

Water for all?

A study of water utilities' preparedness to meet supply challenges to 2030

A report from the Economist Intelligence Unit



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About the research

Water for all? is an Economist Intelligence Unit report, sponsored by Oracle, which looks at the relative preparedness of water utilities across ten major markets—the US, Canada, UK, Australia, France, Spain, Brazil, Russia, India and China—to meet future water supply challenges to 2030. It highlights potential risks and shortfalls, while also outlining the broad nature of the responses by utilities to these risks and shortfalls.

To support this study, the Economist Intelligence Unit conducted a survey of 244 senior water utility executives across the ten countries under review. All respondents hailed from the management function of their businesses, with close to one-half (45%) consisting of C-suite executives. Organisations of all sizes were polled: 13% have annual revenue in excess of US\$1bn, while 40% are firms with under US\$250m in revenue. Nearly one-half (48%) are owned by either the state or a local municipality; the balance are privately owned, barring 6% which operate as a public-private partnership. The companies polled operate across the water supply chain: for example, 72% operate water distribution networks; 51% operate water production facilities; and 34% handle water sewage and treatment.

To complement the survey findings, the Economist Intelligence Unit also conducted wide-ranging desk research and in-depth interviews with a variety of experts and executives. We would like to thank the following for their time and insight (listed alphabetically by organisation):

- Jack Moss, Senior Adviser, AquaFed
- Juan Antonio Guijarro Ferrer, CEO, Aqualogy, a division of Agbar
- Jeff Sterba, President and CEO, American Water
- Debashree Mukherjee, CEO, Delhi Jal Board
- Sergey Sivaev, Director, Institute of Urban Economics
- Stanislaw Khramenkov, General Director, Mosvodokanal
- Yarlene Frisani, Director, Risk, Compliance and Training, Ontario Clean Water Agency
- Peter Siggins, Global Lead, Smart Business, PA Consulting Group
- Robin Lewis, COO, Queensland Urban Utilities
- Georgy Boldin, Executive Director, Rosvodokanal Group (RVK)
- John Ringham, CEO, SA Water
- Geoff Henstock, Corporation Secretary, SA Water
- Steve Clark, Executive Director, Sino-French Water Development
- Jacques Manem, Managing Director, Suez India, Suez Environnement Group
- Yvette de Garis, Head of Environment Regulation, Thames Water
- Laurent Auguste, President and CEO, Veolia Water Americas

- Ruddi de Souza, Managing Director, Veolia Water Solutions & Technologies
- Gesner Oliveira, Head of Go Consulting; World Bank water consultant
- Colin Skellett, Executive Chairman, Wessex Water
- Juan Costain, South Asia Regional Head, Water and Sanitation Programme, World Bank

James Watson is the author of the report and Aviva Freudmann is the editor. Ben Aris, Sarah Fister Gale, Colin Galloway, Conrad Heine, Premila Nazareth and Thierry Ogier assisted with additional research and interviews. ■

Executive summary

"All the water that will ever be is, right now." This simple statement, from National Geographic in 1993, underscores an increasingly pressing challenge—supplying 7 billion people, with a further 1 billion expected by 2030, with water from what is an absolutely finite supply. Furthermore, the less than 1% of the world's total supply of water that is freshwater is being badly managed, with a growing proportion wasted through despoiling and pollution. Looking ahead, ongoing urbanisation, uncertainty over climate change and a growing middle class are all adding to the pressures.

So how concerned are water utilities about such potential shortfalls, or mismatches in supply and demand, between now and 2030? What are the major obstacles hindering their progress towards increased water efficiency? Do they have the necessary technologies and strategies available to meet these concerns? And how well are they managing the risks? These are the core questions this report considers, based on a survey of senior water utility executives across ten key markets. Six of these markets are developed countries (the US, Canada, UK, Spain, France and Australia), while a further four are rapidly developing (the BRICs: Brazil, Russia, India and China). Some of the key findings include the following:

For most water utilities, increased water stress by 2030 is largely a foregone conclusion.

Overall, about four in ten (39%) executives polled for this report think that the risk of national water demand outstripping supply by 2030 is "highly likely", or essentially certain (see Chart 3). A further 54% think such a risk is moderately likely. But the nature of such stress varies hugely, depending on local circumstances. Brazil, for example, has some 42,232 cubic metres of fresh water per person per year available, one of the highest amounts in the world, yet 42% of water utilities in the country worry about supply issues. This is because of ongoing urbanisation and economic growth, much of which is occurring in places where the country's water supply is limited.

For utilities, increased water productivity is the core of the response needed.

None of the executives interviewed for this report doubt that demand by 2030 will, somehow, be met. But to get there, wide-ranging efforts and investments are being made to improve water productivity—from stemming leaks to making better use of recycled water. There is much that can be achieved. In Delhi, for example, the city is supplied with nearly 50% more water than London or Paris, but the Indian capital's residents only get to use about 50% less of the

level of their developed-market peers. Across the ten countries polled, average investment among water utilities is rising to meet supply challenges, with 93% increasing their investment. More than one in five (22%) will increase investment by 15% or more in the next three years.

Wasteful consumer behaviour is seen as the biggest barrier ahead. Across much of the world, and in stark contrast to the costs and difficulties of getting water to the tap, the precious commodity flows out of our taps at almost no cost to the user. As such, it is unsurprising that consumers, business and farmers have little incentive to curb their usage. Overall, 45% of utilities—especially in developed markets—see this as their biggest barrier to progress, while a further 33% believe that tariffs are too low to stimulate greater investment. Other issues add to the mix too. In developing countries, a lack of capital for investment tops the list (selected by 41%), while worries over climate change lie third overall (38%). Regulatory difficulties, along with persistent difficulties in attracting the right skills, further deepen the challenge.

A far greater focus on demand management is seen as the leading overall response. The historical response to water demand pressures has been to build up supply and distribution networks, but much more emphasis is now being put on moderating how much water people use. From both a strategic and technological perspective, new metering and usage awareness approaches to encourage conservation top the list of what utilities think will do most to help. This is effective: research suggests a 10%-15% average drop in usage once a meter is installed. But the core of this is a psychological change, a push to make wasted water more of a social taboo. For water operators, this is a considerable shift—John Ringham, the CEO of SA Water, the state-owned utility that operates in South Australia, admits to being “schizophrenic” in balancing the desire to sell more water versus instilling a conservation ethic among users.

Developed countries are increasingly focusing on resilience, while developing ones are still scrambling to roll out, or refresh, basic infrastructure. For countries like the UK, Canada or Australia, where population and economic growth are moderate, the overall priority within the sector is shifting away from a focus on quality and price towards increased resilience. Uncertainty over future weather patterns is at the heart of this response, particularly given the decades-long lifecycle of any planned infrastructure: building for a future of drier summers, or more severe storms, for example, requires different priorities. “Resilience has become the watchword,” says Colin Skellett, the chairman of Wessex Water in the UK. By contrast, developing markets face sustained infrastructure rollout challenges. By 2010, for example, China was building water treatment plants at a rate of more than one per day, while India has a long development road ahead on this front.

From improved water desalination to aquifer recharge, necessity is prompting innovation in a once-staid industry. For an industry that struggles to attract talent, the water sector is becoming an increasingly prominent innovator, prompted largely by necessity. Israel has become a global expert in water reuse—it recycles some 70% of its wastewater, a country far ahead of Spain, the second best, which reuses just 12%. From California to Queensland, desalination technology is booming, with growing efficiency gains that are helping to make it more affordable. Network sensors and smart meters, which often link back to consumers' smartphones, are helping utilities both to moderate demand and to find costly leaks more accurately. Taken as a whole, a quiet boom in water innovation is well under way. But more utilities need to improve their ability to identify and implement such advances: more than one in three (36%) profess to being generally unaware of the innovation options available to them.

Utility operators expect regulators to focus on metering first, price later. As the pressures to ensure supply continue to rise in many countries, utilities expect regulators to focus primarily on promoting increased use of metering. But between 2020 and 2030, there is an expectation that reality will finally catch up, with regulators starting to give way on pricing, more realistically pricing the commodity in line with market pressures. A further strong shift will be the increased globalisation of water markets, as regulators open up to competition in order to bolster preparedness.

Drought and increased water pollution are seen as the two most severe risks faced by operators. They are also considered among the most likely to occur. The risk outlook for utilities is not an easy one, with a diverse set of potential stumbling blocks between now and 2030. And risk management is not made any easier by various barriers. Externally, for example, 50% of executives say that information and support from government is lacking; internally, 43% confess to not having the requisite risk management techniques in place, such as the ability to model more precisely future water availability or rainfall. A shortage of skills further exacerbates the situation, as it does in other aspects of the business. ■

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When the well is dry, we know the worth of water.

”

*Benjamin Franklin
(1706-90)*

¹ “Water resources”, UN-Water, http://www.unwater.org/statistics_res.html, last accessed in August 2012.

² The United States Census Bureau puts the 7bn milestone at March 12th 2012; the UN Population Fund has it at October 31st 2011.

³ *The Emerging Middle Class in Developing Countries*, Brookings Institute, June 2011,

⁴ “Water scarcity”, UN-Water, http://www.unwater.org/downloads/WWD2012_water_scarcity.pdf, last accessed in August 2012.

⁵ “Urban population growth”, World Health Organization, http://www.who.int/gho/urban_health/situation_trends/urban_population_growth_text/en/index.html, last accessed in August 2012.

⁶ “Capacities for megacities coping with water scarcity”, Jan-Peter Mund, UN-Water Decade Programme on Capacity Development, September 7th 2010.

⁷ *Fourth Assessment Report: Impacts, Adaptation and Vulnerability*, Intergovernmental Panel on Climate Change, 2007.

Introduction

A thirsty world

It is unsurprising that the world is becoming a thirstier place; yet the figures remain, in many respects, surprising. The earth has about 35 million cubic kilometres (km³) of fresh water—about 2.5% of the total, according to UN-Water. But 70% of this is locked up as ice or snow in the Antarctic and Arctic regions, or as permanent snow cover in mountainous regions. This leaves less than 1% for watering farms, supplying industry and piping into taps.¹

On the demand side, the earth's total population continues to rise. It passed the 7bn mark in either late 2011 or in early 2012.² By 2030—the forecast period this report considers—another 1bn people will be added. Just as importantly, the world's middle class is expected to grow from less than 2bn to nearly 4.9bn over the same period.³ As this more affluent section of the population expands, demand for water will surge, not least due to a greater appetite for meat and other goods that are water-intensive to produce. In developing countries, where the vast majority of both population growth and rising incomes can be found, a 50% increase in water withdrawals is expected by 2025, while developed countries will increase by 18%.⁴ As a result, as UN-Water highlights, water use continues to expand at more than twice the rate of population growth.

There are other, often interrelated challenges. One is ongoing urbanisation. By 2030, the World Health Organization expects six in ten people to live in cities, up from about 50% in 2010.⁵ But already, nearly all of the world's megacities are facing water stress—from overexploited and polluted freshwater resources, to insufficient and poorly maintained infrastructure, to limited technical and water management capacities.⁶ Another challenge is climate change. The UN's Intergovernmental Panel on Climate Change (IPCC) maps out a range of impacts with clear implications for water utilities: more frequent hot days and heat waves on the one hand, and increases in both drought and heavy rainfall events on the other.⁷ For utilities that plan their infrastructure investments over decades, this all means greater uncertainty ahead.

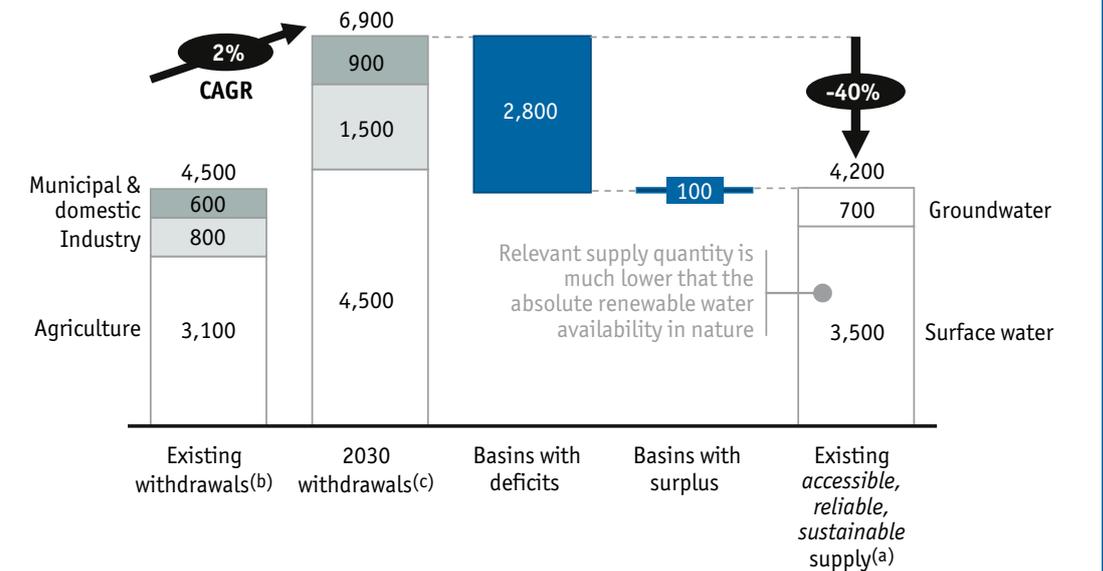
Stressed out

Given this situation, it is clear that the world faces a future that will be more regularly characterised by water stress. According to analysis from The 2030 Water Resources Group, with just average economic growth and no efficiency gains, water demand will expand from 4,500 km³ in 2009 to 6,900 km³ in 2030—about 40% more than is currently reliably accessible (see Chart 1).⁸ This burden is not evenly distributed: some countries are blessed with

Chart 1: The water gap

Aggregated global gap between existing accessible, reliable supply^(a) and 2030 water withdrawals, assuming no efficiency gains

(bn m³, 154 basins/regions)



(a) Existing supply which can be provided at 90% reliability, based on historical hydrology and infrastructure investments scheduled through 2010; net of environmental requirements.
 (b) Based on 2010 agricultural production analyses from IFPRI
 (c) Based on GDP, population projections and agricultural production projections from IFPRI; considers no water productivity gains between 2005-2030
 Source: Water 2030 Global Water Supply and Demand model; agricultural production based on IFPRIIMPACT-WATER base case; McKinsey, *Charting Our Water Future*.

significant water resources; others face severe stress. In China, as the same analysis points out, without a change in course, water demand will outstrip supply by 25%. In India, the gap yawns far wider, with a 50% deficit.

A more recent study, published in the journal *Nature*, estimates that some 1.7bn people live in areas where groundwater resources, or ecosystems dependent on these, are under threat.⁹ However, these stresses are highly concentrated around a handful of key aquifers (see map). Of the countries under review in this report, China, India and the US are, in particular, overexploiting the available groundwater in many large aquifers that are crucial to agriculture.

Nevertheless, as The 2030 Water Resources Group study is quick to point out, and as all interviewees for this study agree, there is little doubt that

demand will be met; the question is simply how. "We believe there is enough water on the planet. It is the way that the water management is organised that is going to pose the biggest challenges for the water supply and sanitation sector," says Jack Moss, a senior water adviser at AquaFed, the International Federation of Private Water Operators.

The short answer is a pressing need for increased water productivity, without which wider societal cracks will appear. As a study from Veolia Water outlines, 22% of global GDP was at risk owing to water stress by 2010—about US\$9.4 trillion—while 36% of the world's population live in water-scarce regions.¹⁰ In its forecasts, under a "business as usual" scenario, by 2050 this risk would swell to 45% of projected GDP, with 52% of people exposed to severe water scarcity. In contrast, its "blue world" scenario—with major

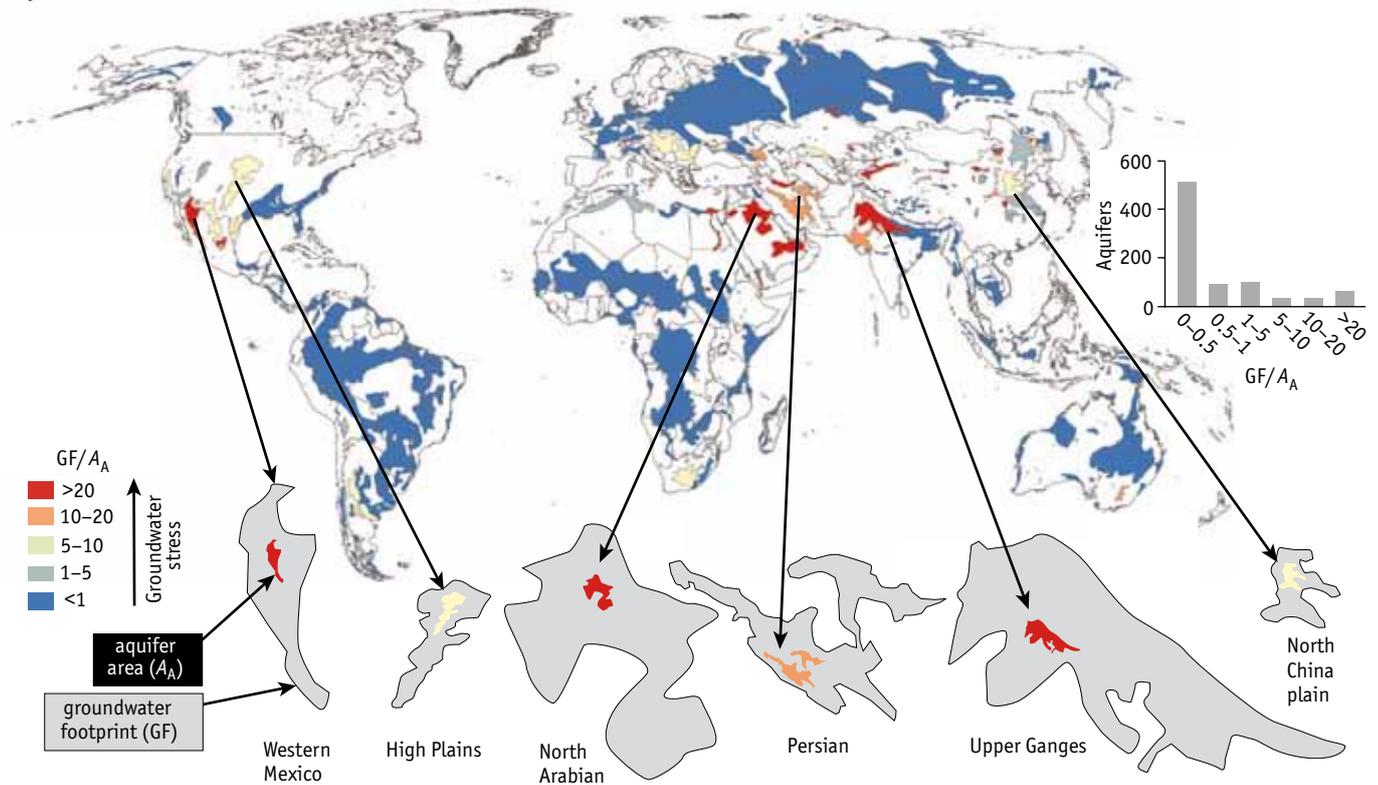
⁸ *Charting Our Water Future: Economic frameworks to inform decision-making, The 2030 Water Resources Group, 2009.*

⁹ "Water balance of global aquifers revealed by groundwater footprint", Tom Gleeson, et al, in *Nature*, Vol 488, August 9th 2012.

¹⁰ *Finding the blue path for a sustainable economy, Veolia Water, 2011.*

Chart 2: Growing demand

The groundwater footprint of several of the world's crucial aquifers far outstrips the actual geographical size of the aquifers themselves



Groundwater footprints of aquifers that are important to agriculture are significantly larger than their geographic areas. Aquifers are major groundwater basins with recharge of >2mm^{yr}⁻¹ in the global inventory of groundwater resources²⁰ (see Supplementary Information). At the bottom of the figure, the areas of the six aquifers (Western Mexico, High Plains, North Arabian, Persian, Upper Ganges and North China plain) are shown at the same scale as the global map; the surrounding grey areas indicate the groundwater footprint proportionally at the same scale. The ratio GF/A_A indicates widespread stress of groundwater resources and/or groundwater-dependent ecosystems. Inset, histogram showing that GF is less than A_A for most aquifers.

Source: Nature Magazine.

improvements made in leakage reduction and water efficiency gains, among other things—still shows a worrying outcome, but much improved: 33% of GDP at risk, and 41% of people in water-scarce areas. The difference, as Laurent Auguste, the president and CEO of Veolia Water Americas, puts it, “is basically de-risking the business as usual scenario by about US\$17trn, more or less the size of the US economy, through more sustainable management of water.”

So, the potential stakes are high, although the burden across countries is hugely varied. “Water stress is becoming much more of an issue,” says Jeff Sterba, the president and CEO of American Water, the largest publicly traded water and wastewater utility in the US. “We have to take on this issue for the future, because obviously new water doesn’t get created, so we have to do a better job of utilising the water that we have.”

1

Tapping smaller supplies: The shortfall outlook

Unlike many other commodities, water is an inherently local one. Even within the borders of most countries, some regions have a natural deficit, even as others enjoy a surplus. In Australia, for example, long-term drought is a key driver of water stress. This has led some local utilities to make use of additional sources of supply, but the situation is far from even. "Water supply issues have been a major issue for Australia as we have a very dry climate and have experienced record droughts," explains Robin Lewis, the chief operating officer of Queensland Urban Utilities (QUU), a water utility that serves Brisbane. "Still, in South East Queensland, we have ample water supplies through to 2030. This is based on various sources, including alternatives such as desalination and recycled water."

Across the ten countries in this study, views vary widely, from low to high levels of concern over water stress, although none predict an easy period ahead. In India, water stress is already a concern, says Debashree Mukherjee, the CEO of Delhi Jal Board (DJB), which serves some 18m people. She highlights various issues: a limited and dwindling supply of groundwater, with deteriorating quality; a high reliance on surface water, which has to be shared with other states; and a rapidly increasing population. This in turn slows growth, as Jacques Manem, the managing director for Suez India, the local operational arm of the Suez Environnement Group, points out. "The development of some industry is blocked, because there's simply not enough water. In every city I've been within India, water is starting to be the number one issue."

In Brazil, by contrast, vast stocks of water are available. But much of the major growth is taking place where supplies are tight. "Brazil has one of the world's greatest reserves of drinking water," says Ruddi de Souza, the managing director of Veolia Water Solutions & Technologies in Brazil. "But water that used to be largely available now begins to become scarce in several cities. Meanwhile, the water network quality is declining fast."

This latter problem is apparent in Russia, too, which also has an abundance of supply. Although the country has over 20% of the world's fresh water, its infrastructure is often decrepit, notes Georgy Boldin, the executive director of the Rosvodokanal Group (RVK), one of the country's largest private water utilities. "In Russia, water losses reach 50% due to ineffective management of networks. The use of power for the production and distribution of water is 30% higher than the European average. And only 1% of water supply pipes and 0.5% of sewage pipes are replaced each year," he adds.

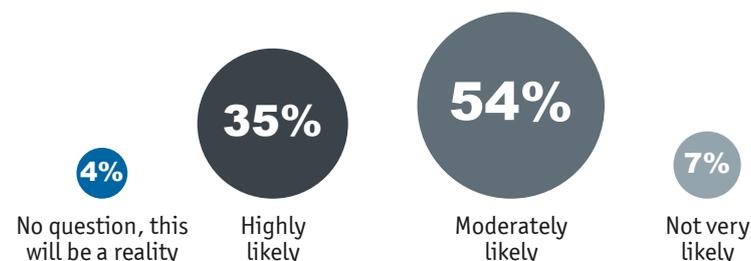
Demand pressures

In our survey of water utility executives, water stress pressures are apparent. Overall, four in ten (39%) consider the risk of water demand outstripping supply in their country by 2030 as highly likely, or certain. A further 54% think this is moderately likely. Although the situation varies widely, it underlines the challenge ahead. As interviewees reiterate, this is not to suggest that the supply problem is insurmountable, but rather that utilities will need to work hard to make more productive use of the available

Chart 3

Q In the country in which you are personally located, how likely do you think the risk is of national water demand outstripping supply by 2030, based on current projections?

(% respondents)



Source: Economist Intelligence Unit.

water. Nevertheless, for a commodity that is a human right—and for the farmers, business and households that rely on this commodity for their survival—such figures are worryingly high. As Mr Moss of AquaFed puts it, “you see fairly significant differences in the ability to manage the water resources across these ten countries. There are also huge differences in the levels of water and sanitation services within countries and between the developed and developing world.”

The scope of the pressure depends to some degree on the proportion of a country’s freshwater supply that is withdrawn each year. Brazil, Russia and Canada, for example, have vast stocks of fresh water at their disposal (see table 1). “Water scarcity is irrelevant to Mosvodokanal,” notes Stanislaw Khramenkov, general director of the utility that supplies Moscow with its water. Indeed, of the ten countries under review, just three currently fall into the commonly agreed threshold of water stress (when total annual withdrawals of renewable water resources are at 20% or higher): Spain, India and, just on the cusp, China (see Table 1). Beyond these, the US and France remain comfortable in terms of the average levels of withdrawals, but these are still relatively high.

Furthermore, there is often a mismatch between the supply and the demand locations. London is the nexus of the UK’s economic growth, and while the UK as a whole has plenty of fresh water, little of this lies in the South East. Indeed, despite its reputation for wet weather, the city receives less rainfall per head than Addis Ababa. “The thing we suffer from is confusion with wet weather and grey weather. The South East of England suffers

Table 1: Key water statistics by country

Key water indicators; all data shown are latest year available

| Country | Freshwater withdrawals as percentage of total renewable water resources (%) | Total renewable water per capita, actual (m3/capita/year) | Total water withdrawal per capita (m3/capita/year) | Urban population with access to improved water source (%) | Rural population with access to improved water source (%) |
|-----------|---|---|--|---|---|
| Spain | 29.02 | 2,420 | 704.5 | 100 | 100 |
| India | 33.88 | 1,560 | 621.4 | 97 | 90 |
| China | 19.51 | 2,070 | 409.9 | 98 | 85 |
| US | 15.57 | 9,079 | 1,583 | 100 | 94 |
| France | 14.98 | 3,361 | 512.1 | 100 | 100 |
| UK | 8.82 | 2,361 | 212.5 | 100 | 100 |
| Australia | 4.58 | 22,094 | 1,152 | 100 | 100 |
| Canada | 1.58 | 83,782 | 1,470 | 100 | 99 |
| Russia | 1.47 | 31,534 | 454.9 | 99 | 92 |
| Brazil | 0.71 | 42,232 | 306 | 100 | 85 |

Sources: FAO 2012, AQUASTAT database; World Bank.

Table 2: Shortfall perception from water utility executives

Aggregate responses from survey, conducted July 2012

| Country | Utilities expecting a mismatch in supply and demand by 2020 (%) | Utilities expecting a mismatch in supply and demand by 2030 (%) | Respondents who think the risk of water demand outstripping supply in 2030 is highly likely (%) |
|-----------|---|---|---|
| India | 52 | 23 | 42 |
| US | 41 | 7 | 44 |
| Canada | 39 | 4 | 39 |
| UK | 33 | 38 | 25 |
| Australia | 28 | 33 | 44 |
| Brazil | 21 | 4 | 42 |
| China | 21 | 26 | 46 |
| France | 18 | 27 | 32 |
| Russia | 18 | 5 | 32 |
| Spain | 0 | 14 | 36 |
| Average | 28 | 18 | 39 |

Source: EIU survey.

an awful lot of dreary, grey days, which aren't necessarily wet," explains Yvette de Garis, the head of environment regulation at Thames Water.

Pushing for change

Such mismatches in supply and demand are apparent in most of the countries polled. Twenty-eight percent of water utilities polled overall expect a mismatch between water demand and supply in their respective country by 2020 (see Table 2). There is greater optimism about the longer-term outlook, where the proportion of executives who expect a mismatch drops to 18%—but this masks the fact that for half of the countries polled, an increase is expected. The UK, France, Spain, China and Australia all expect this to happen.

For others that seemingly show less concern, this is often because their regions are already accustomed to such worries. "Water stress is a concern for sure, all over the world, and especially in Spain. But here, where we have always historically suffered from drought, we

have developed a special expertise in managing water stress," explains Juan Antonio Guijarro Ferrer, the CEO of Aqualogy, a division of Agbar, a major Spanish water utility. "But there is still a lot to be done, in terms of improving efficiencies in systems and pushing new technologies."

Such efforts need to be made far in advance of potential risks. Indeed, water companies are often the ultimate long-term investors, given that the infrastructure they build must last for many decades. And a spurt in investment seems apparent—more than nine in ten of those utilities polled for this report say that their spending will increase in the years ahead, with nearly one-half increasing by 5% or more. Across Australia, for example, utilities are investing heavily in schemes such as desalination plants, in order to meet future demand. SA Water, a state-owned utility that operates in the state of South Australia, is currently finalising a seawater desalination plant capable of supplying about half of Adelaide's drinking water supply. Mr Ringham, the firm's CEO, describes it as "the

biggest single investment in water by the state government in the state's life."

Overall, as this report argues, the necessary technologies to tackle supply worries already largely exist. But a uniquely complex array of barriers are hindering progress.



2

Pumping water uphill:
Barriers and risks ahead

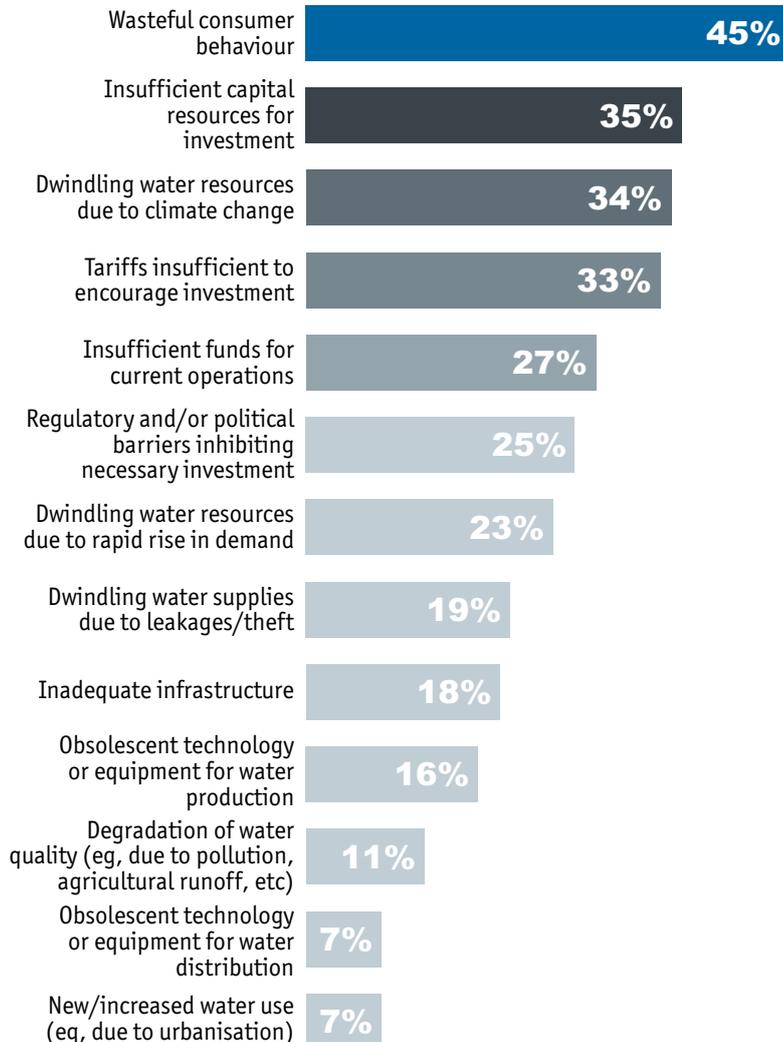
Chart 4



What, if any, are the main barriers to ensuring sufficient clean water supplies to 2030 in the country in which you are based?

Please select the top three.

(% respondents)



Source: Economist Intelligence Unit.

In most industries, increased scarcity of a key raw material—or greater difficulties in extracting and delivering that material—would have a simple consequence: prices would rise, leading consumers to buy it more judiciously. Not so in water. From a consumer perspective, the availability of water is a de facto human right. In the UK, water utilities are barred from turning off water supplies to anyone, regardless of whether they have paid for it or not. At the other end of the spectrum, given that water is treated as a public good, prices are tightly controlled by regulators, with water utilities unable to regulate demand through clearer price signals. This all gives users little reason to turn off their taps.

This core challenge is reflected in the results to this survey, where 45% of utility executives cite wasteful consumer behaviour as their number one barrier to ensuring enough supply by 2030. This applies to all markets, but it is especially a concern within developed markets. Mr Skellett of Wessex Water argues that this creates the need for a set of responses that influence and change consumer behaviour. “You need to get wasting water into the same place as smoking in the consumer psyche, something that makes water conservation a thing that people are committed to doing,” he says. As the next chapter outlines, this suggests a far greater emphasis on demand management measures. Particularly for developed-market utilities, such efforts will come ahead of supply-side infrastructure measures, which was largely the case during the last century.

Chart 5



What, if any, are the main barriers to ensuring sufficient clean water supplies to 2030?

Top three responses; developed versus developing markets.

(% respondents)

Developed markets

48%

Wasteful consumer behaviour

37%

Tariffs insufficient to encourage investment

32%

Dwindling water resources due to climate change

Developing markets

41%

Insufficient capital resources for investment

40%

Wasteful consumer behaviour

38%

Dwindling water resources due to climate change

Source: Economist Intelligence Unit.

In developing markets, although the issue of wasteful consumer behaviour is second on the agenda, concerns over insufficient capital for investment tops the list. Here, many initiatives remain focused on creating sufficient infrastructure in the first place—not least as utilities work to keep pace with a rapid rate of urbanisation. Complicating the mix is a lack of political will and leadership, which also constrains financing. One in four executives polled reckon that regulatory and political barriers conspire to inhibit necessary investment. “Politicians do not generally give enough long-term priority, for example on infrastructure and planning and operation,” explains Mr Moss of AquaFed. “Lack of political incentive is the first big problem for the sector.”

Rethinking regulation

Another key barrier is regulatory. In part, this relates to the setting of tariffs, which one in three respondents say is simply insufficient to encourage investment. “Tariff rates in Russia are not economically feasible and do not provide proper funding for water utilities,” says Mr Boldin of RVK. He notes that Russian utilities typically incur high operational expenses, but little in the way of capital investment, thanks to the funding shortfall. Mr Khramenkov of Mosvodokanal

agrees. “We are still lacking a fully working long-term tariff mechanism, which would attract investment for the company and industry, while allowing us to plan effectively for water utility operations in the medium and long term,” he explains.

In general, regulatory concerns tend to be more worrying in developing markets, where regulatory frameworks are often not well established. Brazil only introduced a water and sanitation law in 2007, which helped to create a regulatory framework for operators and has boosted investment.¹¹ Nevertheless, issues remain. Gesner Oliveira, the former president of Sabesp, a state water utility in Brazil, and now the head of Go Associados, a consulting firm, highlights three concerns. One is that the tariff levels are too low, which deters investment. The second is that tariffs are overly complex. And the third is a lack of an appropriate subsidy for consumers unable to pay. “You need to have direct subsidies, that are efficient and transparent,” he argues. The net result is simply wasteful behaviour. “If you walk around São Paulo, you will see lots of people washing sidewalks with good water. This suggests that the price is too cheap,” says Mr Oliveira. “And if you go to certain industries, you will find all types of informal arrangements to avoid paying the water company. That suggests the water price

⁹ “Brazil’s new sanitation law set to boost investment”, *Global Water Intelligence*, Volume 8, Issue 1, January 2007.

2020 to 2030: A changing regulatory perspective

In the water utility sector in particular, operators set their strategies and investment plans in direct response to regulatory signals. So what is the expected regulatory focus likely to be in the period to 2020, and then the decade thereafter to 2030?

To 2020: Based on responses to this survey, utility executives expect little movement on pricing between now and 2020, with most expecting rates to remain too low. Instead, a strong focus on metering is apparent. This can be felt across a range of markets, with widespread metering rollouts announced in recent years, albeit largely in developed markets. The clear hope is that consumers will naturally curb demand.

To 2030: In the following decade, executives believe that regulators will finally start to shift on pricing, at least in some places. Most think regulation will ensure adequate supplies, but at artificially set prices, although many still believe prices will remain too low. In emerging markets in particular, there will be a greater emphasis on market forces, even as this becomes a lesser priority within developed markets. Another striking shift that many expect during this decade is a rise in global water utility competition. Nearly one-half (45%) see foreign private suppliers as their key rivals during this decade, up sharply from just 13% in the previous decade.

is too high. All this shows the tariff structure is totally wrong.”

In developed countries, where regulatory regimes are better established, this tends to be easier. In the UK, water utilities are obliged to produce a water resources management plan every five years, which sets out supply and demand expectations over 25 years. This effectively forces longer-term planning, with a transparent view for both operators and regulators, which in turn helps to ensure a more predictable tariff environment. “The economic regulator, Ofwat, sets the amount we can increase customer bills each five-year period, and we then use the revenue generated from that to service our debt and finance investment,” explains Ms de Garis of Thames Water.

In many markets, greater efficiency is often gained when government steps back and lets competitive forces emerge. This is a more difficult step to take within the water market, given its unique nature, but it is likely to become a larger facet of the answer over time (see *2020 to 2030: A changing regulatory perspective*).

A change in the climate

Further pressure comes from concerns about climate change, which lies third overall on the list of barriers. At the one extreme, this could exacerbate droughts in many key areas; at the other extreme is a heightened threat of flooding. In between are other weather concerns, such as changing patterns of summer and winter rain cycles, or greater intensity within existing cycles—more intense rain in the rainy season, and far drier in the dry season.

For water utilities, all this is hugely problematic, as they need to place major financial bets on an uncertain future. If dry seasons are more intense, greater investment into storage becomes important; if flooding is expected, more robust infrastructure is needed, including drains, sewers and treatment plants. “Developing infrastructure has to be planned on an assessment of usage peaks and annual demand, but it is becoming more difficult to decide what level of uncertainty to use when planning on both drought severity and duration and return frequency, and severity of flooding too,” explains Mr Moss of AquaFed.

For example, the 2011 flooding in Australia washed away key pipeline infrastructure, cutting off supplies. "The significant impact in rural areas related to water supply, predominantly due to single points of failure with single sources, so they were not on a grid in the same way as cities. Consequently, when bridges were washed away, so were the pipework and water supply network," explains Mr Lewis of QUU. Preparing for such considerations is now starting to be an active consideration. In the UK, Anglian Water kicked off a wide-ranging review of the implications of climate impacts in 2005, and now continues to allocate a proportion of its annual spend towards adaptation.¹²

"I do believe climate change is having an impact and will increasingly do so. We will end up having to do adaptation for more severe weather patterns, as volatility will be more dramatic," explains Mr Sterba of American Water. "So we're building this into our long-term planning, the ability to ensure that we take into account adaptation to climate change, along with the many other factors that you've got to look at for long-term water system health."

Mind the skills gap

In interviews with water executives, all these issues are exacerbated by another concern: a skills gap. The sector struggles to attract top

engineers and managers, many of whom seek better paid, or more glamorous, sectors. And many existing skills are now retiring. In Australia, water utilities have to compete for skills with the mining sector, where the mines "can obviously outcompete us in terms of wages," explains Geoff Henstock, the corporation secretary of SA Water, a utility in South Australia.

Ms Mukherjee of the DJB says that looking at the next generation of skills "is not great"—not just within her organisation, but across the sector as a whole. "Human resources would be a major constraint for an organisation. We have people but we don't have the right mix of skills. And that is something we need to address," she says. Action in her firm is already under way, from internal training plans to co-operation with relevant institutions—not least as one challenge is hiring civil engineers and electrical and mechanical engineers who have little to no exposure to the water sector's changing issues. "It's increasingly only now that we're looking at water as a scarce resource," says Ms Mukherjee. "Before that, water has always been a natural resource, with a well or a hand pump or a borehole, and the water is free. So the focus on water and wastewater as a professional and technical competence has just come in the last decade or two."

Please, sir, I want some more (money)

When it comes to pricing water, everyone agrees that something needs to change. But agreement quickly dries up thereafter. Almost one-half (49%) of respondents believe that pricing structures need to be changed to encourage conservation. This suggests an increase, but 38% also agree that prices need to be held down to ensure fair access for all, and only 22% think pricing ought to rise to discourage demand. It is a reflection of the idiosyncrasies of water that

just 35% think pricing should cover actual costs. Overall, water utilities perhaps need to take a cue from their peers in electricity, and start to explore more tariff innovation—such as time of use pricing, for example. But, as executives mostly note, nothing makes a more concrete impact than simply giving consumers a clear indication of how much they actually use, and what that costs.

¹² *Adapting to an uncertain climate: A world of commercial opportunities*, UK Trade & Investment and the Economist Intelligence Unit, 2011.

3

Getting more from less: Boosting water productivity

Given the barriers faced, it is encouraging that the industry largely feels that it has the necessary technologies and know-how needed to grapple with future pressures. Furthermore, despite an often-staid reputation, a huge amount of innovation can be found. Israel's tight water supply, for example, has made it the world's leader in the purification and reuse of its wastewater. It makes use of almost 70% of its wastewater for agriculture (Spain, the second best, reuses just 12%), with some 200 local companies now exporting related technologies and systems.¹³ Indeed, much of the battle in the coming two decades will not be a technological problem, but rather a political, sociological and managerial one—in particular, changing the psychology of how people think about water.

Inevitably, the responses taken vary widely from country to country, and even within specific regions of a given country. In the US, California will invest a lot in desalination to bolster limited supply, while states such as Florida instead deal with water transfer disputes between the north

(where much of its fresh water lies) and the south (where much of the demand originates). As such, water utilities will draw on a diverse set of technologies and strategies in their response to supply pressures. Nevertheless, these can be bundled into four main buckets: demand management, recycling and reuse, improved efficiency and new sources of supply.

From managing supply to managing demand

Historically, water suppliers have largely focused on supply-side measures. But as the pressures on the sector rise, and the nature of the challenges faced start to shift, a new set of responses is increasing rapidly in importance. Topping the list is demand management: getting users to think more carefully about water conservation. At the core of this is a relatively simple technology: the water meter. Water executives in both developed and developing markets place new metering and related usage awareness technologies as their most promising technology-led approach to ensuring supply to 2030 (see Chart 6).

Keeping abreast of innovation?

Bringing new technologies to market is just one piece of the puzzle: operators need to have the requisite processes in place to assess and adopt such innovations. Many do, but concerns still persist, especially in developing markets. Although many have good procedures in place, just one in five (20%) of developing-market utilities say they regularly evaluate new technologies, compared with one-third

(33%) of developed-market ones. And far more developing-market executives admit to lacking a good understanding of the innovation options available (29% compared with 16% for their developed-market peers). This is not to say that no new technology is needed: just two of the 244 utilities polled think their companies have no need for any further sophisticated technology. ■

¹³ UN: Israel #1 world leader in water recycling, Arutz Sheva, March 23rd 2009.

Chart 6



What, if any, are the most promising technologies for ensuring adequate water supplies in the country in which you are based?

Top three responses; developed versus developing markets.

(% respondents)

Developed markets

30%

New metering and/or usage awareness technologies

30%

New technologies for tapping previously inaccessible water sources

26%

New water desalination technologies

Developing markets

38%

New metering and/or usage awareness technologies

25%

New materials/technologies to strengthen distribution networks

25%

New technologies for tapping previously inaccessible water sources

Source: Economist Intelligence Unit.

In countries around the world, water utilities are now working fast to roll out meters in order to give consumers a clearer view of consumption. Indeed, global investment in so-called smart water meters alone, between 2010 and 2016, will total some US\$4.2bn, according to Pike Research.¹⁴ Across all ten countries examined within this study, efforts are being made to increase the proportion of metered users—to promote conservation, reduce waste, help detect leaks and lower meter reading costs. This works: simply installing a water meter typically cuts usage by 10%-15%.¹⁵

Metering also provides an array of other options, such as the potential to implement variable tariffs. "For example, there's no reason why you can't have summer/winter tariffs, or peak demand tariffs," says Mr Skellett of Wessex Water. Nevertheless, the key point is to learn "what sort of information can be given to customers to make them change their behaviour, when they can see not just what they're using, but also see it in cash terms." This gives rise to great potential for innovation, as is being seen within the electricity utility sector too: from including average usage information from similar properties nearby, to giving specific incentives for making savings, and to the most basic option of including clear

information about how simple household changes can save water.

In developed countries, some utilities are even looking at how to link such information to users' smartphones, to help remind them in a more intuitive way. This can also help to bring utilities closer to customers, by making water information and costs more meaningful and live, via a smartphone app. This in turn can help to drive other efficiencies, such as reduced customer support queries, notes Peter Siggins, the global lead for smart business at PA Consulting Group. And as Mr Skellett previously noted, this can help influence consumer attitudes about water conservation, so that eventually wasting water becomes socially unacceptable.

There are also demand-reduction technologies for users, which 21% of executives say will be a key part of their response. At a residential level, there is much available here—from low-flush toilets and aerated taps to major appliances that use less water per cycle. Utilities are hardly at the forefront, but there are many ideas that can be borrowed from the energy sector. At one level, this is about educating users of the benefits and providing help in switching. At a different level, they can lobby governments to implement

¹⁴ *Global investment in Smart Water Meters to Reach \$4.2 billion by 2016*, Pike Research, February 21st 2011.

¹⁵ "Water meters 'help cut usage'", *The Guardian*, December 8th 2009.

labelling schemes for white goods that portray their water efficiency. Of course, this is more powerful if it is backed up with a stronger pricing signal. As Ms de Garis of Thames Water notes, consumers can typically “buy the most profligate water-using appliances without really much of a premium on them.”

Of course, a shift towards demand management will not happen overnight. For water utilities, this is a considerable shift in thinking—from selling water to encouraging the saving of water. As Mr Ringham of SA Water explains, “We have to preach an efficiency measure, while also looking at the bottom line. This means that we not only have to get customers to be more efficient in their use, and we also need to be efficient in our costs.”

Recycling and reusing water

Another major element of the response lies in rethinking the “waste” in wastewater. Water utilities are increasingly considering how they can effectively recycle and reuse any wastewater generated. In the US, American Water has a scheme dubbed “One Water”, which tries to further such efforts. “It describes our long-term strategy of not thinking about individual segments of water, like drinking water,

wastewater and storm water, but rather thinking that it’s all water, and it’s all a resource. It can be used for different purposes,” explains Mr Sterba. The company has ongoing water reuse initiatives in a number of regions. “It’s thinking about the system holistically, from the start of the watershed through to the various points of use,” says Mr Sterba.

This area is also receiving growing attention in Brazil, where specific regions have increased production of water treatment for use in industrial applications. “This kind of technology has enormous potential to save water for human consumption,” says Mr Oliveira of Go Associados. However, there is still significant scope for improvement. “Today we have maybe 40%-45% of households in Brazil that are connected to the sewage network. Among those, 40% is being treated, so we have 20%-25% of residential sewage that is being treated. Over 70% is polluting rivers, and is in turn making the water treatment progress more expensive,” explains Mr de Souza of Veolia. As a result, some cities have to pipe in water from rivers that are 80-100 kilometres away, at a high cost. “Every year the situation becomes more critical,” he says.

Chart 7



What, if any, are the most promising strategies and/or tactics for ensuring adequate water supplies in the country in which you are based?

Top three responses; developed versus developing markets.

(% respondents)

Developed markets



Reforestation and/or other methods of supporting water table



More extensive distribution networks



More efficient metering of water usage

Developing markets



Reforestation and/or other methods of supporting water table



More efficient metering of water usage



Improved means of importing water for purification

Source: Economist Intelligence Unit.

Much more can be done. Within developing markets in particular, a significant proportion of wastewater remains entirely untreated. This is not only a health risk, but also a striking loss of water. But steps are now being taken to address this issue. In China, for example, in one of the typically eye-widening statistics that highlight the scale of the country's ongoing development, an average of eight new wastewater treatments were being activated each week—more than one a day—as of 2010. This has led to a dramatic increase in the proportion of wastewater treated in the country, from about half in 2005 to 75% in 2010. Others face capital constraints in their ability to roll out such infrastructure, but this will inevitably have to become a part of the overall solution at some point.

Plugging the leaks and other efficiency gains

A related set of responses can largely be categorised under the guise of efficiency. The most obvious of these is simply about cutting water leakages. Juan Costain, the South Asia regional head of the World Bank's Water and Sanitation Programme, gives the example of Delhi as an illustration, where about 200 litres per head per day is supplied through the water network, but ultimately usage is only about 70 litres owing to water losses in the system. "Unfortunately for the average Delhi citizen, they start off with 50% more water than the average person in London or Paris, but end up with 50% less," he says.

For DJB, a local utility, this makes leakage reduction a clear priority, which Ms Mukherjee says accounts for about 70% of its efforts. "This is a key priority for us, as we have to make the most of the water we have," she says. Backing this up are supporting efforts on demand management and consumer education. However, one particular challenge for emerging markets comes down to entirely understandable consumer aspirations: just as families gain disposable income for the first time, they immediately seek to increase their water usage. "It's a curve," explains

Ms Mukherjee. "As countries grow richer, water demand increases. It peaks and then as awareness grows, water demand drops again. We're riding the curve right now."

Other countries face different efficiency challenges. In Australia, Mr Lewis of QUU cites investments into a leakage management system as an example. "Over the past five years we've saved 26 megalitres per day through a pressure reduction programme," he says. By contrast, in Russia, poorly maintained infrastructure—a legacy of the country's past—adds to pressures on water quality. "There's an acute problem of storm sewers and wastewater," explains Mr Khramenkov of Mosvodokanal. The waste from households, industry and others all flows back into the overall water supply, he notes. "The main problem is weak and poorly designed water protection legislation, as well as mechanisms for monitoring implementation."

Some places, such as Singapore, now act as exemplars of what can be achieved through wide-ranging efforts literally to make every drop count. The city-state operates a water supply system that is tightly managed—with an average of just one leak per day. As one example of how it achieves this, its Public Utility Board uses sensors in key parts of the network to detect issues immediately, so that a source can be shut down straight away. Others are following suit: QUU, for example, is looking at implementing a smart control system specifically to monitor and measure leakages within its network.

Globally, however, residential users are typically the smallest consumers, with agriculture accounting for about 70% of all water withdrawals. This makes more responsible agricultural water management a key facet of future preparedness. "In the case of Spain, agriculture uses around 65%–70%," says Mr Guijarro of Agbar, who argues that much of the expertise that has been developed around urban water efficiency could be applied to agricultural infrastructure, to make it more efficient. "There's

¹⁶ *New directions in Chinese wastewater*, Global Water Intelligence, October 2010.

¹⁷ "China's municipal wastewater treatment rate up by 24 percentage points", Xinhuanet, March 15th 2011.

¹⁸ "Making every drop count", *The Economist*, November 4th 2010.

¹⁹ "Managing water under uncertainty and risk", United Nations World Water Development Report 4, Volume 1, 2012.

a lot that can be done, especially in terms of recycling water for agriculture. Not only that, but implementing distribution technologies, improving the efficiency of irrigation to save water and improve agriculture," he explains.

Pressures are rising. Based on current approaches, farmers are estimated to need 45% more water by 2030—but, as *The Economist* puts it, "they won't get it."²⁰ As the same article explains, various techniques are available to boost water productivity, from drip-feed irrigation for smallholdings, to no-till agriculture and genetically modified crops. Utilities are typically far removed from such initiatives, but closer collaboration with major users is likely to become more pressing in the coming decades. Already, an initiative by Wessex Water to work with local farmers, aimed at reducing the usage of pesticides and fertiliser, has improved groundwater quality as well as total available supply.²¹ Others will surely look to follow suit.

New supply-side measures

A final set of measures looks at the supply side. For an indication of what is feasible, Dubai is a prime example. By 2005, the United Arab Emirates was using 1,867% of its total available freshwater supply each year.²² Making up the shortfall is desalination. This technology is now being deployed in an increasingly large number of cities and areas. Indeed, among developed-country respondents, desalination is regarded as one of the top three technologies needed.

This is hardly new: Spain built its first desalination plant in the 1960s and now has over 900 such plants²³—but the trend is accelerating. By late 2011, close to 16,000 plants were in operation globally, with 747 added in the past 12 months alone.²⁴ The most obvious challenge

is cost, given its high energy intensity. While Middle Eastern countries have been able to use oil revenue to offset such costs, other countries have tougher budgetary constraints. Nevertheless, one in five (21%) executives polled overall say that new desalination technology is a key technology in the response to supply pressures; rising to one in four (26%) in developed markets.

Another supply-side measure involves the bulk moving of water from regions with a surplus to regions facing a deficit. In the UK, Wessex Water is spending about £18m over three to four years to improve its regional grid, so that it can improve connectivity with neighbouring companies. A crucial element has been recognition of the need to change the regulatory system, which had essentially disincentivised bulk water trading between utilities. "So now, where people have got surplus water, they are encouraged to use that because there is a financial incentive to do so," explains Mr Skellett.

But when it comes to water relocation, China's ambitions dwarf most others. Its South-North Water Diversion Project seeks to shift at least six trillion gallons of water to its parched northern provinces, at an estimated cost of US\$62bn.²⁵ Few utilities could justify such a scheme, but the Chinese government takes fixed control of raw water supply to cities, while local water utilities are responsible for handling the supply that they receive. Also, as Steve Clark, the executive director for Sino-French Water Development, which supplies water to about 16m people in China, says, cost efficiency is all relative when it comes to water: "If you cannot develop a city because of a lack of water, then it's got to be cost effective, no matter how much it costs."

²⁰ "No easy fix", *The Economist*, February 24th 2011.

²¹ "Water companies and farmers collaborate to improve water quality", *The Guardian*, July 8th 2011.

²² "Millennium development goals indicators", United Nations, last accessed August 2012.

²³ "Desalination", University of Edinburgh, <http://www.see.ed.ac.uk/IIE/sustconf/2011-G14.pdf>

²⁴ "Desal's annual inventory released", Desalination.com, September 5th 2011.

²⁵ "Plans for China's water crisis spurs concern", *New York Times*, June 1st 2011.

Promising water technologies—in trial or on the horizon

Few outsiders consider the water sector as a source of innovation. But, as the truism has it, necessity is the mother of invention. Although many technologies are well established, developments continue. A few promising examples include the following:

- *Lower-cost water desalination.* One of the biggest issues with desalination is its high-energy intensity, and thus high cost. But in-depth efforts are under way to improve these, with technologies ranging from introducing carbon nanotubes within membranes (which make it easier for the water to pass through) to radial deionisation, an alternative technique for removing salt from water.
- *Better wastewater treatment.* As greater attention is paid to water reuse, a lot of R&D is going into wastewater treatment. One development within American Water is a treatment process for wastewater that the

company has now patented, which cuts energy use by 30%–45%.

- *Managed aquifer recharge.* Since the 1990s, Wessex Water has been developing its expertise into managed aquifer recharge, which is essentially taking any surplus water and storing it within underground aquifers until it is needed again. Such technologies continue to be developed around the world, as interest grows.
- *Using water assets as a real-time battery for the electricity grid.* A project by Enbala and American Water in Pennsylvania involves using water treatment plants as a flexible source of power to the grid, to help electricity providers balance supply and demand in real time. By acting as an energy supply backstop, water operations are not affected, but it offsets 2%–3% of total annual energy costs.²⁶

²¹ "Pennsylvania American Water connects to the smart grid", Enbala case study, <http://www.enbala.com/resources.html>

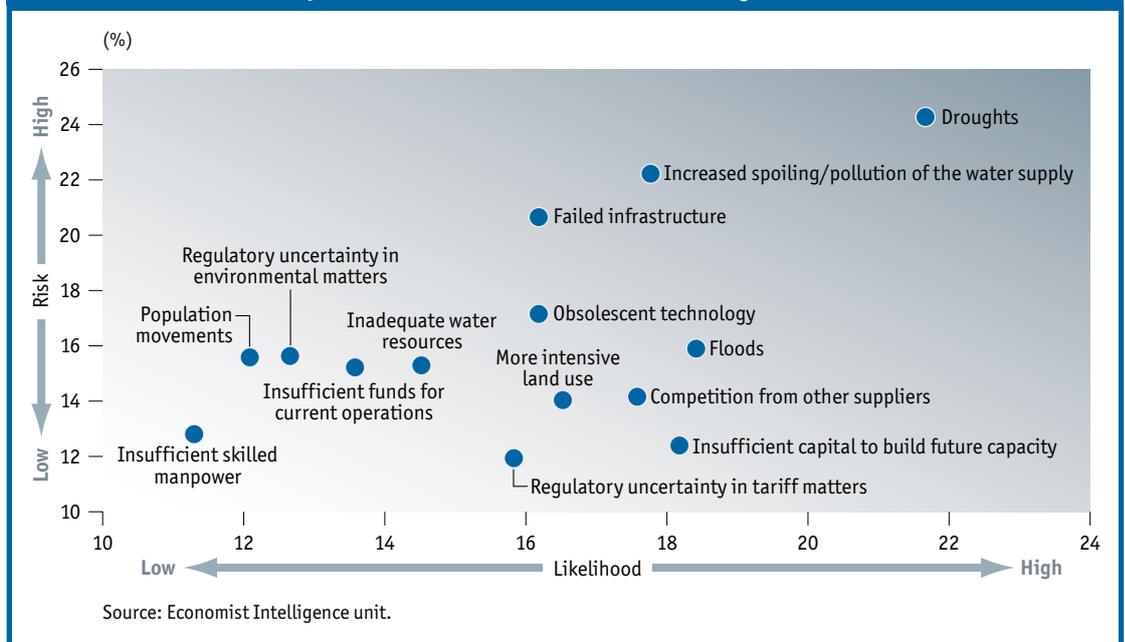
4 Rough waters ahead: Managing for risks

This report has highlighted that water utilities face great uncertainty between now and 2030. Indeed, uncertainty is a growing watchword in an industry that is otherwise highly predictable, and which routinely maps out its investments in decades-long cycles. This is especially true in the case of less predictable weather patterns, as a result of climate change. For infrastructure investments needing to last decades, operators now have to make far more difficult bets about future supply and demand assumptions, all of which can have sharp investment consequences.

And other risks abound. Those utility executives polled for this report flagged up a range of

issues, based on both their severity and their likelihood (see scatter chart). Among these, the most obvious concern is drought, followed by the increased pollution or spoiling of the water supply. Both of these are considered high risk and highly likely to occur. For the risk of pollution, for example, both agriculture and urbanisation are exacerbating the situation, making the available supply of water both more expensive and less usable for operators. Some of this risk can be mitigated through regulation: in Russia, for example, recent amendments to the country's water laws also implement a "polluter pays" principle for wastewater discharge, explains Mr Boldin of RVK. "Previously, water

Chart 8: Executives' top concerns in terms of their severity and risk



operators were responsible for paying charges for the quality of wastewater being disposed by other companies in water basins," he notes.

Getting a handle on all of these kinds of issues requires a robust approach to risk management, which can account for wide-ranging uncertainties in a range of domains (for example, the likely seriousness of climate change and its related effects; the future political will of regulators to reform tariffs and water markets; and the psychology and behaviour of consumers in their usage of water). Such considerations are not just about the downside risks, but the upside ones

too. "Risk management is extremely important because risk is not limited to the threats you're facing, but also to the opportunities available," says Yarlene Frisani, director for risk, compliance and training at Ontario Clean Water Agency in Canada. Her organisation has established a formal risk assessment process, which helps to identify, treat and monitor risks. "What this allows you to do is arrive at a decision and quantify where the investment makes sense. So to either control for a particular risk, or to invest in an alternative opportunity where the return is greater," she says.

Overall, executives polled for this study are relatively confident about their ability to handle risk management. Around two-thirds (65%) feel that they can either do this well, or at least respond sufficiently to issues that might emerge. But most of the rest (34%) are less sure, believing they can respond to some issues, but not others. This is far more so in developing markets, where 43% find themselves uncertain about their abilities in this domain, compared with 27% in developed markets. "There is quite a big gap between what people would like to do and what they can really do, because risk management starts by thinking about problems, generating the information you might need, and actually being able to act," says Mr Moss of AquaFed. "Forecasting is one thing, doing something about it is something else."

Better information, more skills

Across all markets, a similar set of issues constrains utilities' risk management efforts. Topping the list (50%) is poor support from water authorities, with limited collaboration or input. After that, however, the problems then quickly become internal, with both limited awareness of risk management techniques (43%) and a shortage of skills (36%) hindering efforts. Information shortages are another challenge. "In many countries across the sector, we are facing a degenerating level of information about water availability, rainfalls, water flows, state of aquifers and river flows," says Mr Moss. Some

Chart 9

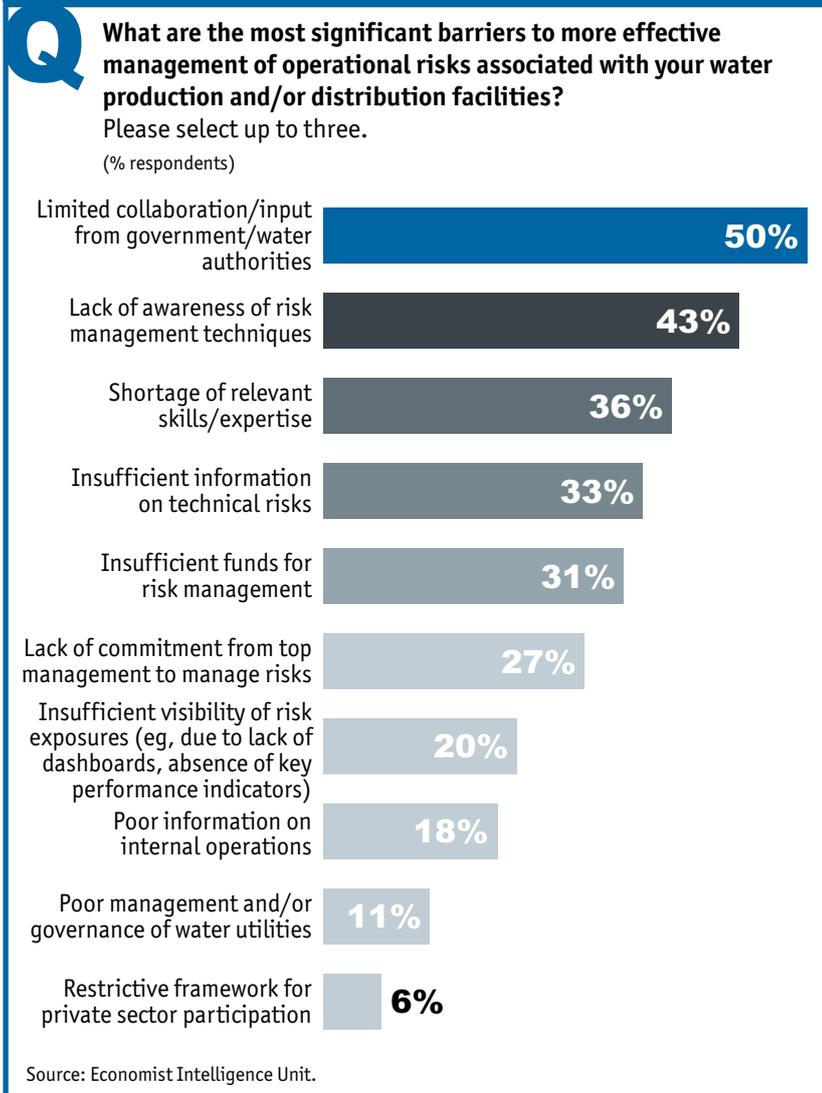


Chart 10

Q What measures does your company take to mitigate risks in the following aspects of your business: operational and construction; water production and deployment; regulatory and political?

Top three responses; three risk areas.

(% respondents)

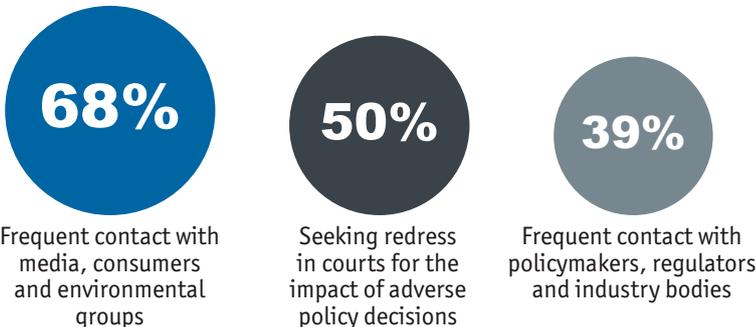
Operational and construction



Water production and distribution



Regulatory and political



Source: Economist Intelligence Unit.

private sector players are responding with more detailed mathematical models in order to try to forecast such metrics more accurately, but many others lag in such efforts. Such shortfall in capability comes just as the risks loom ever higher.

Beyond the risk management function itself, a shortage of skills also hinders the actual response that utilities are adapting to mitigate risks—whether the regular maintenance of water assets, or the deployment of sensors and analytics technology to analyse water networks (see Chart 10). Although not the primary response overall, skills development will need to play a fundamental part in how utilities respond between now and 2030—from basic operational training to the development of skills around environmental regulations. Even the most basic of skills can be crucial. Mr Manem of Suez India gives an example of repairing a simple section of pipeline, where he observed one maintenance team trying to cut into a section of pipe with a hammer, in order to replace it. “I’m sure by repairing the leak they were making at least two or three other leaks in the next 100 metres,” he explains. Few will be able to afford such mistakes in the future, as pressures continue to mount. ■

Conclusion

It is easy to get gloomy when considering the deep challenges facing the world's water suppliers. After all, both growth and lives are at risk if they fail. But there is much cause for hope. Singapore and Israel have both built thriving, globally competitive economies, despite a chronic shortage of freshwater supply.

Although these are tiny countries, in geographic and demographic terms, in comparison to those examined in this report, their leadership is instructive. It suggests that, with the right political will, and consumer backing, the necessary steps can be taken to ensure adequate supply. According to Mr Ferrer of Agbar, Spain's water stresses have forced it to develop technology, expertise and innovation to cope. "We now have the technology, we have the expertise," he says. In turn, this is providing Aqualogy with a competitive advantage to expand into new markets and bring these insights to bear.

Water operators everywhere can learn from their example. Indeed, even in the case of operators not facing immediate water stresses, there is a variety of measures that can and should be taken to ensure water preparedness for 2030. While many sources of present and future water stresses—climate change, drought, water pollution, to name a few—are outside of operators' direct control, many strategies to ensure long-term preparedness are well within their purview.

This study has highlighted some of the most important such measures. These include boosting productivity by,

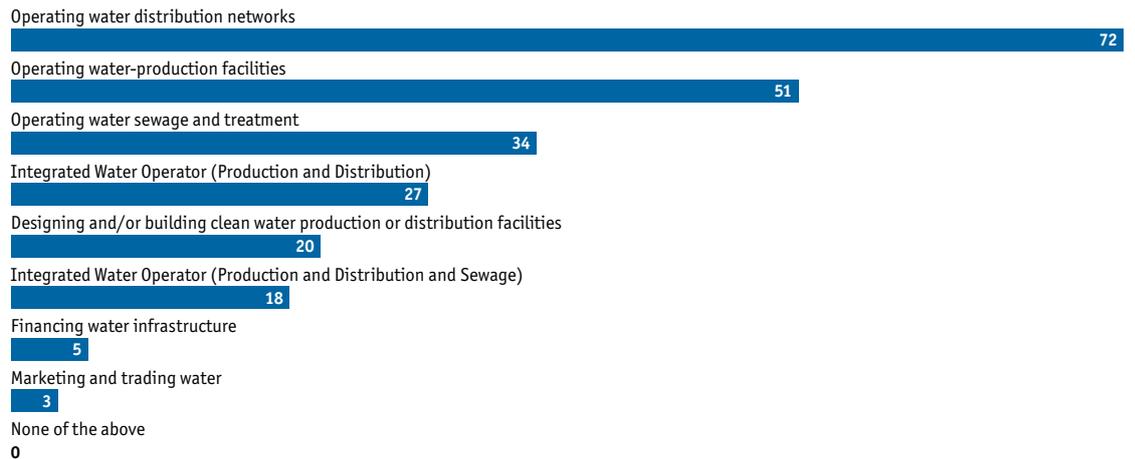
for example, stemming leaks and making better use of recycled water; stressing demand management by, for example, increasing usage awareness, introducing more sophisticated tariff structures and discouraging consumer waste; focusing on innovation in all phases of the water cycle, from water production to recovery and re-use, to enhance the performance and integrity of productive assets; upgrading risk assessment and risk management to ensure the resiliency of the water producers themselves; and focusing on organisational and skills development and on following industry best practices, to ensure excellence in all phases of water production and distribution.

Many of these measures are near at hand; they do not require long lead times, nor do they depend on large investments or actions by outside organisations. Other measures, such as those relating to ensuring cost-efficient expansion and the long-term integrity of infrastructure, require a somewhat longer time horizon and investment of resources. But they all require, above all, a significant shift in how all parties—consumers, business, farmers, regulators and utility operators—perceive water. "The industry must do a better job in helping customers be more aware of the value of water and how what they do impacts it," says Mr Sterba of American Water. So, for example, some might today simply refuse ideas such as producing potable water from recycled sewage, yet they may have to swallow such ideas tomorrow.

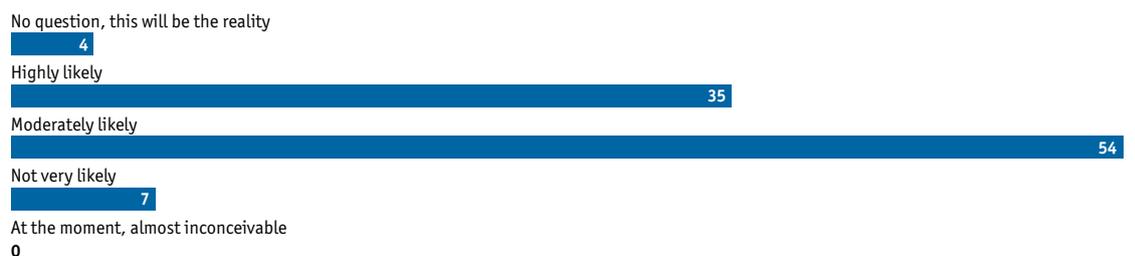
Appendix

Survey results

Are you currently involved, or thinking about getting involved over the next 12 months, in water production in any of the following ways? Please choose all that apply.
(% respondents)



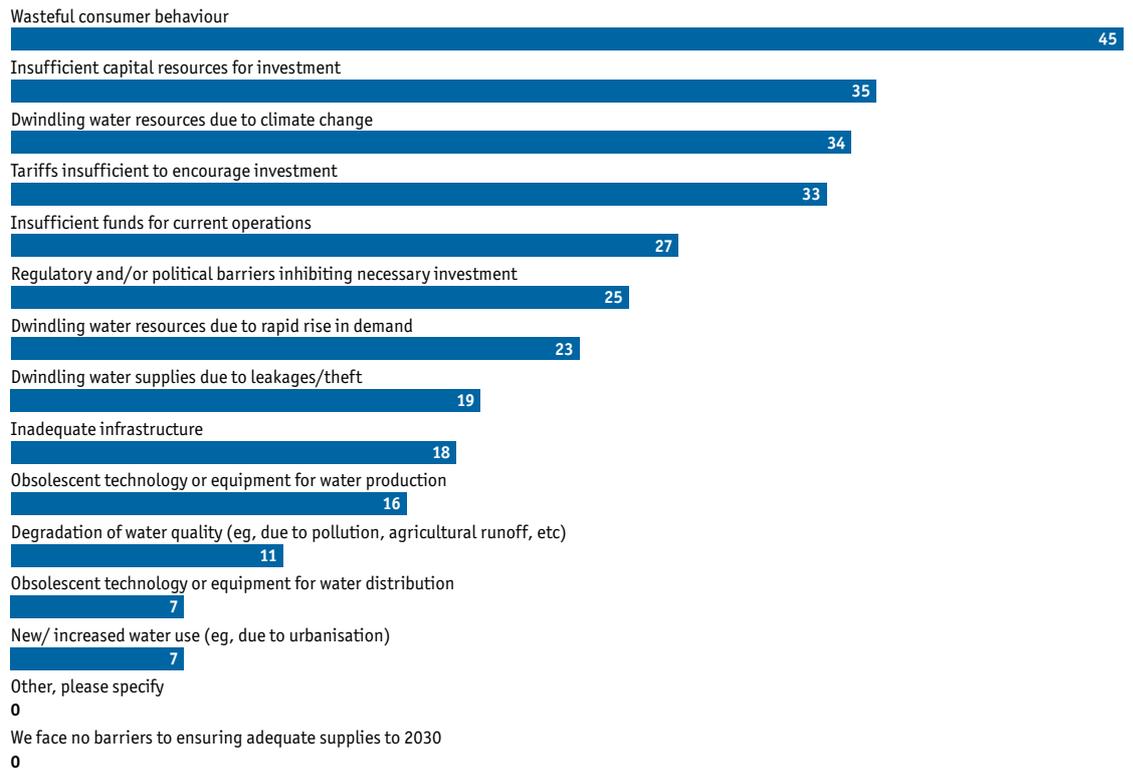
In the country in which you are personally located, how likely do you think the risk is of national water demand outstripping supply by 2030, based on current projections?
(% respondents)



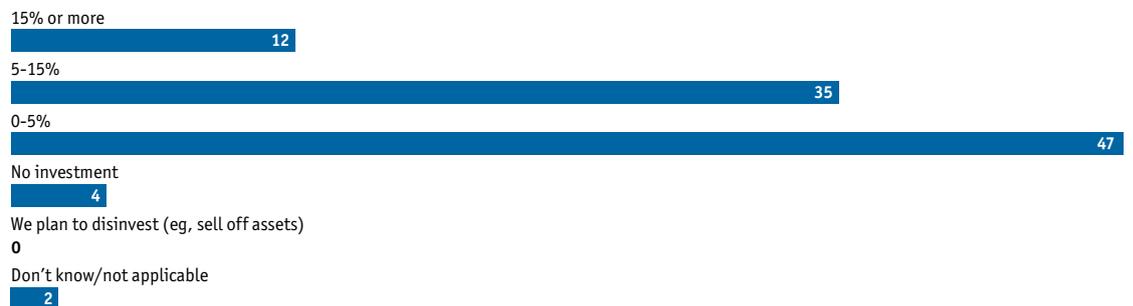
What, if any, are the main barriers to ensuring sufficient clean water supplies to 2030 in the country in which you are based?

Please select the top three

(% respondents)

**Please estimate your company's total average year-on-year change in investment in water production and/or distribution facilities over the next three years. Please choose one answer only.**

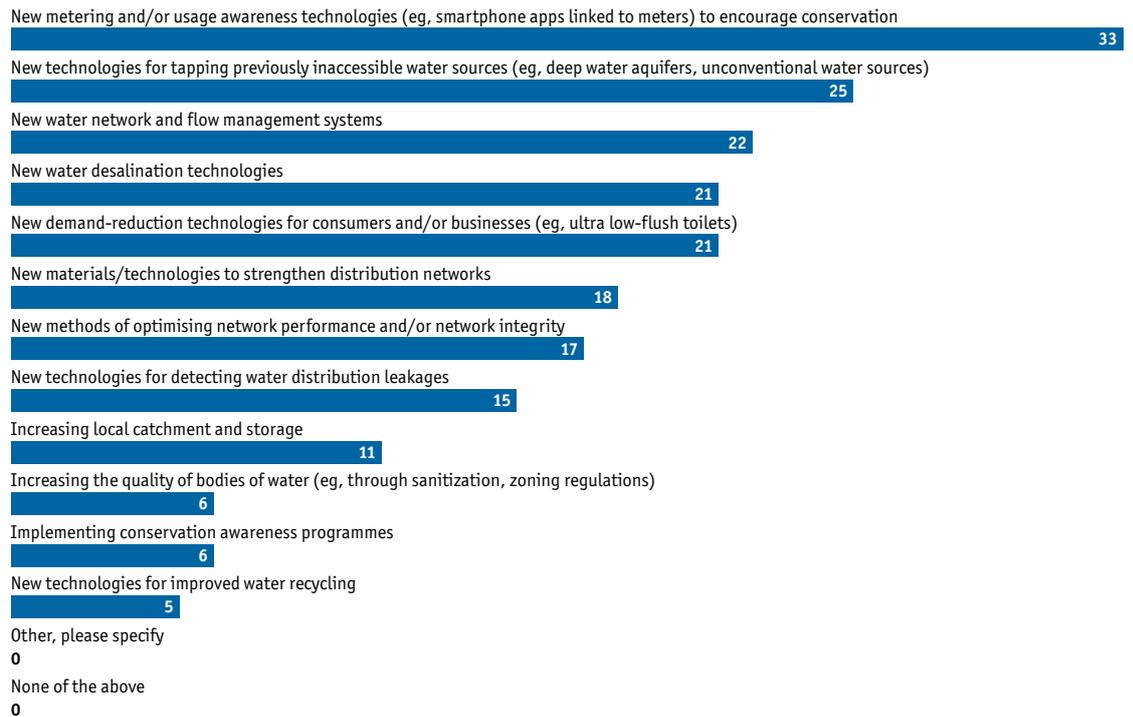
(% respondents)



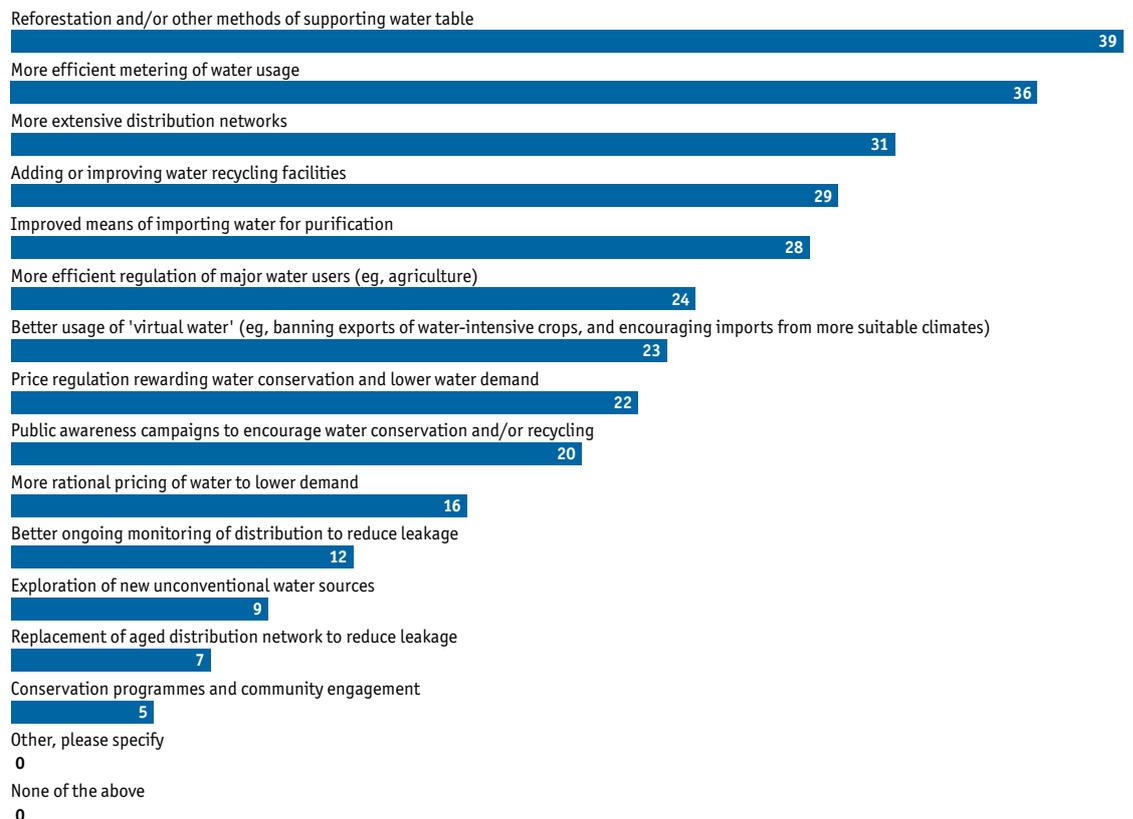
What, if any, are the most promising technologies for ensuring adequate water supplies in the country in which you are based?

Please select the top two.

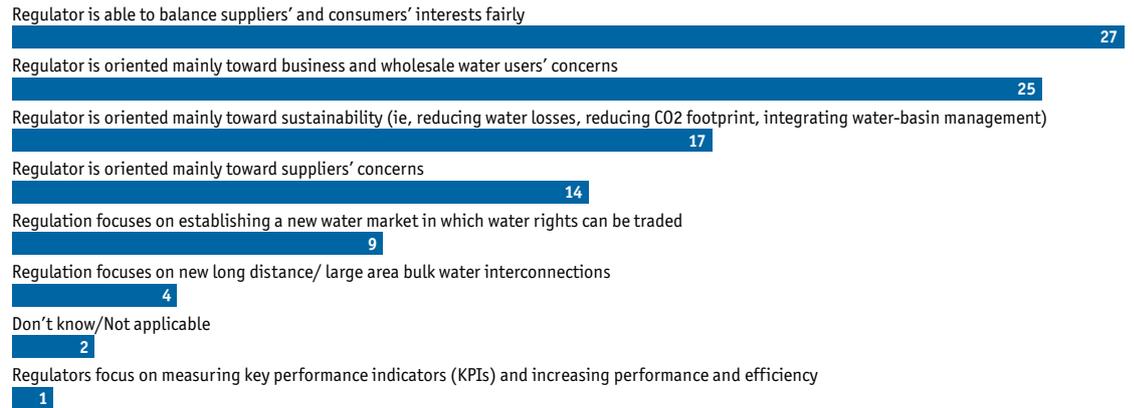
(% respondents)

**What, if any, are the most promising strategies and/or tactics for ensuring adequate water supplies? Please select the top three**

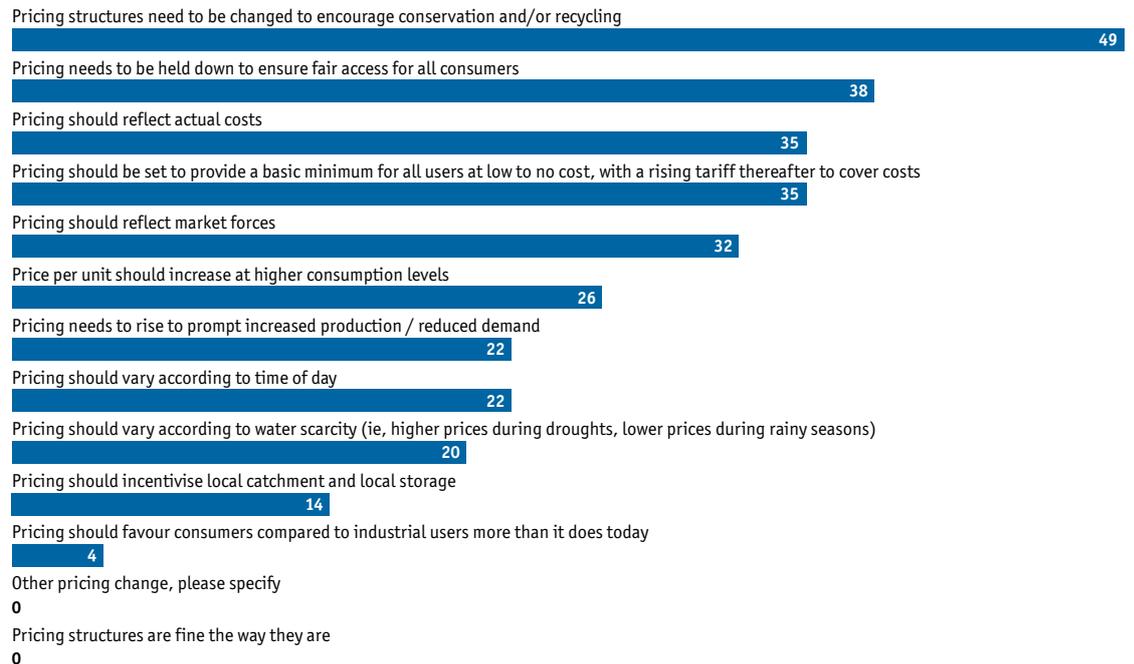
(% respondents)



In the country in which you are located, how well do you feel your company's water regulator balances the requirements of water suppliers and consumers? Please select the one answer that best describes your water regulator:
(% respondents)



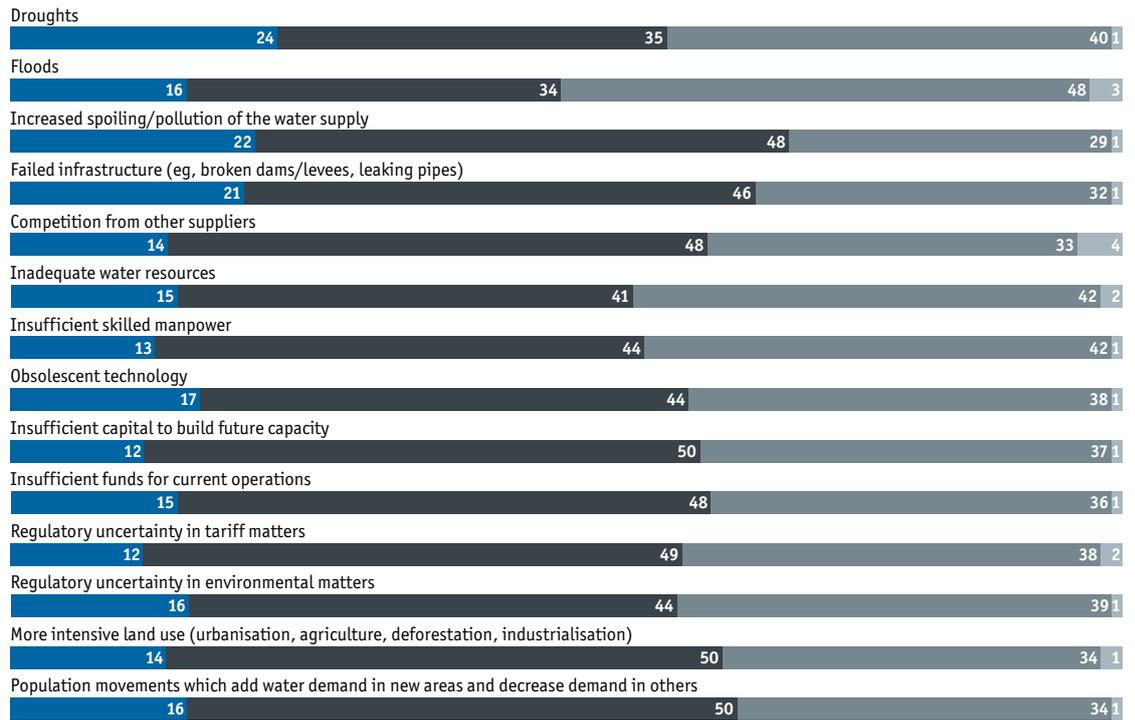
What, if at all, do you believe needs to change in water tariffs to ensure adequate supplies by 2030? Please choose the top three
(% respondents)



Please rate each of the following types of risk according to its potential significance/impact for your company by 2030:

(% respondents)

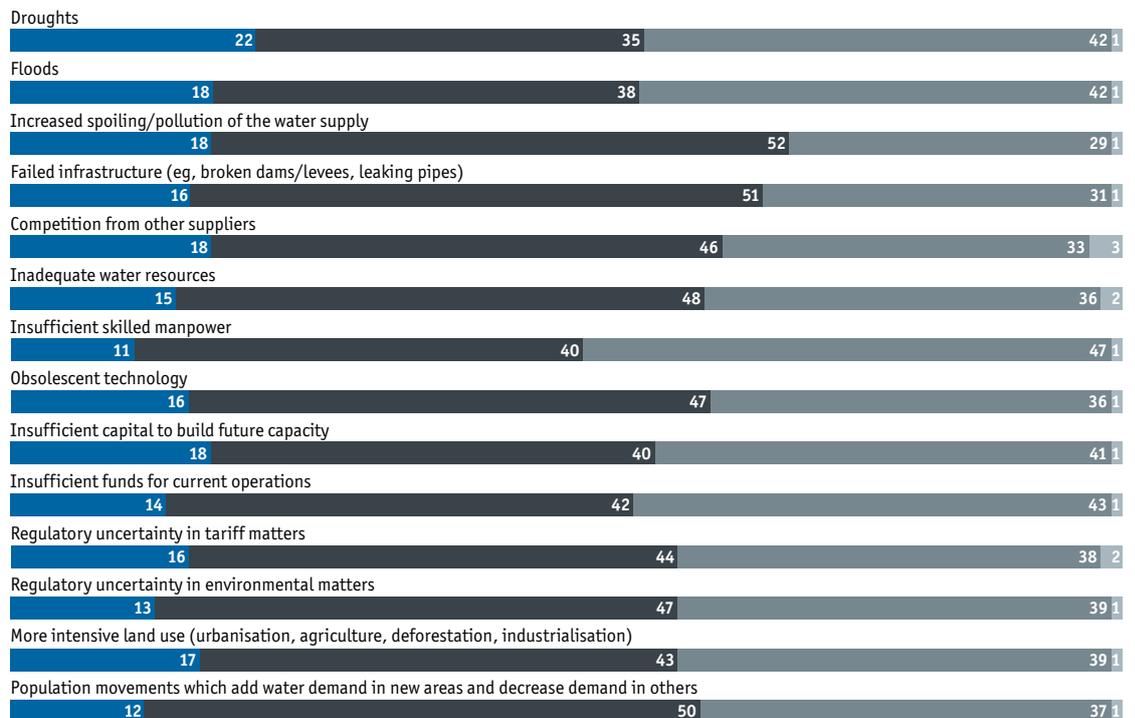
High risk Medium risk Low risk Not applicable



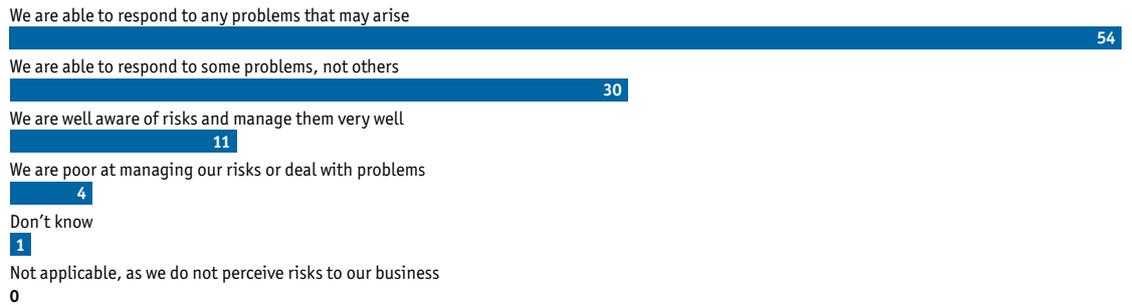
Please rate each of the following types of risk according to its likelihood for your business by 2030:

(% respondents)

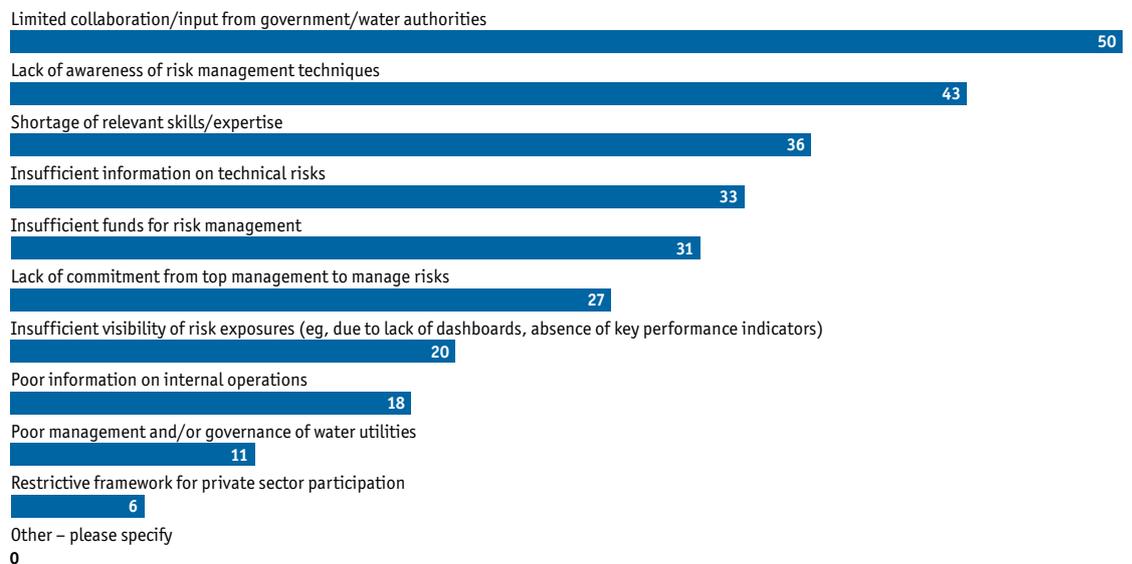
High likelihood Medium likelihood Low likelihood Not applicable



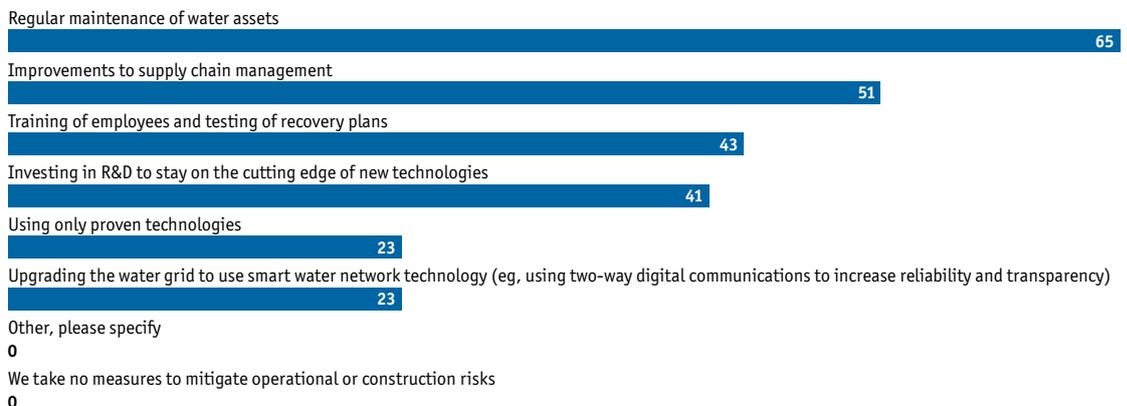
Overall, how well do you feel your company manages its most serious risks? Please select one answer.
(% respondents)



What are the most significant barriers to more effective management of operational risks associated with your water production and/or distribution facilities? Please select up to three.
(% respondents)



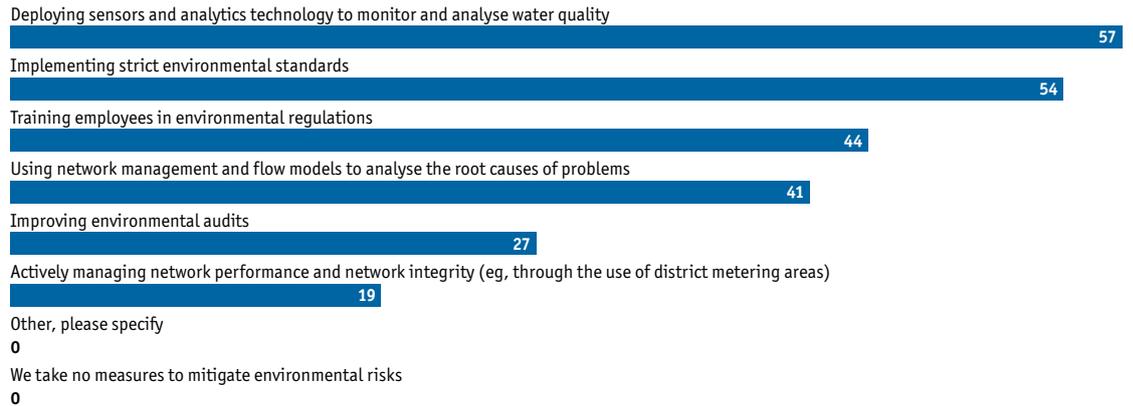
What measures does your company take to mitigate operational and/or construction risks associated with water production and distribution? Please select all that apply.
(% respondents)



What measures does your company take to mitigate environmental risks associated with water production and distribution?

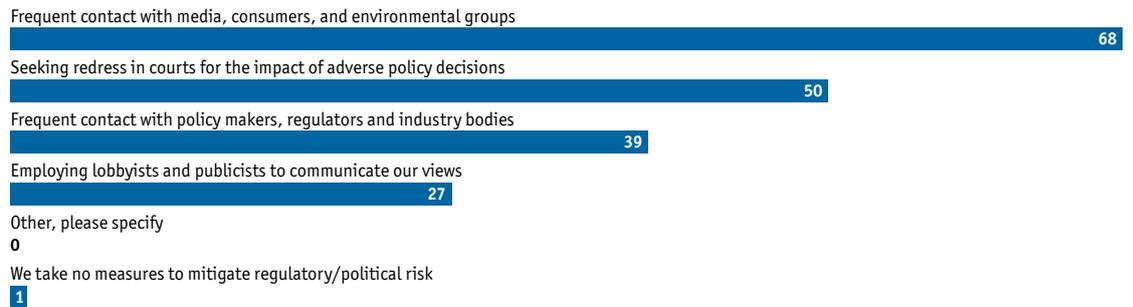
Please select all that apply.

(% respondents)

**What measures does your company take to mitigate regulatory/political risks associated with water production and distribution?**

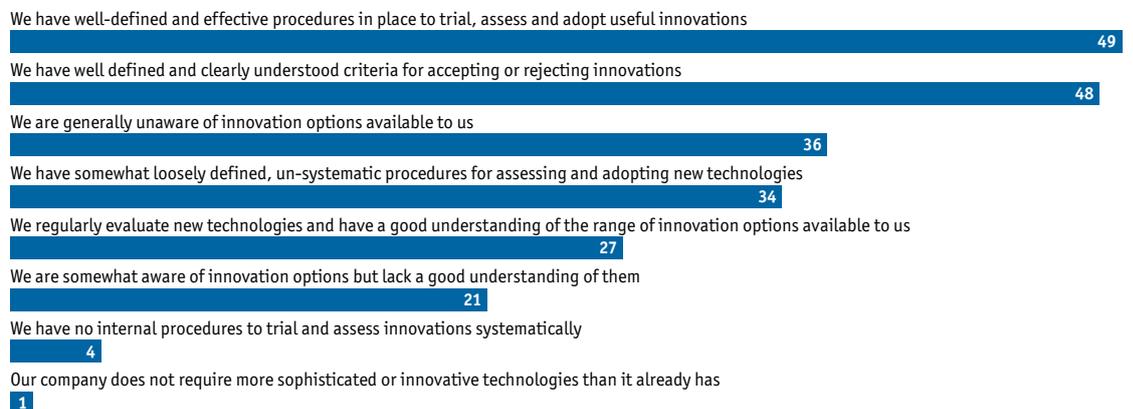
Please select all that apply.

(% respondents)

**How would you best describe your company's internal processes for evaluating and adopting new technologies for water production, distribution and metering?**

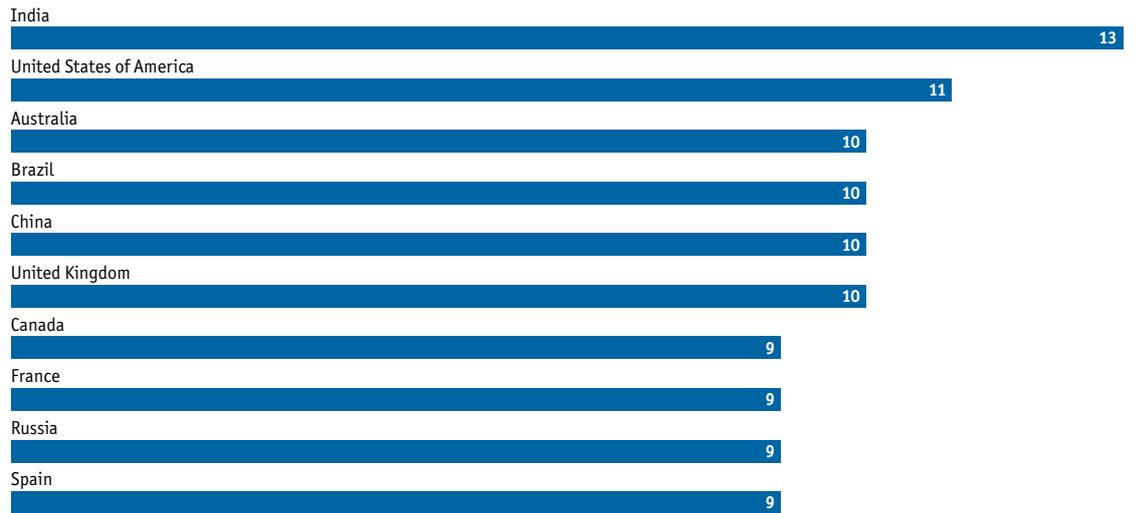
Please select all that apply.

(% respondents)



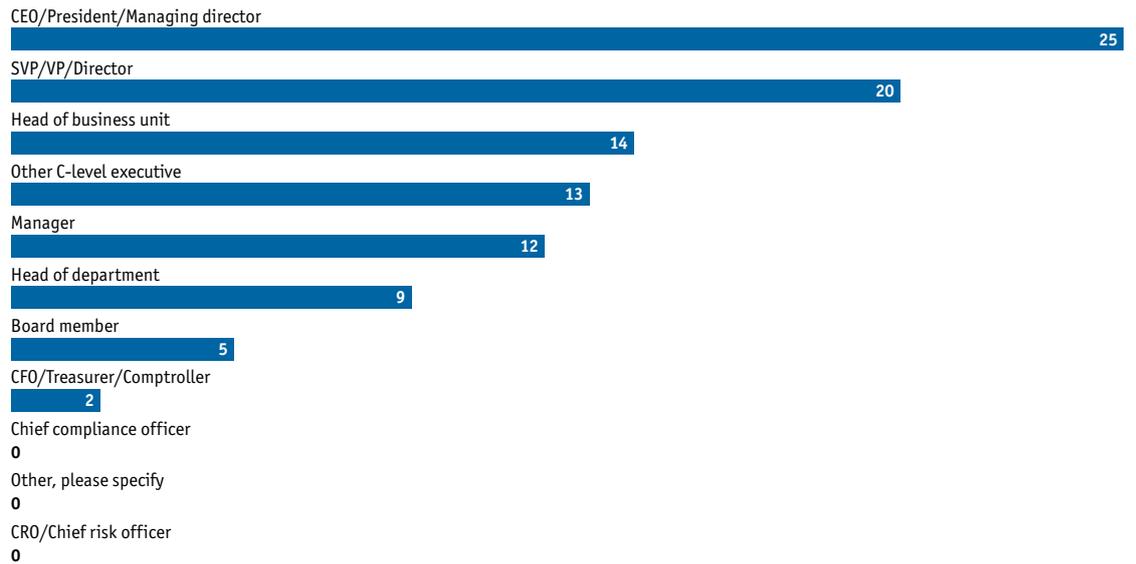
In which country are you personally based?

(% respondents)



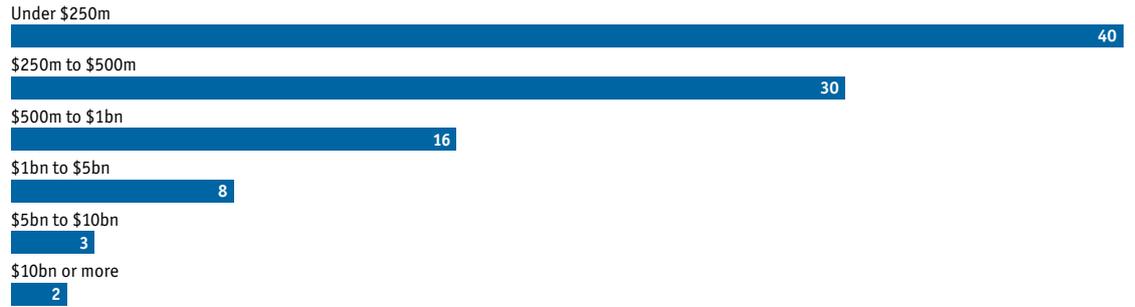
What is your title?

(% respondents)



What is your organisation's global annual revenue in US dollars?

(% respondents)



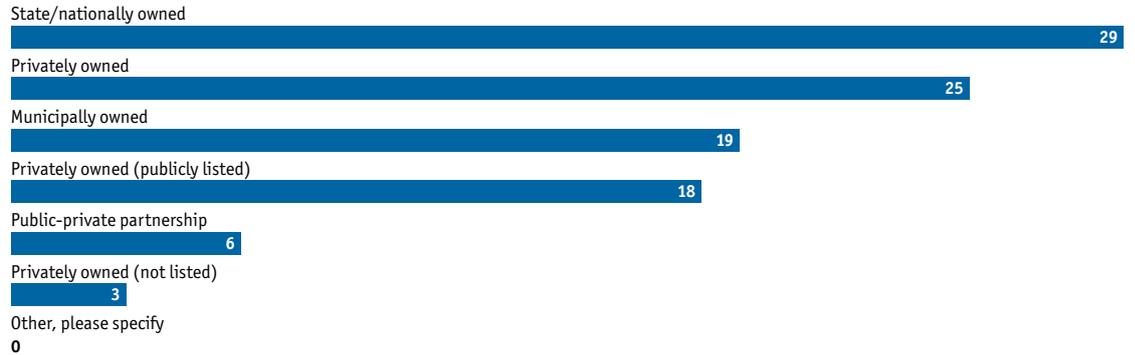
How would you describe your regulatory context?

(% respondents)



Please indicate which ownership structure applies to your company:

(% respondents)



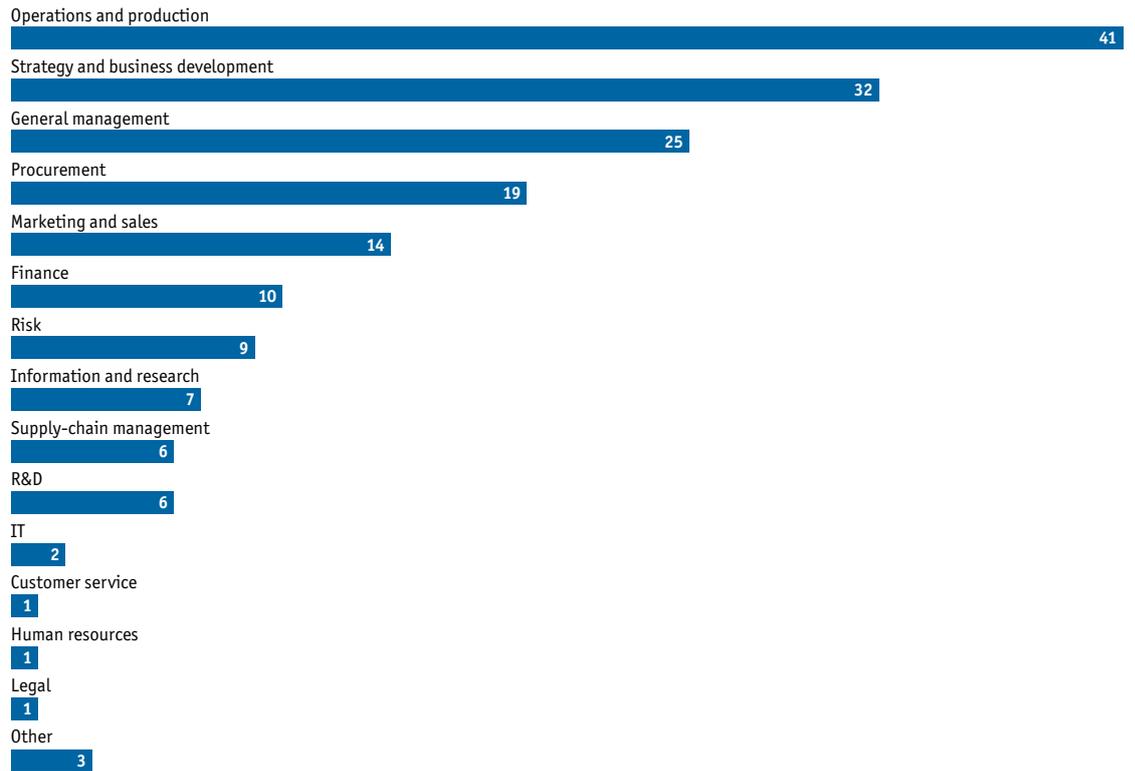
Please indicate which of the following applies to your company:

(% respondents)



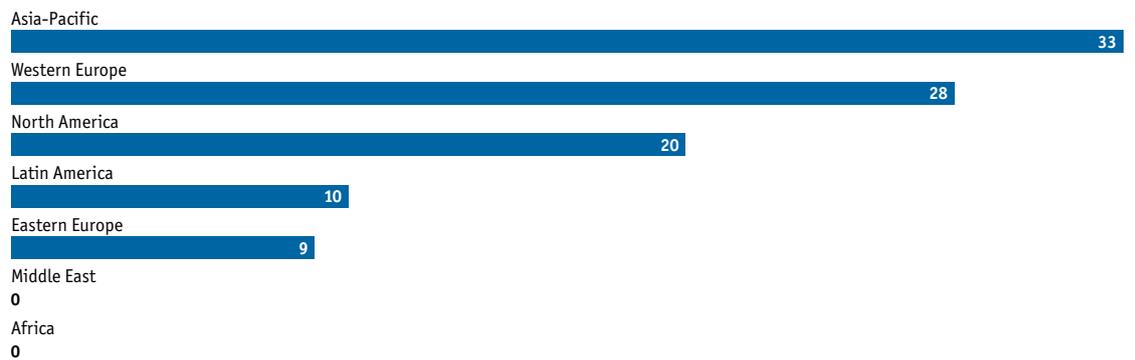
What are your main functional roles? Select up to three.

(% respondents)



In which region are you personally based?

(% respondents)



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