / shutterstock.com

Pages 8 & 9: Algal bloom in lake in Bavaria © Wolfisler / shutterstock.com

Page 10 & 11: Rice paddy field terrace in Sapa, Vietnam © Rafal Cichawa / fotolia.com

Page 14: Boy drinking from water pipe © Riccardo Mayer / shutterstock.com

Page 15: Beautiful sunset over Czech valley reservoir © Kletr / shutterstock.com

Page 16: Farming irrigation sprinkles system © Igorstevanovic / shutterstock.com

Page 19: Dead fish carp float surface water © John Minster / shutterstock.com

Page 20: Green yellow capsules freely laid on a white table © Marian Weyo / shutterstock.com

Page 21: Rising sea levels cause flooding in coastal areas © JivkoM / shutterstock.com

Page 25: Drought dead crops © Rachelemily / Dreamstime.com

Page 27: Blue water bird in green waterway © Lyndale Woolcock / dreamstime.com

Page 27: Aerial view of water treatment factory © Antikainen / dreamstime.com

Page 28: Dam over Eresma river © Juan Enrique del Barrio / shutterstock.com

Page 33: Sewage system over the river water © Philip Lange / shutterstock.com

Page 34: Summer view at the lake in the park © shalith / shutterstock.com

Page 36: business concept © allstars / shutterstock.com

Page 38: Indian farmer working on field © V.R.Murralinath / fotolia.com

Page 38: Rice paddy field terrace in Sapa, Vietnam © Rafal Cichawa / fotolia.com

Page 39: Women going for the water in well on the desert: © RCH / fotolia.com

Page 40: Aerial view of sewage treatment plant © mariusz szczygiel / fotolia.com

Page 41: Corn field with irrigation sprinkler system © REDAV / shutterstock.com

Page 44: Image of people walking in the rain in the city © carlos castilla / shutterstock.com

Page 44: Frankfurt am Main © SeanPavoinePhoto / fotolia.com

Page 45: Water drops and ripples © Wollertz / shutterstock.com

Page 46 & 47: Field overlooking city © Naska Raspopina / shutterstock.com

Page 49: Mexican open sewer © Juan Manuel Robledo / dreamstime.com

Page 50: River Dniester in the evening © Alexei Averianov / dreamstime.com

Page 50 & 51: Mer bleue par temps calme © Unclesam / fptolia.com

Page 65: Brazil river forest Amazon water © Neil Palmer Photography

Page 66 & 67: Water is poured © jazz3311 / shutterstock.com





This document and any maps included herein are without prejudice to the status of, or sovereignty over, any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

This work is published on the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Organisation or of the governments of its member countries.

“We have the ability to provide clean water for every man, woman and child on the Earth. What has been lacking is the collective will to accomplish this. What are we waiting for? This is the commitment we need to make to the world, now.”

Jean-Michel Cousteau

© OECD August 2019

OECD freely authorises the use of this material for non-commercial purposes. All requests for commercial uses of this material or for translation rights should be submitted to rights@oecd.org.