

CCSI Water & Adaptation Service Line



The global corporate water footprint

Risks, opportunities, and management options

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A rising tide of risk

Water, an increasingly scarce commodity subject to the growing pressures of a globalized economy, is capturing ever more attention from business leaders, politicians, and the general public. Many multinational companies, particularly consumer packaged goods and manufacturing firms, have water footprints that span the globe – and value chains that expose them to local and national water challenges from Atlanta to Beijing.

To be sure, businesses of all kinds face risks to their operations and reputations as they use scarce water resources. But understanding trends and using water wisely can help companies differentiate themselves and gain competitive advantage, too.

Despite the growing risks and opportunities, few companies seem prepared to look more carefully at how they manage water – or how better management can create value. This paper explores global water challenges that are of particular relevance to large corporate users, presents analytical approaches that can help companies make better decisions about water, and outlines recommendations for the years ahead.

The drivers of water scarcity

McKinsey analysis shows that by 2030, demand for water will outstrip supply by 40 percent, and that about half of the world's population will live in water-scarce areas. Growing demand is on one side of the equation, driven by industry, population growth, changes in dietary habits and ever-rising demands for energy. On the other side of the equation, many water suppliers have to rely on crumbling infrastructure and do business in regulated markets with little control over pricing.

Industries will be affected in ways that may not seem obvious now. The food and beverage sector, power generation, mining, high tech, and pulp and paper all depend heavily on water and are thus directly exposed to water scarcity. But water is vital to industry even when it is used indirectly for cooling or heating, transport, cleaning, and so on. And many more industries are exposed to the risk of water scarcity through their supply chains, since they rely on energy and input from water-dependent agricultural and industrial sectors.

The corporate impacts of water scarcity vary widely, of course, depending on a company's business and where it operates. Climate is only one factor – competition is another. The demand for household water will always trump industrial needs, but powerful interests sometimes arise in short order. In Brazil's São Paulo state, for example, a potential boom in demand for sugarcane to produce ethanol could more than double the gap in water supply from 2.6 billion to 6.7 billion cubic meters by 2030.

Until recently, few people would have anticipated that political events in the Middle East could affect water supplies in Brazil. But an increasingly globalized economy is driving major water trends that are relevant for multinational corporates:

- The need for food and other agricultural products is growing with wealth and urbanization. Many companies using global supply chains seek agricultural products without attempting to address local water management issues.

- Manufacturing consumes – and contaminates – an increasing share of the world's water, exacerbating local challenges.
- Consumers and other stakeholders are increasingly pointing fingers at the large corporations they see as responsible for water crises.

Each issue presents distinct operational and strategic challenges. Together they raise profound questions for the 21st-century global corporation.

Food and water nexus: The challenge for the food and beverage sector

The world's population, which grew from 4.4 billion in 1980 to 6.4 billion in 2005, is a fundamental driver of water consumption. And since the share of people in urban areas grew from 39 to 49 percent in the same time period, municipal resources, projected to grow annually by 1.8 percent to 2025, are reaching breaking point.

More people need more food, which drives demand for water in the agricultural sector. According to UNESCO, production of food crops in developing countries will increase by 67 percent between 2000 and 2030, putting new strains on the world's water resources. And as incomes rise, consumers around the world are eating more meat and vegetables, which require much more water than the cereals that were once the basis of nearly every meal. Growing a kilo of wheat, for example, requires 1,300 liters of water, whereas a kilo of beef requires about 16,000 liters.

Some observers estimate that the consumption of meat in developing countries is rising by more than 5 percent a year, and farmers are responding to that demand. According to the UN's Food and Agriculture Organization, total annual production of cereals rose by just 1.5 percent from 1980 to 2004, while meat and vegetable production rose 2.7 percent and 3.3 percent respectively. The water shortages that seem likely to arise from these new demands will only be exacerbated by climate change.

Manufacturing's global footprint

Water issues are already seriously disrupting manufacturing supply chains, and operational risks will rise with more frequent major droughts. In Australia, mining firms have struggled with water scarcity, while thermal generation in South Africa has been interrupted because of lack of water.

Companies will find themselves exposed to scarcity risks in more regions, especially in countries that have seen the most production growth in the past few years. McKinsey analysis shows that eight of China's 10 basins will experience water shortages of up to 25 percent in the years ahead, for example. Meanwhile, industrial demand for water in China, if unconstrained by efficiencies, will grow at 3 percent annually from 129 billion cubic meters in 2005 to 265 billion cubic meters in 2030, with the fastest growth in the next decade. These trends will likely have a major impact on China's industry – and on companies around the globe that source products from China.

Growing consumer and government focus

Regulation to restrict water use can require technology solutions and upgrades – some that may be expensive enough to threaten production. In some places, certain industries may be regulated to the vanishing point, since countries facing serious water shortages typically look to save their “food bowls” first. Australian companies today are drawing water from the Murray Darling Basin under 24 different kinds of permits and licensing agreements. The government has responded to a severe, prolonged drought by starting to buy back these permits, and has instituted a trading system designed to reduce demand over time by reflecting water’s true value in times of scarcity.

Reputational risks will increase as the public learns more about water challenges. Large corporations, industry leaders in particular, can easily become targets because they are so visible, regardless of how much they contribute to a problem. This is especially true today given the impact of the current financial crisis on corporate reputations in general.¹

Some water-intensive sectors, such as food and beverage, have faced intense public scrutiny during water shortages. In October 2008, for example, *The Sun*, a British newspaper, reported that a major coffee shop chain was wasting more than 23 million liters (6 million gallons) of water a day through its policy of keeping taps open in its 10,000 outlets.

The Sun reported that this would be enough water “for the entire two-million-strong population of drought-hit Namibia,” and quoted experts who dismissed the giant coffee retailer’s claim that its practice would reduce bacteria in taps.² *Sun* reporters in Sydney found taps in the chain’s stores running nonstop, despite Australia’s infamous drought. The story made headlines worldwide.

As regulatory, reputational, and operational risks intersect, public awareness will turn into action, from prolonged protests to lawsuits and new laws. In 2004, hundreds of farmers invaded a Newmont gold mine in Peru to protest a proposed expansion. They feared it could reduce water supplies and accused the mine of water pollution. Today, Newmont is still facing strong protests and difficulties in expanding production in Peru.

Where public perception forces the government to action, corporates will find it difficult to retain their share in the struggle for water. In 2003, Pepsi and Coca-Cola both lost their licenses to use groundwater in Kerala, India, and were forced to shut their plants after the public accused them of depleting the water supply. An investigation by the Energy and Resources Institute found that coke bottlers generally complied with Indian laws, and the Supreme Court dismissed Kerala’s appeal against Pepsi and returned its licence in 2008.

These threats are only the beginning. As more people recognize water challenges, they will look beyond the most obvious waste to more hidden and complex problems.

1 See “Rebuilding corporate reputations,” *McKinsey Quarterly*, June 2009

2 “The Great Drain Robbery,” October 6

How business can stay afloat

In spite of clear signs of a pending global water crisis, only a few large companies have made the challenge a high priority. Few corporate users of water understand the severity of the crisis or its eventual impact on their businesses. When confronted with a water crisis today, most companies focus on short-term operational fixes – failing to evaluate risks comprehensively or address the issue strategically.

Given the relatively low cost of water, and correspondingly scant savings from water efficiency, it is no wonder that few companies are looking for long-term solutions. Unfortunately, incremental operational improvements will not be enough for many companies in the years ahead. They should take three steps to begin identifying, quantifying, and managing water-related risks and opportunities:

- They must first understand their exposure across geographies and along value chains and product portfolios.
- They should then look for solutions in their own operations and products – pulling efficiency levers but also thinking boldly about new opportunities to help customers and other stakeholders use water wisely.
- Finally, companies should get involved in the wider debate to have a voice and help solve water challenges.

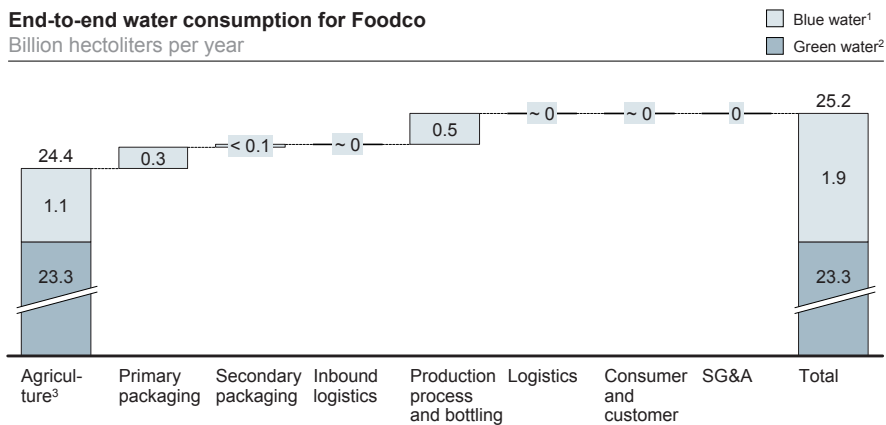
Understanding exposure to water risk: The global footprint

Most large industrial users have data on water usage in their own operations. But it is in sourcing and the supply chain where many face operational risks. In serving a retailer, for example, McKinsey found that depending on material choices, the early parts of the company's value chain accounted for as much as 90 percent of the water use in production. The retailer's own operations used less than 1 percent of the total water, while suppliers accounted for 10 to 40 percent of water and sub-suppliers took the lion's share of 60 to 90 percent.

The first step to managing this risk is quantifying it. This should begin with creating a water footprint map and overlaying it on areas of water scarcity to reveal risk exposure. The water footprint map accounts for current and future water intensity of cultivation and production by origin of inputs, water usage, and infrastructure in production, distribution, and sales (Exhibit 1). Once all three are mapped, anticipated changes in supply can show where water demand will rise along the value chain. The analysis should be supplemented by interviews with local plant managers to understand their experience and hypotheses about scarcity.

A recent study at a global beverage company showed that although almost half of current or future production was at risk, most of the risk was concentrated in three countries out of more than 24 where the company had production sites. Interviews revealed that managers in the riskiest production sites had similar experiences and expectations about the water crisis. More than one-third had already experienced scarcity, and more than two-thirds expected regulation to tighten.

Foodco's water footprint of 25 billion hectoliters includes 2 billion hectoliters of blue water



¹ Blue water is located in rivers, lakes, groundwater, and other bodies capable of being manipulated. It includes drinkable water
² Green water is located in soil from precipitation. It includes rainwater
³ Blue water consumption in agriculture excludes leakage and waste in the irrigation process
 SOURCE: Client's corporate finance; client's production performance report; University of Frankfurt; McKinsey & Company

Exhibit 1

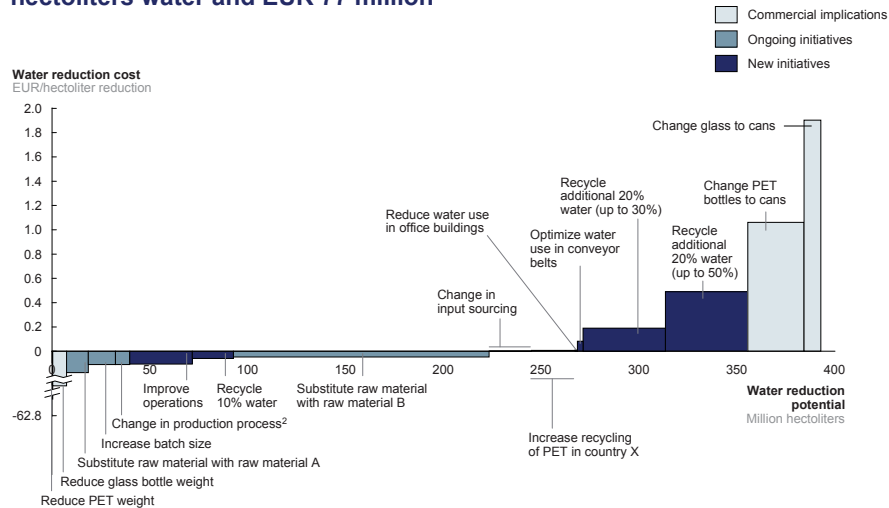
Taking individual action

Large users can take several steps to reduce water usage in their own operations, such as reuse, wastewater utilization, more efficient cooling systems, and good housekeeping, including reducing leakages. The value of each lever will depend on local conditions, regulatory regimes, and other considerations such as new plants and retrofits. Water recycling and reuse have the largest impact in most sectors. Technology enablers, such as water-efficient equipment, controls, and meters can help companies make these changes. Managers need to change processes, mindsets, and behaviors to ensure measurement and follow-up. Companies can also reduce risk by relocating production away from water-stressed regions, or substituting designs or materials for less water-intensive inputs.

To find the most efficient levers, companies should review all available technologies, considering their impact and cost. For one company, recycling the first 10 percent of water delivered cost savings, while recycling an additional 20 to 30 percent measure imposed higher costs.

By leveraging this information, companies can save water and money. A beverage company saved more than EUR 70 million annually from doing a water review, for example (Exhibit 2). Given that water and energy use are often linked, this analysis can be accompanied by a CO₂ efficiency analysis, which unlocks even greater savings potential. The technology review can be used in conversations with regulators and in bargaining for tax breaks or other financial support for water-saving investments.

Water cost curve indicates potential savings of 223 million hectoliters water and EUR 77 million¹



¹ Of which EUR 43 million overlaps with savings from different production process, glass weight reduction, and consolidation in CO₂ cost curve

² Lever would be implemented due to regulatory requirements, not to save water. Investment costs therefore not included

SOURCE: Client team

Exhibit 2

Some companies have moved beyond risk management as they find opportunities to create new products around water scarcity. A retailer found that water-saving products would fit well with its existing portfolio and offered good business potential. The company believes households in its markets can use up to 50 percent less water, mostly by finding savings in the bathroom. A team generated ideas for new products, assessed their water-saving and business potential, and studied where they might fit in the portfolio. The company has now decided to offer a number of these new products to consumers.

Going beyond individual action

Texas Instruments found a successful approach to collaborating with local and federal agencies in Attleboro, Massachusetts. The company's comprehensive strategy reduced treated wastewater discharges from 175 million gallons per year to less than 50, and it modified its treatment plant to send all treated water to the city's publicly owned works instead of discharging it into the local watershed. The company's various agreements and flexible permits helped it make the changeover while reducing costs and improving local water quality.

Companies can also address water challenges by collaborating with each other and NGOs. The "CEO Water Mandate," launched by the United Nations Global Compact in July 2007, is a private-public initiative designed to help companies develop, implement, and disclose water sustainability policies and practices. Several companies also collaborate with NGOs. SABMiller and the World Wide Fund for Nature (WWF) collaborate on water foot-printing, for example.

Coca-Cola pledged to lead its global beverage operations, including franchise bottlers, to replace the water it uses in its beverages and their production. In addition, the company announced a partnership with the WWF to promote sustainable

agriculture and help conserve seven of the world's most important freshwater basins. For years, Nestlé has collaborated with the Nature Conservancy to protect rivers, lakes, and wetlands across the United States.

Ultimately, companies will achieve the highest impact by working with other water-intensive users and government agencies to draw a water abatement cost curve for a region or basin. They can then determine which levers should be adopted immediately, and which would require up-front investment or need to overcome other barriers. Rather than paying for costly efficiency improvements in their own production, companies could offer to remove financial barriers for the most cost-effective levers to improve overall water availability. For example, our analysis of India shows that agricultural productivity is the most efficient lever, with 80 percent of the cheapest solutions focused on increasing “crop per drop.”

From the most ancient aqueducts to the latest desalination technology, humanity has shown relentless ingenuity – and thirst. The world will continue to get water where it is needed, but the life-giving liquid will come at an increasingly high cost. Companies and communities that recognize where those needs will arise will gain enormous advantages in the decades ahead.

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