

## The OECD Environmental Strategy: Progress in Managing Water Resources

Ensuring access to safe drinking water and adequate sanitation

Improving water quality

Applying an integrated river basin management approach

Adopting a strong legal framework

Ensuring full cost-recovery

Reducing leakage from water network pipes

Preventing floods and droughts

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### Introduction

Water is a vital resource for society but needs to be managed carefully to ensure that people have access to affordable and safe drinking water and sanitation, without depleting water resources or damaging ecosystems. The *OECD Environmental Strategy for the First Decade of the 21st Century*, adopted by OECD ministers in 2001, highlights water management as one of the key issues in maintaining the integrity of ecosystems.

The *Strategy* identifies two main challenges facing OECD countries in the management of freshwater resources, namely to:

A: Manage the use of freshwater resources and associated watersheds so as to maintain adequate supply of freshwater of suitable quality for human use and to support aquatic and other ecosystems.

B: Protect, restore and prevent deterioration of all bodies of surface water and groundwater to ensure the achievement of water quality objectives in OECD countries.

The *Strategy* lists nine National Actions that OECD countries agreed to take to address these challenges, ranging from ensuring access to safe drinking water for everyone to using water resources efficiently and limiting water pipe leakage. This Policy Brief looks at the progress made so far in achieving these National Actions, and the areas where more needs to be done.

*The OECD Environmental Strategy for the First Decade of the 21st Century, adopted by OECD Environment Ministers in 2001, identifies five objectives for achieving environmentally sustainable development in OECD countries. The first Objective aims at maintaining the integrity of ecosystems through the efficient management of natural resources, in particular in the three priority areas of climate, freshwater and biodiversity. The other Objectives aim to decouple environmental pressures from economic growth, improve information for decision making, address the social-environmental interface, and improve international environmental governance and co-operation. In April 2004, OECD Environment Ministers will meet again to discuss their progress so far in implementing the Strategy and to identify the areas for which further action is needed. To support their discussions, the OECD has produced a report reviewing progress in implementing the Strategy. This Policy Brief highlights the main progress made in addressing the two main challenges facing OECD countries in the management of freshwater resources, and the nine National Actions they agreed to take in the Strategy to address these challenges.*

### Ensuring access to safe drinking water and adequate sanitation

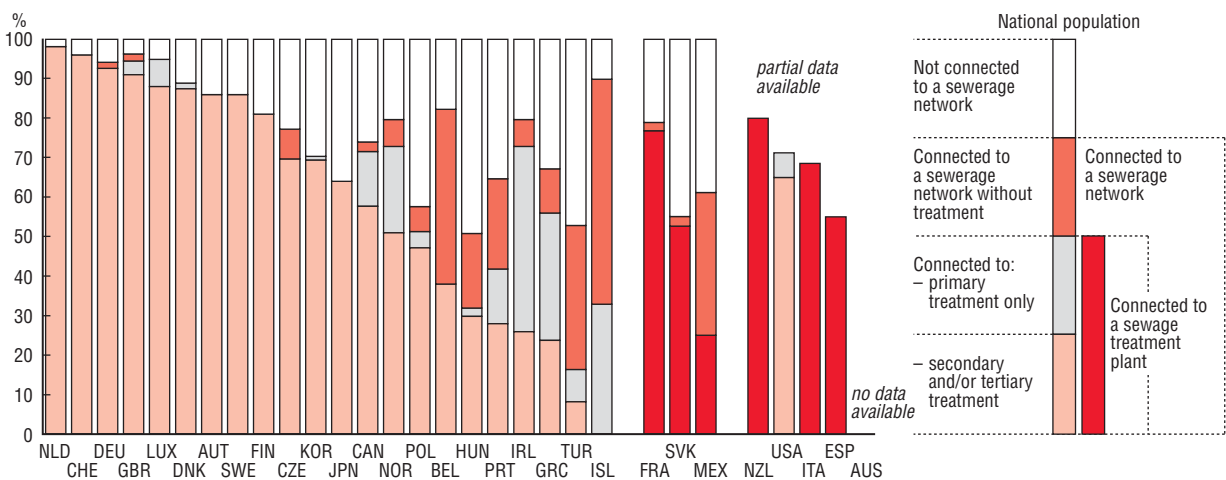
National Action 1 calls on countries to “Ensure access for all to safe drinking water and adequate sanitation”.

OECD countries have greatly improved access by their population to water supply and sanitation over the past decade, but some gaps – such as access by rural populations – remain to be filled. All but a few OECD countries have connected 100% of their populations to safe water supplies. In general, the drinking water supplied to the main urban centres is bacteriologically safe, but countries face some new challenges. Concern about the greater vulnerability of children, the elderly, and those with weakened immune systems to infection by viruses and parasites, which are often highly resistant to the usual chlorine disinfection techniques, is creating demand for more advanced microbiological purification. Other concerns include the increasing need to treat water

for nitrates and pesticides from agricultural run-off, lead levels in water supplies in older buildings, and the effect of disinfectants and increased chlorination.

The share of the population connected to advanced wastewater treatment systems, on the other hand, still needs to be increased. About 65% of the population in OECD countries is connected to public wastewater treatment plants, and many of the rest use private sewage treatment (see Figure). Achieving 100% coverage through public systems is neither technically nor economically desirable, nor is it environmentally necessary. In many OECD countries, the proportion of the population connected to a community sewerage system is approaching its economic maximum. Several countries have done well in providing small treatment systems for isolated settlements. Improvement is still needed in terms of the level of sewage treatment; for some countries this will involve increasing introduction of advanced treatment, and for most it will mean ensuring nutrient removal in sensitive areas. ■

Figure 1. Sewerage and sewage treatment connection rates, latest year available



Source: OECD.

### Improving water quality

National Action 2 calls on countries to “Achieve agreed water quality targets and adopt additional targets necessary to ensure the ecological value of in-situ water resources and the ecological functions they provide”.

Despite major efforts over the past two decades to reduce end-of-pipe discharges, a number of OECD countries cannot yet claim to satisfactorily meet the baseline quality standard for inland waters (e.g. suitability for fishing and swimming). While dissolved oxygen content in larger rivers is satisfactory most of the year, and bacterial contamination has been greatly reduced, there has been no improvement

on other fronts. Stabilisation of nitrate concentrations in some basins has occurred, probably as a result of nitrogen removal from sewage effluents and less over-fertilisation in agriculture, but in many rivers this trend is not apparent. Pollution caused by urban stormwater run off in urban areas remains a challenge. Most OECD countries have found it very difficult to protect groundwater quality and in many places the trend appears to be towards a worsening of quality. Many agricultural areas have elevated nitrate and pesticide levels, and quality standards are exceeded regularly where agriculture is particularly intensive. Recent progress in shifting towards the use of less hazardous and persistent pesticides should contribute to a reduced impact of pesticide run-off on water bodies.

In estuaries and coastal areas, there has been an increase in diffuse pollution loads (e.g. from agriculture, traffic, erosion from earthworks, or deposition of heavy metals and persistent organic pollutants). Except in the case of the North Sea and Baltic Sea, OECD countries have generally not established clear objectives for reducing pollutant discharges in seawater.

To better protect aquatic ecosystems, there is a trend away from a uniform national approach to water management towards “place-based” approaches, reflecting consideration of the ecological value of water resources. ■

### Applying an integrated river basin management approach

National Action 3 calls on countries to “Apply the ecosystem approach to the management of freshwater resources and associated watersheds, based on integrated river basin management”.

Most OECD countries have been moving toward an integrated river basin management or an ecosystem approach to water management. Such approaches often reflect a move toward water quantity and quality management at watershed or river basin level, greater consideration of interactions between urban and rural activities and water quality, and greater recognition of the need for rivers and lakes to support aquatic life, as well as to meet human health and recreation criteria.

Some OECD countries have long established river basin agencies, and many others are now creating them. Other countries are improving integration by creating ad hoc entities for the protection of specific water bodies. Some countries have set up so-called

“river contracts” in which central and local governments, private enterprise and non-governmental organisations (NGOs) commit themselves to a set of co-ordinated actions to clean up part or all of a river by an agreed date. In some OECD countries, institutional capacity at sub-national level has been insufficient to allow adequate implementation of integrated water management policies.

In some cases, an integrated river basin management approach is being applied even to transboundary water resources. ■

### Adopting a strong legal framework

National Action 4 calls on countries to “Develop and apply legal frameworks supported by appropriate policy instruments to ensure the sustainable use of freshwater resources, including measures to enhance their efficient use”.

Many OECD countries have been strengthening their legal frameworks for water management. For example, the European Union Water Framework Directive provides a comprehensive, river basin management approach to prevent and reduce pollution, promote sustainable water use, protect the aquatic environment, improve the status of aquatic ecosystems and mitigate the effects of floods and droughts in European countries.

Under the Plan of Implementation agreed at the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg, all countries are committed to developing integrated water resources management (IWRM) and water efficiency plans by 2005. IWRM aims to maximise water use efficiency and equity in allocating water across different social and economic groups, while protecting the water resource base and associated ecosystems. Many countries have made significant progress in terms of the legislation and institutions required to achieve integrated water management. However, the implementation of IWRM systems in OECD countries will require considerable investment, with clear targets and a schedule of expenses to protect aquatic ecosystems, protect against floods, improve river quality, and ensure adequate water infrastructure.

OECD governments use a range of policy instruments to manage water demand. These include water pricing, sometimes combined with charges to agricultural or industrial users for direct water abstractions and/or

tradable permits, as well as effluent limits and standards for pollution discharges to waterbodies. There has been a marked trend in many countries toward water pricing tariff structures and levels that better reflect the marginal costs of water use, and thus provide stronger incentives for efficient use. Nationally uniform effluent limits are often inefficient, as the assimilative capacity of receiving waters is not the same everywhere. Other policy instruments in use or planned in some countries include information or awareness raising campaigns regarding water use efficiency, Pollutant Release and Transfer Registers (PRTs), and voluntary agreements. For example, the establishment in Korea of a comprehensive programme to manage household water demand, support installation of water-saving devices, and enforce water pricing tariffs led to a 450 million tonne reduction in municipal water demand in 2002 compared with 1999.

There has been a general trend in many OECD countries for government to become the “regulator” of water services rather than their “provider”. In many cases this has meant greater autonomy for water utilities, in some countries accompanied by privatisation of water service systems. Most countries moving in this direction have opted for the private-public partnership or “concession” model, where the private sector participates in managing some services, but the public sector retains ownership of the system. While in many cases such a move has led to more efficient and cost-effective provision of water services, in some countries the effectiveness of the regulatory function of government has been questioned, in particular with respect to ensuring affordable access to water services by vulnerable populations and sufficient investment in the necessary infrastructure and purification systems. ■

## Ensuring full cost-recovery

National Action 5 calls on countries to “Establish policies aimed at recovering the full costs of water services provision and the external costs associated with water use, and provide incentives to use water resources efficiently (demand side management), taking the social impacts of such policies into account”.

There is growing acceptance in most OECD countries that the full cost of providing household, industrial and agricultural water services needs to be recovered. Many are working towards applying the Polluter Pays

and User Pays Principles. Most use a range of economic instruments to provide incentives for efficient water use, including by making water prices or charges better reflect the marginal costs of water use, reducing or abolishing subsidies to water use, introducing water abstraction or pollution charges, and using tradable abstraction or pollution permits.

Service fees for municipally supplied water services are in place in almost all OECD countries. In about one-third of countries, they now cover the full cost of operating and maintaining water facilities and may include all or part of capital costs. While municipal water users increasingly pay prices that closely reflect the economic costs of providing water services, cross-subsidies between different user groups are common. Few municipal water prices reflect the environmental costs of water use. Irrigation in agriculture receives the largest subsidies to water use in OECD countries, and in a number of countries it is provided free. While the water quality needed for irrigation is less than that required for drinking water, the infrastructure and operating costs of irrigation systems are often quite substantial. Despite this, OECD households and industries may pay as much as 100 times as much as agricultural users for their water.

The structure of water pricing tariffs varies considerably among OECD countries, but there is a trend away from fixed charges and toward tariffs which include both a small fixed component to reflect fixed costs such as connection or metering costs and a component to reflect the amount of water consumed. The structure of wastewater charging systems tends to closely follow that of household water supply systems in most OECD countries, and so is based on the water used rather than the wastewater produced.

Pricing systems based on the amount of water used encourage efficient water use. Metering water consumption is a prerequisite for such systems. About two-thirds of OECD countries already meter more than 90% of single-family houses. In apartment blocks, where the majority of OECD populations live, metering in individual apartments is less common or even non-existent. In metered systems, the trend is towards increasing-block tariffs, where the charge increases with each additional unit of water used or wastewater treated, further strengthening incentives for efficient water use. Some countries have also been experimenting with “peak pricing” arrangements, especially seasonal pricing, to better manage demand.

Direct water abstractions (e.g. from rivers or ground-water reserves) represent roughly 75% of total water consumption by industry in OECD countries. Many countries have implemented resource charges for direct pollution and/or withdrawal by industry and, to a lesser extent, agriculture users. Abstraction charges are in use in about half of all OECD countries. In most cases, abstraction charges were created to raise revenue for administration and management costs, so that their level is generally low. Pollution charges for discharging effluent to natural waters now exist in more than a dozen OECD countries. These charges are often quite high, and as a result there is a trend towards increased in-house water recycling or water treatment in large industries.

Municipal water prices have continued to increase in OECD countries, but at a slower rate. During the first half of the 1990s, municipal water prices rose by about 3.7% annually, but this slowed to just under 2% by the late 1990s and early 2000s. This may in part reflect public opposition to higher water charges. Consumers' willingness to pay is likely to become an increasing concern, as more countries move towards full cost internalisation and as water-related expenditure continues to rise to meet higher drinking water standards and to cover replacement of pipe networks and upgrading of sewage treatment systems.

To address social concerns about affordability of and access to water services, most OECD countries have introduced measures to make water more affordable to the population at large and to selected groups of people (e.g. large families, pensioners, poor people). These measures include reducing the VAT or waste water tax, use of progressive social tariffs, providing targeted assistance for water to poor people, avoiding water disconnection and abolishing annual fixed fees. ■

## Reducing leakage from water network pipes

National Action 6 calls on countries to “Significantly reduce water network leakage”.

Municipal water networks are estimated to lose about 30% of their input due to leaks in most OECD countries. This exceeds the economically optimum level – estimated to be on average between 10% and 20%, depending on the nature of individual systems. A

number of OECD countries have been replacing or upgrading old water pipe networks, and some have been able to reduce water network leakage to as little as 10-12%.

For many others, water network leakage remains a problem. Reducing such leakage, as well as encouraging greater water conservation efforts by industrial and municipal users, could stabilise or even reduce total water demand. While significant investments are needed to reduce water network leakage, in some cases this could enable countries to avoid or postpone expensive infrastructure investments to expand water supply systems, including environmentally intrusive measures such as building dams and reservoirs. ■

## Preventing floods and droughts

National Action 7 calls on countries to “Develop appropriate strategies to manage watersheds ecologically to prevent extreme flood and drought risk”.

Most OECD countries face some seasonal or local problems, such as seasonal droughts, shrinking groundwater reserves, or falling groundwater tables. A number are threatened by major floods or droughts, with severe economic and social impacts. There is a risk that climate change will exacerbate such extreme weather events.

Flood damage has been significant in some OECD countries in recent years, accompanied in some regions by economic losses of up to a few percent of GDP. While intense rainfall is a natural occurrence, the magnitude and velocity of the ensuing large water flows are affected by human actions, as is the vulnerability of human settlements to flooding and erosion. Natural flooding has been exacerbated in many cases by fragmented responsibilities and lack of integration of policies relating to flood protection, land use planning, and flood damage compensation. Even where coherent policies are in place, land use and building height restrictions in flood plains are not always respected, and compensation payments may even permit property owners to return to the pre-flood situation that led to the damage in the first place. Some countries which have experienced major flooding recently – such as those around the Rhine basin, in Central Europe, and Korea – have implemented catastrophe plans to prevent future events where possible, and to ensure better man-

agement of catastrophes where they cannot be avoided.

Local and regional droughts and water crises are becoming more common, particularly in OECD countries with extensive arid or semi-arid regions. In many of these regions, strong water demand management policies – such as high municipal water prices and limits on total water abstraction – are being used to manage demand, but often these are not sufficient and so available water resources continue to be depleted. ■

### Improving transboundary co-operation

National Action 8 calls on countries to “Ensure co-operation for the environmentally sound management and efficient use of transboundary water resources to reduce flood risks and to minimise potential conflicts from the use or pollution of transboundary water resources”.

OECD countries have made considerable progress in recent years in resolving issues relating to transboundary waters. Bilateral, regional or multilateral agreements have been reached for most such waters, and more effective agreements have replaced earlier ones. Countries have implemented the OECD Recommendations on Principles Concerning Transfrontier Pollution and on Water Management Policies and Instruments adopted in the mid-1970s. Multilateral conventions have been adopted and are being implemented, such as the 1992 Helsinki Convention, which set general rules for transfrontier waters in Europe. Numerous bilateral or multilateral plans and strategies are in place. Some international agreements include emergency preparedness plans and flood prevention plans.

Several large basins – such as the Rhine and Danube – are now managed under international agreements, with a basin committee and a permanent secretariat. However, the issue of equitable sharing of water between states sharing a number of rivers or other water bodies is still not settled. Measures to avoid international disputes over water use arising from water diversion, such as prior notification, have been used where a river's regime has been changed (e.g. the Euphrates river) or where bilateral agreements have been negotiated between countries (such as for the Scheldt, Meuse, Danube, Oder, and Rhine rivers, and for Portuguese-Spanish river basins).

In the case of transboundary water pollution, common standards have been agreed in a number of cases to avoid disputes, such as within the European Union, and for some water bodies integrated river basin management systems have been introduced. Quantified discharge/emission reduction targets for a large number of pollutants have been set for various rivers and for inputs to the North Sea and Baltic Sea. As a result of such measures, monitoring of some of the most contaminated transboundary waters in OECD countries shows declining pollution levels. In some cases, to reflect principles of common but differentiated responsibilities, there have been financial transfers between countries to overcome differences in environmental protection priorities, for example along the US/Mexico border and with wastewater discharges to the Baltic Sea. ■

### Supporting developing countries

National Action 9 calls on countries to “Provide support for capacity building and technology transfer to assist developing countries in managing and developing their freshwater resources in a sustainable manner, and in ensuring safe drinking water and adequate sanitation”.

A significant portion of development assistance from OECD countries supports developing countries in the sustainable management of their freshwater resources. Support to water supply and sanitation through bilateral and multilateral aid amounts to about USD 3 billion a year, with an additional USD 1-1.5 billion a year provided in the form of non-concessional lending. Total bilateral aid to the sector has been declining since the mid-1990s, in part reflecting cuts in official development assistance (ODA) in general, but also reflecting a decline in the share of aid to the water sector. Over the 1990s, aid to the water sector declined from 7% to 6% of multilateral outflows (see Table).

Through the UN Millennium Declaration, all UN member states in 2000 set a target of halving the proportion of people in the world without access to safe drinking water by 2015. Two years later in Johannesburg, the World Summit for Sustainable Development adopted the same objective, as well as halving the proportion of people who do not have access to basic sanitation. Achieving these goals will require additional financing of an estimated USD 10-49 billion per year, on top of current investments to the sector of about USD 30 billion. ODA represents a relatively

Table 1. **Water supply and sanitation aid commitments by DAC donor**  
1996-2001, annual average and share in total sector-allocable aid<sup>1</sup>

	USD million		% of total aid	
	1996-1998	1999-2001	1996-1998	1999-2001
Japan	1 442	999	14%	14%
Germany	435	318	19%	11%
United States	186	252	6%	4%
United Kingdom <sup>2</sup>	116	165	8%	7%
France	259	148	13%	13%
Netherlands	103	75	8%	7%
Denmark	103	73	15%	13%
Spain	23	60	4%	8%
Austria	34	46	17%	18%
Australia	23	40	3%	6%
Sweden	43	35	6%	6%
Norway	16	32	4%	5%
Italy	35	29	14%	9%
Switzerland	25	25	7%	6%
Canada	23	22	4%	4%
Belgium	12	13	4%	4%
Finland	18	12	11%	8%
Luxembourg	2	8	4%	13%
Ireland	6	7	7%	7%
Portugal	0	5	1%	3%
New Zealand	1	1	2%	2%
<b>Total DAC</b>	<b>2 906</b>	<b>2 368</b>	<b>11%</b>	<b>9%</b>
<b>Multilateral Aid</b>	<b>575</b>	<b>730</b>	<b>7%</b>	<b>6%</b>
<b>Total bilateral &amp; multilateral aid</b>	<b>3 482</b>	<b>3 098</b>	<b>10%</b>	<b>8%</b>

1. About 60-75% of DAC Members' bilateral ODA is sector allocable. Contributions not susceptible to allocation by sector (*e.g.* structural adjustment, balance-of-payments support, actions relating to debt, emergency assistance, internal transactions in the donor country) are excluded from these numbers in order to better reflect the sectoral focus of donors' programmes.

2. A DFID study shows that since 1999 actual expenditure for water supply and sanitation is about double the levels reflected here. Approximately half of the UK water expenditure takes place within multisector projects.

Source: OECD, DAC CRS.

small fraction of current investment in water supply and sanitation in developing countries. It is likely that strengthening other forms of financing – including raising revenues internally through water charging and general taxation, better management of public expenditures on water, and private sector investment – as well as bilateral and multilateral aid, will be important if these targets are to be met. ■

### For further information

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## For further reading

- **The Price of Water: Trends in OECD Countries**, 1999  
ISBN 9264173994, US\$23, €22
- **OECD Environmental Strategy for the First Decade of the 21st Century** –  
available at: [www.oecd.org/env/min/2001](http://www.oecd.org/env/min/2001)
- **Environmental Indicators for Agriculture, Volume 3: Methods and Results**, 2001  
ISBN 926418614X, US\$69, €73
- **OECD Environmental Outlook**, 2001  
ISBN 9264186158, US\$65, €75
- **Environmental Performance Reviews: Water**, 2003  
ISBN 9264101330
- **Improving Water Management: Recent OECD Experiences**, 2003  
ISBN 9264099484, US\$24, €24
- **Social Issues in the Provision and Pricing of Water Services**, 2003  
ISBN 9264099913, US\$37, €37
- **Financing Strategies for Water and Environmental Infrastructure**, 2003  
ISBN 9264102760, US\$25, €25
- **OECD Environmental Strategy: 2004 Review of Progress**, 2004  
ISBN 9264107800, US\$50, €40
- For more information of the work of the OECD Environment Directorate, see: [www.oecd.org/env/](http://www.oecd.org/env/)
- For more information on the 2004 Meeting of OECD Environment Ministers, see: [www.oecd.org/envmin2004](http://www.oecd.org/envmin2004)

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