Securing tomorrow's water

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See www.oecd.org/worldwaterforum4

Every Thursday at noon the *Inbunal de las aguas* (water court) meets outside the cathedral in the city of Valencia along Spain's Mediterranean coast. For more than a thousand years, it is believed, the court has ruled on disputes affecting the irrigation of the arable lands known as *huertas*, which nourish the lemon trees, the oranges and other crops that give this region its distinctive scents and flavours, and for many, livelihoods as well.

Water is basic to life: it is essential for health, agriculture, industry, and the maintenance of key ecosystems. Today access to and the management of water resources have become global issues, affecting social and political relationships across the world.

UN estimates suggest that by 2025 some 1.8 billion people will be struggling to make a living in countries or regions afflicted by "absolute water scarcity". This means without action, water shortages will worsen and there will simply not be enough water available, particularly in more arid areas, to maintain food production, or to meet household, industrial or environmental needs.

Most countries in the Middle East and North Africa already fall into this category. Rising populations, growing industrial production and consumption in emerging and developing countries look set to lengthen the list of countries experiencing such scarcity, with Pakistan, South Africa and large parts of India and China set to join it by 2025. Climatic variability, particularly in many semi-arid regions, further complicates the situation.

Then, there is also the very pressing issue of health. Take diarrhoea. In a developed country, this disease is easily cured with a little salt in a glass of water. In many developing countries, however, it is the number one killer of children, due mainly to a lack of clean water.

It is against this background that the job of achieving the water targets under the Millennium Development Goals and agreed in 2002 at the World Summit on Sustainable Development must be set: halving the proportion of people without sustainable access to safe drinking water and sanitation by 2015 will be no mean feat.

While access to water in poor countries is a very grave concern, the challenge of providing safe water is also a major issue in developed countries. In fact, the OECD Environment Strategy to 2010,* adopted by

Uneven access

% of population served by water supply and sanitation services 2002

		World	Developed countries	Developing regions
Water supply	Urban	95	100	92
	Rural	72	94	70
	Total	**83**	**98**	**79**
Sanitation	Urban	81	100	73
	Rural	37	92	31
	Total	**58**	**98**	**49**

Source: OECD (2006, forthcoming), Futures Project on Global Infrastructure Needs, Paris.

OECD environment ministers in May 2001, also identifies freshwater as a priority issue for OECD countries, and with good reason. Safe water has been compromised by pollution of our water basins, while water supply and sanitation infrastructures in many urban centres are ageing and in need of repair or replacement. In North America some urban water systems are nearly 200 years old! The financing required to meet these challenges is enormous, and a solution has to be found.

Scarcity is also a problem. Groundwater has reached new lows in many regions, for example in the US and France, largely reflecting over or inefficient water use in farming, as well as groundwater pollution, salination, and so on. Recently, the BBC reported that because their drinking water reserves have not recharged this winter, the inhabitants of the county of Kent in the UK, which is hardly an arid place, will face severe restriction measures this year. Other OECD countries face similar problems.

The good news is that indefinite water scarcity is by no means a *fait accompli*. It is true that freshwater is a fragile resource–just over 2% of total water reserves on the planet are freshwater, and most of that is ice. Yet despite this, overall water supplies will probably remain plentiful as long as they are managed properly. Not only must the right policies be put in place, but these then have to be implemented thoroughly and coherently.

As a natural resource, water is obviously influenced by major forces, not least the possible effect of climate change on rainfall. At the same time, water continues to be used inefficiently almost everywhere, while inadequate or poorly maintained infrastructure leads to remarkable levels of leakage. This is not nature's fault, and it is our common responsibility to put it right.

Much of the problem comes down to economics. water is a fragile resource subject to competing demands. As a basic economic principle, it should be treated as a valued resource and charged for in a way that encourages efficiency and prevents needless overuse. At the same time, water is a social good: safe water is a basic need for us all, and so affordable access must be a priority, particularly for the poorest and the vulnerable.

Moreover, water is inherently political: for policy to work, co-operation and agreement are needed at every level, from international operators and industry all the way down to local villages and private users. Popular participation–as illustrated in user associations in many developing countries and public-private partnerships–can help to bring relevant stakeholders together to address water management challenges.

Work carried out in the OECD shows that price-based policies work when user charges are set on a full cost recovery basis, which reflects the actual costs of water abstraction and delivery, including operation, maintenance and capital costs. This approach would provide an incentive for people to use water efficiently, while generating revenues to support necessary investment in infrastructure. Consequently, both efficiency and overall welfare require that all users–households, industry and agriculture–should pay for the water they actually use.

Even policies targeting poor users must provide incentives to be efficient with their water use; no-one can afford to ignore this principle. Water, unlike many other commodities, is a public good. Hence, some will argue for providing cheap water services across-the-board. The trouble with this view is that even where prices are cheap, access is still denied to many, or at an unfair price. There is also the risk that the loudest interest groups will receive more equal treatment than others.

Across-the-board cheap water supplies are both inefficient and subsidise wasteful water use by rich and poor alike. However, pricing must clearly be bolstered by measures to ensure equitable access to water services by the poor. To achieve this, many countries have developed specific targeted measures to support affordable access to essential water services by the poor, while still providing incentives for efficient water use. Such targeted measures include various types of income support, including through general increases in social welfare support, like those in Chile, or tariff-based systems designed to reduce charges specifically for low-income households, such as those operated in Greece, and some Asian countries, like Indonesia. Rallying stakeholders can also pay off; in France, in addition to legislation and a charter on water solidarity, a national convention from 2000 stipulates that no water disconnection should occur when a baby or an elderly dependent person is part of the household, whatever its financial situation.

In most countries, including the OECD area, industrial or household users pay over a hundred times more for their water than farmers. Yet, agriculture is by far the biggest single user of water. Is that fair? True, the quality needed for irrigation may be lower and the delivery systems less sophisticated than for households, but water usage is still effectively

cross-subsidised by other, sometimes poorer, users. Paradoxically, in cases where water restrictions are in operation, farmers may be exempt.

In general, if water usage reflected the true price of water, farmers would face a choice: either to get tough on their water consumption or shift into producing something less water-intensive. Some arid countries are already doing this, and are even ceasing cultivation of some crops that generate less added-value.

Raising prices or reducing subsidies is not easy politically or socially, particularly in farming, where strong historical, cultural and political factors come into play. There may also be concerns to maintain national food security, though there are probably more efficient ways of addressing those concerns than subsidising water. Ultimately, the need to manage water resources sustainably gives us little choice but to activate reforms; at the very least, the status quo cannot be allowed to continue.

There are of course places where available water supply is below the minimum recharge levels or has become polluted, affecting reliable supplies. Sometimes piping or shipping water in from neighbouring regions is a solution. Technology might also help, such as for desalination.

Whatever the solution to the water challenges, political will and economic instruments are no good without financing. Financing needs to be mobilised to create new water projects and upgrade infrastructure. For most countries a combination of locally raised finance and private investment supported by strategic public investment is the answer. Developing countries will also look to aid. While taxation may have a role to play in some cases, for sustainable water security, a robust financing system should rely primarily on water charges, with provisions for affordable access by the poor.

However, in all but the very poorest places, Official Development Assistance (ODA) for water has been squeezed in relation to other sectors of aid in recent years and has become concentrated on a handful of countries. Water supply and sanitation accounted for only 6% of total sector-allocable aid of OECD DAC countries in 2004, down from 9% in 1999-2000. Sub-Saharan Africa has not benefited much from any new water aid. Foreign direct investment into water and sanitation has had to compete intensely with sectors offering higher returns, such as energy. Extra political effort will be needed to mobilise resources and boost ODA for water, and policymakers could do more to improve the framework conditions for investment.

The international dimension of water lends all of these challenges extra urgency. Transborder water basins and sources, from rivers and lakes to groundwater and ice caps, cover some 40% of the world's population and 60% of the earth's freshwater volume. Water is both strategically vital, as well as geopolitically sensitive. Countries and regions that share water sources will need to ensure together that proper management practices are in place, particularly if water is scarce or vulnerable to pollution, or vital for trade.

As a basic economic principle, water should be treated as a valued resource and charged for in a way that encourages efficiency and prevents needless overuse.

The only way to achieve this is for concerned parties to talk, and the earlier the better. As an organisation created to bring once-conflicting countries together, the OECD understands this more than most. Negotiations can deliver agreements on the likes of information and notification, water abstraction levels and common emission standards for water pollution.

Cross-border agreements can help improve joint management of whole water basins, and are now in place for many transboundary water resources. Financial compensation can also be used to support such agreements. For example, compensation is used between Mexico and the US in the case of the Tijuana waste water treatment plant, and there are agreements in place to oversee waste water discharges into the Baltic Sea and pollution loads in the Rhine and Danube. Also, UN bodies have contributed to an initiative on water and security in Central Asia, a zone of potential water-related conflict. Forums for dialogue and co-management can help prevent disputes over water from spreading or spinning out of control.

Water is set to become a more important issue in all our lives. In this global village, we must work together to secure the future of this basic resource for everyone. Valencia's ancient *Tribunal de las aguas* holds timeless lessons for us all. ■

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*Note: The OECD Environmental Strategy points to the need to manage the use of freshwater resources and associated watersheds in a way that maintains an adequate supply of freshwater of suitable quality for human use, while still supporting aquatic and other ecosystem needs. In adopting this strategy, OECD countries pledged to undertake national actions aimed at meeting this challenge, and adopted three broad indicators for measuring progress: reduced intensity of water resource use; improved ambient water quality; and a larger share of the population connected to secondary and tertiary wastewater treatment systems. For more information, visit www.oecd.org/env.

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Water and farms
Towards **sustainable** use

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Both consumption and pollution of water by agriculture are becoming serious concerns. Yet, water resources can be used much more efficiently in producing food and fibre, while minimising pollution and supporting ecosystems. How to achieve this depends on mindsets and societal goals, as well as institutional systems and structures. And that means government.

A widely held view is that developed countries are water-abundant and farmers need pay little attention to issues like water management or quality. If only that image were true. Rising production of thirsty crops and livestock have brought severe strains on water resources everywhere, including the richest countries.

Consider the US, which is one of the world's largest agricultural producers. There, irrigated agriculture has been depleting groundwater resources beyond natural recharge rates for several years in some regions. For example, in the High Plains (Ogallala) aquifer, which irrigates more than 20% of US cropland, the water level has fallen, and is close to depletion in parts of Kansas. In the Texas Panhandle, water depletion now poses a serious threat to the sustainability of the agricultural and rural economy.

The US is by no means the only developed economy faced with such a problem. In France, also one of the world's leading agricultural exporters, farming's share in groundwater use rose from 10% in the mid-1980s to 17% by mid-1990s. In fact, OECD agricultural water use has increased more rapidly than for other uses over the past decade, accounting for 45% of total water use. This reflects a 6% expansion in the irrigated area in agriculture, in particular for cereals, horticultural crops like vines, and improved pasture.

Projections over the next decade suggest that demand for water from irrigators will continue to rise, notably in countries where irrigated farming provides the major share of agricultural production, such as Australia, Mexico, Spain and the US. This means stiffer competition for water among other users, too. Moreover, the growing incidence and severity of droughts over the past decade, perhaps related to the impact of climate change, is raising the pressure on irrigated farming in many drier and semi-arid areas.

Agriculture's share in total groundwater utilisation is above 30% in some OECD countries, and farming now draws an increasing share of its supplies from deeper underground aquifers. Use of groundwater by irrigators is well above recharge rates in some regions, which is threatening the economic viability of farming in those areas.

While farms can act as guardians of the environment, in too many cases the opposite is happening.

The dilemma is that farming can be a boon and a bane for the environment. Over-exploitation of water resources by agriculture has damaged some aquatic ecosystems, and has harmed recreational and commercial fishing. On the other hand, farming systems can bring environmental benefits to water catchments by providing habitats, replenishing groundwater reserves and helping to control flooding through provision of

riparian buffer strips, tree planting, terracing and good management.

But while farms can act as guardians of the environment, in too many cases the opposite is happening. In some countries the low uptake of water-efficient irrigation technologies, such as drip emitters, and the poor maintenance of irrigation infrastructure has led to inefficiencies in water use. This results in water losses, as well as higher water application rates for every hectare irrigated. But there are encouraging signs that in other countries like Australia, per hectare water application rates have fallen with improvements in water management practices. In short, with proper techniques and incentives to take up the right technology, the stress on groundwater resources can be relieved.

Pollution on the cheap

But use is only part of the challenge. Farming is also a major source of groundwater pollution in many countries. Over a fifth of groundwater monitoring sites in agricultural areas of Denmark, the Netherlands and the US record nitrate levels that exceed drinking water standards. This is a particular concern where groundwater provides the main source of drinking water supplies for both people and livestock. Moreover, the situation is likely to deteriorate, since phosphates put into the soil even a few years ago will, because of particular physical properties, take many years to seep into the groundwater.

The impact of agriculture on water quality has improved slightly over the past decade, reflecting reductions in livestock waste, fertiliser, and pesticide run-off and leaching in response to public concerns and policies. But despite the improvement, *absolute* levels of agricultural pollution remain high in many regions. Nitrogen and phosphorus sources of water pollution are relatively more important, too, as industrial and urban sources of pollution have decreased.

The question is how to tackle these issues. The financial costs of agricultural pollutants, such as nutrients and pesticides in rivers and lakes, are high.

Who pays?

Water prices per cubic metre, selected countries, late 1990s

Water prices (US$/m³)	Agriculture	Industry	Households
Netherlands	1.44	1.075	3.16
Austria	1.005	..	1.05
France	0.0813	0.95	3.11
Greece	0.0515	..	1.14
Spain	0.0485	1.075	1.07
US	0.0459	0.505	1.25
Hungary	0.029	1.535	0.45
UK	0.0205	1.675	2.28
Australia	0.0195	..	1.64
Portugal	0.0175	1.255	1.0
Turkey	0.005	1.675	1.51
Canada	0.00185	1.59	0.7

Note: Some caution is needed in comparing these figures, because water for agriculture is generally of lesser quality than for households, while infrastructural and conveyance costs may be lower.

Source: OECD

Farmers often pay very low prices for water delivered and used compared to households or industry.

According to the UK Environment Agency, agricultural water pollution costs around €345 million per year, affecting drinking water and aquatic ecosystems. This accounts for about 40% of total water pollution costs in the UK.

The costs of bringing water quality in agricultural areas up to standard for environmental and recreational uses would obviously be higher than for drinking water in many OECD countries, given the widespread eutrophication of rivers and lakes in farming regions, and the damage to aquatic organisms from pesticides. Agricultural nutrient pollution of estuaries and coasts is also becoming a more pressing issue, as this causes algal blooms that damage marine life.

Regulations can limit water pollution, but they are not enough. Policies that provide subsidies linked to production misalign farmers' incentives, aggravating overuse and pollution of water in most OECD countries. Although the quality of farm water is usually inferior, farmers often pay very low prices for water delivered and used compared to households or industry. In the US, for instance, farmers pay on average around $0.05/m³, compared with $0.50/m³ paid by industry; in France the respective figures are $0.08/m³ and $0.95/m³; and for Spain $0.05/m³ for farms and 1.08/m³ for industry. At least on price, farmers have little if any incentive to become more efficient in their use of water.

Even if the incentives were created, there is a question of who pays. Property rights to water are often ill-defined in agriculture—a well on a farmers land might belong to a village, for instance. This makes the polluter pays principle hard to enforce.

In short, for many OECD countries, agriculture's impact on water resources is not sustainable. Policies and actions are beginning to place a high priority on new management approaches, using better regulation as well as instruments like market-based water trading. There is wide recognition of the need for better pricing structures that reflect the costs and benefits of water in agriculture. And there is a need for all countries to reinforce the monitoring and evaluation of their reform initiatives to ensure that they are moving in the right direction.

Non-OECD countries face similar concerns, even if there is the difficulty in more arid economies of providing even a very basic supply of water to cultivate crops and rear livestock to feed their growing (richer) populations. In general, however, countries are at different stages in reforming their water policies.

An OECD workshop on agriculture and water held in Australia in November 2005 under the banner of "Sustainability, Markets and Policies", recommended a number of actions for consideration by policymakers. First, they should use a mix of cost-effective and coherent measures, ranging from

watershed to national levels, to improve the management of water both for farming and to support aquatic ecosystems. Second, they should turn to scientific research, water-use accounts and water-quality indicators to underpin their policymaking. A third recommendation is to identify the precise property rights attached to water withdrawals, water pollution and ecosystem provisions.

Also, clear lines of responsibility in water management should be established, with a commitment from governments to resource the necessary actions properly, especially given the challenges related to climate change and climate variability. Policymakers should strengthen reforms with instruments like water pricing and trading, water service competition or benchmarking performance where competition is limited. And they should enhance the capacity for farmers, industry and community groups to participate in the design and delivery of policies for water management.

Developed countries are at last waking up to the realisation that, far from being abundant, water is a fragile resource and that the right market and policy signals must be put in place. They are starting to address the issues, but for many countries there is still a long way to go. ■

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water

A quality conundrum

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Achieving the Millennium Development Goal on water should not only require extension of access, but proper maintenance of existing infrastructure, too. It is a long-term challenge.

When world leaders agreed upon the United Nations Millennium Declaration in 2000, and then staged the 2002 World Summit on Sustainable Development, they set themselves some ambitious world poverty reduction goals: the Millennium Development Goals (MDG). One of the MDGs is to "halve, by 2015, the proportion of the people without sustainable access to safe drinking water and basic sanitation". That goal is turning out to be a more complicated proposition than many expected.

Since the 2000 summit, a UN structure known as the Joint Monitoring Programme (JMP), created to check progress on implementing the various targets set, has come under repeated criticism on the grounds that the indicators used provide a distorted picture of the challenge faced. Quite remarkably, they fail to take account of whether the water to which people have access is really safe to drink and whether access is sustainable.

Most minds focused on access pure and simple, but perhaps in the rush to act, overlooked the monitoring of the MDG on water supply and sanitation in situations where infrastructure already exists, but is deteriorating. This is a problem, since not only does it affect the safety of drinking water, but many developing countries, particularly their larger towns and cities, already have some kind of infrastructure in place. Questions abound: why is the drinking water deteriorating and what can be done to fix the situation?

Consider the countries of the former Soviet Union. The JMP finds that the share of people in the group of countries known as Eastern Europe, Caucasus and Central Asia (EECCA) having access to an improved drinking water source has increased since 1990, with 93% of the population having access in 2002 and about 70% having access to improved sanitation. From these figures, the JMP concludes that the EECCA region is essentially on track to meet the internationally agreed drinking water targets.

However, these indicators paint an overly optimistic picture. Extensive urban infrastructure built in the Soviet era provides a large share of the population with in-house tap water connections. But today much of it is in such a serious state of disrepair that it does not provide sustainable access to safe drinking water to very many people. Also, data gathered by the OECD and other bodies suggest that the situation has been deteriorating significantly over the past 15 years.

Leakage, continuity of supply and actual water quality are all problem areas. The water distribution network shows high leakage, reflecting the poor condition of pipes, as well as perhaps illegal water abstraction. Similarly, continuity of supply has been deteriorating. And while water quality tests at intake into the network may show only a limited number of samples that are below sanitary standards, that water eventually becomes contaminated as it flows through the distribution network. What comes out of the tap is not necessarily what goes into the system.

In extreme cases, policymakers may have to consider the trade-off between providing better water for some, or some quality water for all.

The main reason for discrepancies between the official UN statistics and other available data on this subject in the EECCA and elsewhere lies in the fact that the statistics used for monitoring only measure whether people have access to an "improved" water source, rather than whether the water from such sources is actually safe. Nor do the indicators ask whether access is sustainable. Improved sources are defined as in-house tap connections, water from stand pipes, protected wells, etc.

The trouble now is that the situation exemplified by the EECCA countries is having a serious negative impact on public health. For instance, the World Health Organization (WHO) estimates that more than 13,000 children under the age of 14 die every year in the ECE (Economic Commission for Europe) region, mainly in the EECCA countries, because of poor water conditions. This crucial issue is likely to be replicated in many other parts of the world, too, unless new approaches are adopted to address it adequately.

What can be done? As a starting point, there is a clear need to develop complementary indicators quickly as an aid to sound policymaking, such as on leakage and quality of water at the tap. These would be added to official MDG data about access to water supply and sanitation. Building the data would require additional financial resources, of course, particularly since adequate information in these respects is not normally available in developing countries. On the other hand, not collecting the data will make the goal of clean water far more difficult to achieve.

A much trickier financial question is how to stop and reverse the decline of existing water infrastructure. For example, in the case of the EECCA countries, between 50 and 90% of water utility revenue is currently generated by user charges, and the remainder mostly comes from public budgets. But these funds are not enough to cover operational costs, let alone maintenance and capital expenditure. Also, significant up-front investment will be needed to improve operational efficiency in many cases.

Improving the collection of user charges is one approach that would help boost funds. In the case of the EECCA countries, amounts collected can currently be as low as 30 to 40% of sums billed. Those unpaid bills are another serious leakage from the system to be plugged.

At the same time though, water tariffs for households are often too low and will have to be increased, sometimes sharply. The good news is that in many cases those increases can take place without causing major affordability problems. In

others, especially where poverty is widespread, tariff changes would need to be accompanied both by improvements in service quality to generate sufficient willingness to pay and by social measures to support the poor, such as direct subsidies to consumers.

However, even retrieving unpaid bills and raising prices will not be enough to circumvent the need for higher public spending on the water sector. In some countries, this may mean devoting 3 to 4% of public budgets to the urban water sector alone. Competition for funding from other social and economic sectors will often make this difficult to achieve. In extreme cases, policymakers may have to consider the trade-off between providing better water for some, or some quality water for all.

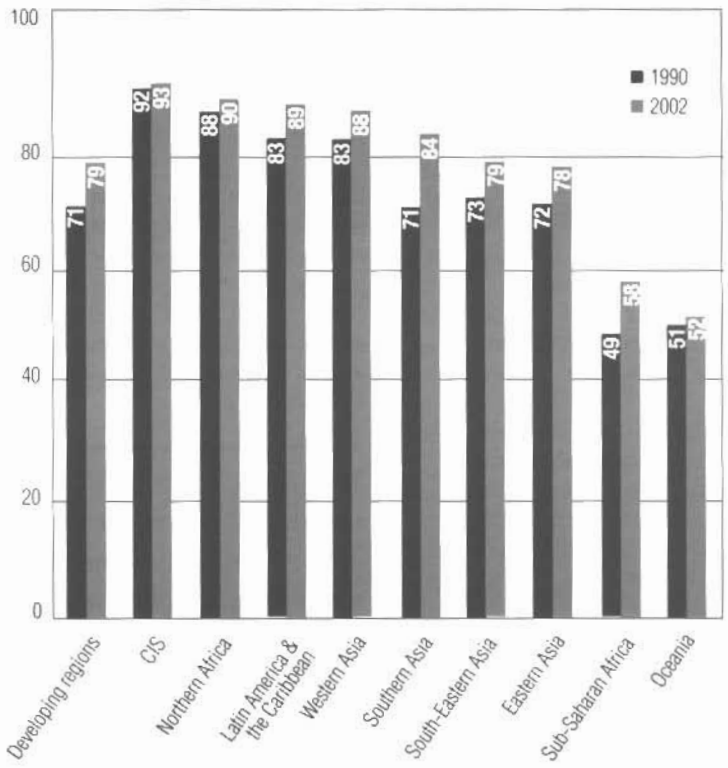
In the former Soviet state of Georgia, where 50% of the population lives below the poverty line and 17% in extreme poverty, the MDG targets on water could be achieved if the existing urban infrastructure were scaled back. That might mean that city dwellers currently connected to an in-house but low-grade water supply may be better served if they could fetch water from safe municipal standpipes.

Except in a few very poor countries, domestic rather than external resources will continue to be the dominant source of finance. Official development assistance for EECCA countries is presently at just US$100 million per year, and even if increased significantly, would still remain a small part of the US$8 billion in overall funding that is needed for operation, maintenance and investment. On the other hand, care must be taken to avoid crowding out domestic financial sources, as has happened in the new EU accession countries. Private operators are generally keen to become involved in water and sanitation projects where they can contribute know-how, management and leasing contracts, but they have been reluctant to bring in the needed finance.

Nonetheless, even at low levels, external finance can underpin financial and governance reforms in the water sector, build capacities, and bring in internationally accepted disciplines and good practices.

Safe to drink?

% of population using improved drinking water, 1990 and 2002



Source: United Nations (2005), The Millennium Development Goals Report, New York

Multilateral organisations can also step up their efforts, such as the Environmental Action Programme Task Force set up by environment ministers from a UN body, the Economic Commission for Europe, in 1993 for EECCA countries. Action undertaken in this framework, and supported by the OECD, includes the development of practical tools and approaches to support legal and institutional reforms, as well as assistance to improve the financial situation of the water sector.

With a range of committed players involved and the right focus, much can be done to achieve the development goal that really counts–that of the sustainable quality and delivery of healthy water. ■

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Aid flow

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The downward trend in aid to water supply and sanitation has been reversed. Or has it?

Three years ago, before the 3rd World Water Forum in Kyoto, we wrote that while the Millennium Development Goal of halving the population without access to safe drinking water by 2015 was feasible, it would be a tall order, particularly against a background in which bilateral development aid from OECD countries had stabilised or fallen. Have matters improved as we move closer to the deadline? There are some encouraging signs, but probably not where it matters most.

Some of the difficulties with water aid have been outlined before, notably at a seminar called "Water for the Poorest", held during the Stockholm World Water Week in August 2004. For a start, water supply and sanitation had not been incorporated in the UN's poverty reduction strategies, and could therefore not attract financing through this mechanism. Another problem was a lack of viable projects, mainly because water projects were generally considered as risky, causing reluctance among programme managers in donor agencies, accountable for their portfolios. Furthermore, funding of projects in countries most in need had been constrained as aid was conditional on governance reforms. Aid had been targeted, not to the poorest communities where the water needs were greatest, the Stockholm seminar heard, but rather to areas where the criteria for donor success were in place.

The latest data from the Development Assistance Committee (DAC) of the OECD tend to reflect this pattern. There is some positive news, insofar as these data show a sharp increase in the allocation of Official Development Assistance (ODA) to water supply and sanitation in 2004. DAC members' bilateral ODA commitments to the water sector amounted to US$3 billion that year. Multilateral donors' commitments also increased, with a total of US$1.8 billion in 2004, reversing the downward trend since the middle of the 1990s (see graph).

A closer look at the trend in aid to the water sector shows that allocations are in fact set by a handful of large donors and are targeted at a relatively small number of countries. As much as three quarters of total bilateral aid to water supply and sanitation in 2000-04 was extended by Japan, Germany, the United States, France and the Netherlands (see table). More than half of those allocations were directed to

There is no sign that donors have been stepping up their efforts for water compared with other sectors.

Asia. The share of recipients in Sub-Saharan Africa was just 15%, a modest increase at best over the last few years.

An even closer look at the trend reveals that much of the 2004 increase in aid is largely explained by the US programme of reconstruction in Iraq. In 2003 Japan reported large new commitments to China, Vietnam, FYROM (Macedonia) and Kazakhstan.

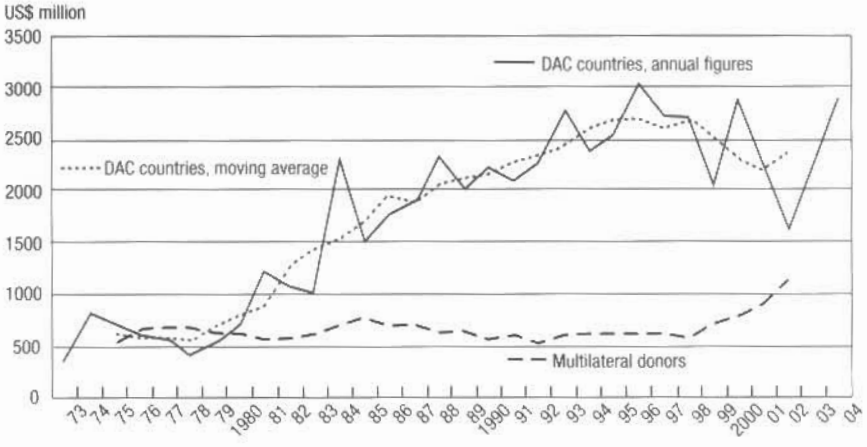
Nor is there any sign that donors have been stepping up their efforts for water compared with other sectors. In fact, the share of aid to water supply and sanitation in DAC members' total sector-allocable ODA dropped from 9% in 1999-2000 to 6% in 2001-02, where it remained in 2003-04.

Still, every drop counts and, in fairness, DAC members' bilateral ODA disbursements to water supply and sanitation have increased slightly, from US$1.9 billion in 2003 to US$2.2 billion in 2004. On the other hand, over a half of these amounts relate to projects committed before 2000. The main recipients include many of the countries listed in the table, as well as Egypt, Turkey and the Philippines. There, large infrastructure projects started in the second half of the 1990s are still ongoing. They have not received any *notable new commitments since then.*

But there is a final note which policymakers must take seriously. In the water sector, most aid is used to finance investments in infrastructure. Projects are large and on average take at least eight years to implement. That is a long lead time, particularly as the deadline for the MDG on water has been set for nine years from now. Any strategy and possible reorientation of aid to water supply and sanitation to reach the Millennium Development Goal on water must take this urgently into account. ■

Watering development

Trends in ODA to water supply and sanitation, 1973-2004: 5-year moving averages (except where marked annual), constant 2003 prices



Note: Non-concessional flows
Source: OECD DAC, *Creditor Reporting System on Aid Activities*

Main donors and recipients of bilateral ODA to water supply and sanitation, 2000-04, annual average commitments in US$ millions, constant 2003 prices

	Japan	Germany	US	France	Netherlands	Other DAC donors	**Total DAC countries**
China	222	5	1	6	4	37	**275**
Iraq	0	1	170	-	0	10	**181**
Vietnam	52	10	0	17	7	30	**117**
Palestinian adm. areas	2	23	72	5	1	9	**113**
India	39	8	2	3	18	32	**102**
Jordan	6	24	45	-	0	12	**87**
Malaysia	80	-	-	-	-	1	**81**
Morocco	24	26	2	16	0	7	**75**
Peru	55	11	0	-	1	6	**74**
Tunisia	28	12	-	26	-	1	**68**
Other recipients	326	254	52	100	93	420	**1245**
Total	**835**	**375**	**344**	**173**	**124**	**567**	**2417**

Source: OECD DAC, *Creditor Reporting System on Aid Activities*

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Note: The statistics of the Development Assistance Committee (DAC) of the OECD, whose members account for some 90% of global bilateral aid, are available in the International Development Statistics online database (www.oecd.org/dac/stats/idsonline). They provide for detailed analyses of aid for water by donor and by recipient. Advice on statistical methods and terminology and practical guidance for searching the data can be found in the User's Guide (www.oecd.org/dac/stats/crs/guide). The views expressed in this paper do not necessarily reflect those of the DAC members.

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H_2 eau

Bordeaux is known everywhere for its fine, if expensive, wines. But what about its drinking water? According to a recent survey of water charges in France by the Federal Union of Consumers, the drink that well-to-do diners discreetly order as "chateau de la pompe" is no longer that cheap in the city of Bordeaux either. In fact, at €3.20 per m^3 (less than half a cent per litre), the typical household water bill there is higher than in Paris, at €2.35/m^3. Some water authorities charge less than €2/m^3, but others charge higher. As value-added tax is just 5.5% of the water price, the authors wonder if such charges simply reflect profits flowing back to private operators. As the survey then shows, the answer is not that simple.

Consider the costs that most users do not see. First, there is capturing water from sources and then treating it. This is on the cheaper side of the ledger, at some €0.14-0.23/m^3. Likewise, standards testing is estimated at some €0.03/m^3, while storage in reservoirs, water towers and the like might cost just €0.04/m^3.

Distribution network costs are higher, at as much as €1.20/m^3. While pipelines may have a life span of 140 years, investment and replacement costs can nonetheless reach €300,000 per km. Moreover, replacing lead joints in pipes, as is legally required by 2013, costs about €1,000 per job, with some communes, including the Paris suburbs, seeing that bill rise to €2,500. Meanwhile, it costs some €50 to install a new water meter, which is being encouraged to improve accuracy.

Sanitation is another easily overlooked cost; the sewage network can account for the equivalent of €1.80/m^3, the survey finds, with sewage treatment plants at some €0.45/m^3.

Against this background, France's water charges might not seem too high. For low-income families, strict measures are in place to help with affordability and to prevent vulnerable households from being cut off. But otherwise, some experts argue that most users could pay even more, for instance, for sanitation.

Making water safe is a constant battle, not least in rural communities facing run-off from agriculture. Official test results are often issued with household water bills. One for 2004 in a village in Picardy stated that while the water standards were met for nitrates, they were near alert levels for toxic contaminants, such as pesticides. Cleaning this up will demand new investment, the local authority says.

Most households would probably agree that if the outcome of that investment was a reliable supply of safe drinking water, a reasonable water bill would be a small price to pay. "Château de la pompe" seems set to remain an excellent bargain for some time to come. ■ *RJC*

"Eau", in *Que Choisir*, No. 434, February 2006, L'Union fédérale des consommateurs, www.quechoisir.org


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Salt of the earth

As the ocean covers three quarters of the surface of the earth, little wonder people see it as a possible source of freshwater. That basically means desalinating it to make it at least clean enough for agriculture and even good enough to drink. How does it work? Distillation is the cheap option, responsible for most desalinised water, but a newer filtering process using membranes, called reverse osmosis, now accounts for nearly half the world's capacity to turn ocean into freshwater.

Desalination is not a new process. Since Kuwait's first large-scale desalination plant in the 1960s, it has spread into use in over a hundred countries, with Saudi Arabia accounting for about 24% of total world capacity. The world's largest desalination plant in Ashkelon, Israel, uses reverse osmosis to produce 100 million m^3 of water per year. The industry is mature, so few if any subsidies will be needed to develop it further, experts say. Also, the cost of desalinisation has declined to less than US$2 per thousand gallons (less than US$0.50 per m^3), making it competitive with, say, shipping surface water over long distances. ■ *AB*

Don't forget the coastal waters!

Martha Crawford Heitzmann
OECD Environment Directorate

Most public debate about water concerns freshwater. Yet coastal zones are coming under increasing pressure, too. Time for renewed action.

Most people know the story of the Dutch boy who saved his country by plugging a leaking dyke with his finger until help arrived. For the Dutch, the story had a happy ending, but millions of people living on the world's coastlands were not so lucky in the past year. First, the tsunami in December 2004 killed over 180,000 people in southern Asia, devastating coastal communities in Indonesia, Sri Lanka, Thailand and the Maldives. Then hurricane Katrina struck the south coast of the US in August 2005, bringing with it a storm surge that caused catastrophic damage along the coasts of Louisiana, Mississippi and Alabama, and flooded about 80% of the city of New Orleans. Although Katrina was the costliest (US$75 billion damages, and counting) and deadliest (1,417 deaths) hurricane in US history, there may well be more like it in the future.

How much these increasingly destructive coastal weather patterns can be attributed to

global warming is a major debate. But beyond that, there is the issue of sea level rise–by over 19cm since 1870, according to recent Australian research–which scientists confirm may be accelerating. Moreover, recent British research has raised the spectre of a collapse of the polar ice sheets, causing a possible further sea level rise of 5-6m.

In other words, water challenges do not just concern freshwater. Indeed, in the future, many coastal populations will likely face a greater threat from sea water encroachment and storm flooding than restricted water supplies. The world's coastline stretches to 1.63 million kilometres, and nearly half (46%) of it is located in OECD countries, mostly reflecting the long coastlines of Canada, the US, Mexico and Australia. Most importantly, coastal zones (i.e. areas within 100km of a shoreline and 100m of sea level) are home to 1.2 billion people, or a fifth of the world's population. Overall, average population density in coastal zones is three times higher than the world average, and in recent decades the overall growth of coastal populations has outstripped that of inland populations.

Such a concentration of people in coastal areas brings with it three major challenges. First, how to manage growing environmental pressures from land-use change, pollution, aquaculture, etc., so that they do not compromise the natural buffering capacity of coastal areas? Second, how to organize coastal settlements in order to minimize the population at risk from sea level rise, massive storms and other projected effects of climate change? Third, how to balance the often conflicting demands for use of the marine coastal zone for a range of economic activities, including shipping, mineral extraction, tourism, fishing and aquaculture?

Oceans cover 71% of the world's surface, but as human populations continue to grow, what once appeared to be a limitless resource is now in need of more responsible management. Two-thirds of the world's fossil fuels are transported by tanker, and maritime cargo shipping has been growing for decades. The risk of accidents or illegal discharges has climbed proportionately. Meanwhile, cruise ships carry a greater number of tourists every year, and produce millions of litres of sewage and wastewater, and tons of solid waste. Mounting evidence links the dumping of ship waste at sea to harmful algae blooms, oxygen-depleted "dead zones", shellfish bed closures, and the destruction of animal life. Also, as offshore oil and gas fields reach the end of their lives, pollutant discharges per unit of production are rising, introducing the risk of damaging fisheries stocks through exposure to endocrine disrupting chemicals.

In short, nowhere are the environmental pressures associated with climatic, demographic and economic trends felt more strongly than in the nexus of our coastal zones–both on land and offshore

Nowhere are the environmental pressures associated with climatic, demographic and economic trends felt more strongly than in the nexus of our coastal zones.

What, if anything, can policymakers do to manage these intensifying pressures and help people to adapt to them? Difficult questions need to be answered. For example, should coastal communities devastated by storm surges be rebuilt as before? If not, what constraints should be imposed? To what extent are major investments in coastal protection justified? Can we "internalise" more of the environmental costs of shipping, fishing, aquaculture and tourism for polluters and users to pay, rather than leaving the tab for others to pick up? Finding answers to such questions will require being as forthright about coastal management objectives as we are about, say, labour standards.

As long ago as 1993, an Agenda for Action was issued at the World Coast Conference in the Netherlands. It called for coastal states to identify their objectives for coastal zone management, and begin implementing programmes to achieve them. It also called for strengthening the capacity of developing countries to manage coastal resources, through development assistance. Twelve years on, recent events have illustrated that there remains considerable room for progress.

If we were to hold a World Coast Conference today, what might a new Agenda for Action contain? Technical experts might call for improved prediction of major storms and tsunami, with freer flow of information across borders. Emergency management experts might call for strengthened regional capacity to respond to large-scale coastal disasters. Policy experts might call for innovative economic or regulatory measures to encourage more sustainable development of our coastal settlements and resources.

Twenty-four OECD countries hold a major direct stake in the future of coasts, and even the six landlocked member countries are concerned, through their foreign assistance or trade. Indeed, three of these –Switzerland, Luxembourg, and Slovakia–operate small merchant marines! Is it not time we mobilised our collective energies and expertise to put a new agenda into action?

Recent events have demonstrated that coastal zones are on the front line when it comes to dealing with the consequences of climate change and sea level rise. With so many people living on that front line and so many economic activities rooted there, will we find the sense of urgency we need to develop innovative policy approaches, nationally and internationally? The price of inaction would be destruction on a scale that no little Dutch hero could stop. ■

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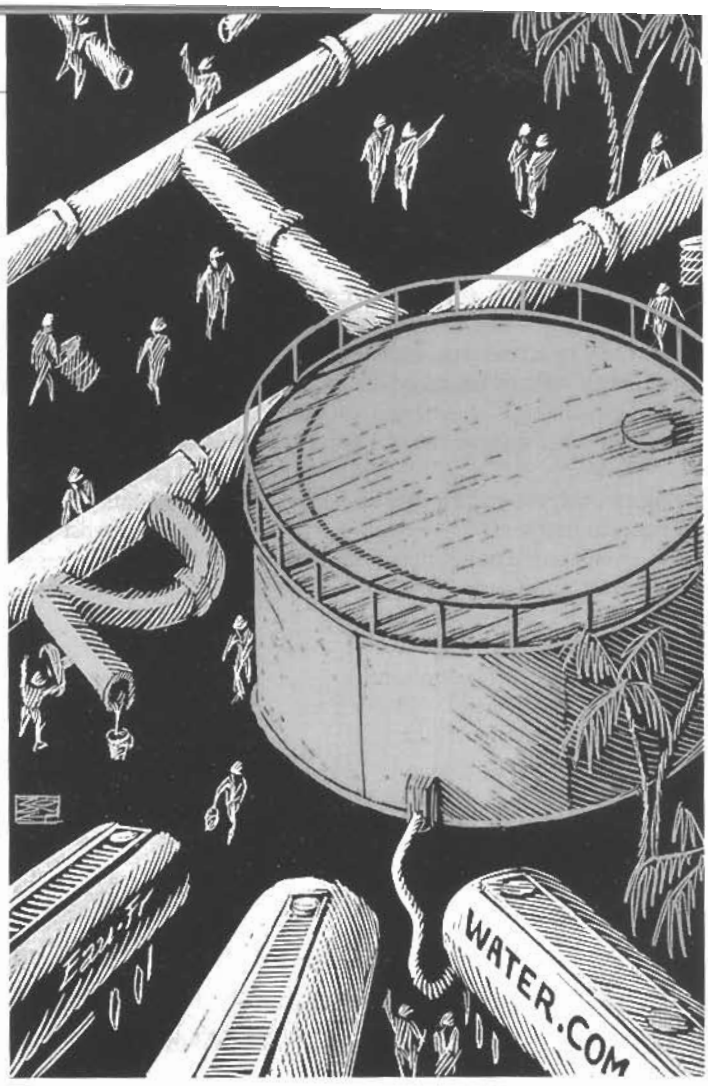

Water business

Gérard Payen, President of AquaFed

The private water sector is larger than many people think, with thousands of businesses working every day, for the most part, to implement government policies. Are those businesses doing enough and how might they do more?

The challenges involving clean water and sanitation have to be addressed locally or regionally at the watershed level. Transporting fresh water is just too costly for any other option. And yet, with achievements falling short of the mark and difficulties intensifying in a great many places, international organisations and intergovernmental conferences are growing increasingly concerned about water and wastewater issues.

AquaFed–the International Federation of Private Water Operators–was set up in 2005 to facilitate dialogue between the international community and companies in the water industry. It brings together over 200 water service providers operating in 38 countries worldwide. Its members are eager to play an active role in meeting common challenges by making their experience in the field available to international organisations. Because water supply and wastewater treatment are public services that inevitably give rise to multifaceted policy debates, AquaFed members are also keen to enhance understanding of what private companies actually do, and of what governments can ask of them.

There is a vast number of private operators involved in the area of water, some with international stature, such as RWE Thames Water or Aguas de Barcelona.

Large companies are only the tip of the iceberg, though. Local operators, while less well-known internationally, are more numerous. The World Bank has identified some 10,000 small enterprises in developing countries. Between the two extremes lies a full spectrum of local businesses of all sizes. The smallest among them manage the water supply of a few hundred people in a single place, while the largest handle water or wastewater for a population of millions spread over multiple locations.

Even if projects involving water are complex and take a long time to develop, there is strong demand in what is now a very dynamic sector. Each year governments commission private operators to handle some parts of water management tasks in new urban areas. This has happened recently in many areas of China, as well as in Tenerife in Spain, Selangor in Malaysia, and Algiers in Algeria, etc. In Ghana, the winner of an international tender for a public-private water management partnership was a Dutch firm that conducts business as a private operator, even though its shareholders are public entities.

The structure of these markets is not cast in stone; it is evolving dynamically with regular new business creations, shareholder turnover and new stock market listings. Among the major local businesses that have been set up or expanded are Manila Water in the Philippines, Puncak Niaga in Malaysia and Aguas Nuevas in Chile. Firms that were once owned by international shareholders have become predominantly local in their shareholder base; LYDEC in Morocco, Tallinna Vesi in Estonia, and ESSBIO in Chile, are some examples.

In the case of the strongest companies, this gradual development of local businesses can spawn new international players. Manila Water has now moved into the Chinese and Indian markets, and Aqualia of Spain has just gained a toehold in Italy.

Today, delivering safe drinking water to the entire world population is still one of humanity's greatest challenges. It is rightly the focus of one of the UN's Millennium Development Goals. Despite all the advances in the field, more than a billion people still have no satisfactory access to drinking water. There are not enough water access projects to reduce this backlog. Current progress is just able to keep pace with population growth.

What is needed urgently is to devise public policies that target the groups in need of improved access, to develop more water access projects and to speed up the actual implementation of current programmes.

Against this background, arguments over the respective merits of the public and private sectors are meaningless. There is an emergency on, and the status quo is unacceptable. Those who are waiting for access to water need all the stakeholders to become involved, both public and private.

Businesses are keen to take up this challenge, not least because developing access to water is central to their mission. Each day they enable more people to access water or sanitation services and effectively exercise their right to access to water. In countries where governments have commissioned them to develop public water services, local private businesses have been able to improve the access to water of millions of people: 400,000 in La Paz/ El Alto; 200,000 in Gabon; several million people in South Africa, etc. I for one will never forget the beaming smiles on the faces of people in a shantytown near Manila the day they saw drinking water flowing to their homes for the first time.

Properly designed, public-private partnerships are an excellent means of implementing public policy on access to water, with the local operator becoming an instrument for executing government policy. Experience has shown that as long as the partners keep sight of a common goal and overcome any obstacles together, results will come. Most difficulties have arisen in cities where the government has changed its water policy or could not deliver on its share of the partnership. Today's private operators have learned to approach this kind of risk with caution.

There is an emergency on, and the status quo is unacceptable.

How to finance access to water for everyone is still an unresolved question. The report, *Financing Water for All*, widely referred to as the "Camdessus Report", estimates that to achieve the Millennium Development Goals would entail a doubling of all existing financial flows that contribute to water infrastructure investments. (This is a rough estimate, the precise figures are unknown.) This simple message–a doubling in financial flows!–has yet to be grasped.

The fact of the matter is that a distinction needs to be made between short-term financing, such as public or private loans or private financial investment, and long-term funding, provided by users, taxpayers or grants. Insofar as loans and investments must eventually be repaid by the revenues of the water utility, short-term financing cannot double unless long-term funding grows as well. Where grants are not available, water rates and taxes must be set at levels that allow the necessary increase of short-term finance. This is not related to the presence or the absence of a private operator.

This fact has been understood in China, where the central government decided to increase the water rates in most large cities a few years ago in order to finance investment programmes. However, it has not been understood everywhere. Those who know that international public aid will never account for more than just a fraction of what is required to supply everyone with safe water make stirring appeals at international meetings for additional financing from private banks and investors. They will be listened to only if governments can deliver a vital prerequisite: confidence that their projects will be capable of ultimately repaying debt and providing returns on investment. That confidence depends largely on their ability to mobilise payments from water users as a group (individually users may benefit from cross-subsidies that aim at making water rates fair and affordable) and from taxpayers. It also depends on the country's political and legal climate, which needs to be stable and predictable.

Allowing all to benefit from a satisfactory access to safe water and sanitation is a global challenge that requires the involvement of all stakeholders. Businesses have played an important role in helping to improve access to safe water for many people over the last decade or more. Given the right conditions, that role could, and should, continue to make a significant contribution. ■

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Assessing the risks

A better place?

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Scarcity, pollution, investment, geopolitics: however murky the challenges ahead may seem, meeting them will require the utmost lucidity. And because the future of water is at stake, everyone is involved.

The county of Kent, known romantically as the "Garden of England", has suffered its worst winter drought since the 1920s. In response, the UK Environment Agency warned in February 2006 that, unless serious water conservation measures were brought in by April, the county could within months witness scenes of people queueing in the streets for water as domestic supplies were being cut off.

Other western and southern European countries face similar water shortages, with all that this implies not only for hosepipe bans for gardeners, but also for farmers, tourists, electricity generation, food processing, the production of semiconductors, and many more industries. Moreover, the fact that "rainy" Britain is forced to consider tough conservation measures shows just how common the issue of water scarcity and management has become.

What needs to be borne in mind is that, while the earth's surface consists mainly of water, most of that is sea water. Just 2.3% of the total endowment is freshwater, and two thirds of that is permanently frozen. Freshwater sources, mainly from precipitation stored temporarily in natural or man-made reserves, come to some 8,000 km^3. That seems quite a modest quantity for an expanding global village of some 7 billion people. With growing populations and rising incomes, expanding irrigation agriculture and rapid rates of industrialisation, the 20th century has seen total water withdrawals and levels of water consumption rise roughly sevenfold. The stresses on this vital natural resource are serious and mounting.

Providing safe water for all is but one side of the challenge ahead. There has been enormous progress in recent decades in improving access worldwide to freshwater supplies and sanitation. For example, between 1990 and 2000, access to adequate water supply in developing countries rose from 73% to almost 80% of the population. But there is still a long way to go.

The Millennium Development Goal on water seems in danger of being missed for a start, particularly if we take as given the WHO/UNICEF view that reasonable access means at least 20 litres per person per day, accessible within 1 km of that person's dwelling. For comparison, per capita consumption rates in the OECD area are 100-400 litres, depending on the country. Over 1 billion people in the developing world still do not have access to safe water and over 2.5 billion people have no access to sanitation. About three quarters of all diseases in developing countries are water-related and it has been estimated that each year this leads to 1.7 million deaths.

The other side of the coin is management and investment, and this challenge concerns everyone. In the developed world, access to fresh water and sanitation is generally not a problem, but infrastructures are all too often old and decaying, and leakage rates are often high, ranging from 10% of the total in Austria and Denmark to 33% in the Czech Republic. In London leakage rates from the mains are reported to be up to 40% of total water supplied.

Then there is pollution. Some 2 million tonnes of waste is discharged daily around the globe, polluting some 12,000 km^3 of receiving waters. Agriculture, which is the largest user of water in most countries, is also responsible for run-off that seeps down into fragile groundwater resources, which must then be cleaned up at great expense. Water companies are quite transparent about the problems. In France, for instance, water bills provide details on "undesirable" substances, such as nitrates, contained in drinking water and state whether official health thresholds are being respected.

Ageing infrastructure can also affect quality, bringing its own pollutants, such as lead. In other words, providing safe water means upgrading local water systems and domestic pipes, as well as fixing reservoirs and improving treatment plants.

Uneven waters

% world's	North and Central America	South America	Europe	Africa	Asia	Australia and Oceania
Water	15	26	8	11	36	5
Population	8	6	13	13	60	<1
Ratio (%)	1,9	4,3	0,61	0,84	0,6	5

Source: OECD, see references

But while we know many of the problems, political and public determination is needed for action. Without this, the risks associated with water can only increase. In the decades ahead, supplies of fresh, safe water will be subject to ever greater pressures. Some will originate from natural causes, others will be man-made. Climate change in the form of sea level rise, flooding, storm damage and the accentuation of seasonal effects such as winter flooding and summer droughts, will reduce the certainty and increase the vulnerability of water resources, posing severe challenges to the resilience and management of water services not only in developing but also in developed countries. Moreover, rising levels of pollution, as well as threats from terrorist activity, physical disruption of supplies, and cyber attacks on critical infrastructures will bring greater focus to water security issues in some countries.

World population will continue to rise, almost all of it occurring in the developing world and accounted for almost entirely by urban growth. By 2025, global water withdrawals and water consumption look set to rise by up to 30% in developing countries and over 10% in the developed world. Added to this, many major water resources are shared among countries. There are now more than 250 international transboundary basins that cover some 45% of the world's land surface, 40% of the world's population, and 60% of the earth's freshwater volume. A good illustration is the hydroconflictual zone along the Tigris-Euphrates which is shared by Turkey, Syria and Iraq.

Water wars are not an immediate prospect, but if competition for scarce resources and diminishing water quantity and quality intensifies, this can at the very least exert a destabilising influence on a region's development.

Stored freshwater sources represent a modest quantity for an expanding global village of some 7 billion people.

In sum, the population living in water-stressed areas is set to double over the period 1995-2025, and by 2030 some two-thirds of the world's inhabitants may experience moderate to high water stress. Regions of particular concern are the Middle East, North Africa, southern Africa, South Asia and parts of China. Many countries in these regions are ill-equipped to deal with these pressures.

However, no country can be complacent about water supply, and certainly not from a financial point of view. For many developing countries the requirements are stark–many more millions of people quite simply need to have access to safe water and sanitation. This raises key questions around financing, ODA, private sector involvement and appropriate technologies. But equally important, it raises issues of governance, of the institutional changes required to create, modernise and strengthen the legal, policy and administrative arrangements that govern the sector.

Many of the transition countries face similar governance problems (see article by Peter Borkey). But in terms of infrastructure investment, the challenge for them is not so much to extend existing networks and systems, but rather to maintain and/or replace them. Timely action would allow developing countries to capitalise quickly on the huge socio-economic gains that could be achieved through expansion of provision and basic improvements. It is estimated, for example, that the benefits of halving the proportion of people without access to improved water sources by 2015 would be 9 times the costs incurred achieving that target. Universal access to improved water and sanitation services by 2015 would generate an even higher benefit/cost ratio.

Understandably, much of the policy interest in recent years has focused on meeting the basic needs of developing countries and the transition economies. But the rapidly accumulating problems in the water sector of OECD countries must now be taken seriously. While supply networks and treatment systems are largely in place in OECD countries, many of them are ageing quite quickly. In North America, for example, many urban water supply systems were built from 1830 to 1880! Without action, the costs of water leakages and pollution can only increase. To keep pace with the deterioration of water infrastructures, it is estimated that they need to be replaced at a rate of about 2% a year, but actual rates are usually far lower, at just 0.01% in London and 0.8% in Munich, for instance.

In addition, the cost of meeting increasingly stringent environmental regulations is set to grow sharply, and for some countries water security will remain high on the agenda because it is a potentially vulnerable critical infrastructure. As well as regulation and encouraging better management practices, full cost recovery through appropriate water pricing will also help.

This is a heavy agenda and needs to be tackled quickly. With water scarcity challenges now facing such places as the lush Garden of England, more than ever, no one can say they were not warned. ■

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