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1. Introduction



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Are companies and investors thinking strategically enough about the profound business risks of water scarcity?

Droughts in recent years – including those in Eastern Africa, Australia, China, several Mediterranean countries and western regions of the US – have caused acute water shortages and damaged crop yields. With a growing world population and further climate change, pressure on water supplies is set to increase, especially in developing countries.

Dwindling water supplies pose significant risks to businesses including reduced water allotment, more stringent regulation and potentially higher costs, as demand for the resource increases in agriculture, industry and homes. Among the sectors most at risk are intensive water users such as high-tech companies, power suppliers, agriculture, forestry, mining, food and drink and pharmaceuticals.

Yet in a world where population growth and climate change is likely to exacerbate already water-stressed areas, it seems that too few companies and investors are thinking strategically about the profound business risks of water scarcity.

Recent pioneering surveys of water use in business¹ – run by the Carbon Disclosure Project (CDP), an independent organization which works with shareholders and corporations to drive greenhouse gas emissions reduction and sustainable water use – found that only around half of the 190 companies surveyed saw water as a risk for their business. And though most companies recorded information on their direct water usage, they did not have reliable data on water usage in their supply chain.

Further reports from other credible bodies^{2,3,4,5} have shown that water scarcity is an issue that demands a strategic and practical response from businesses to develop and implement solutions.

Companies that treat water risks as a strategic challenge will be far better positioned in future. This means assessing your dependence on water and future supplies, and developing plans to cope with increased shortages and prices.

Recent improvements in corporate water accounting are making this process easier, with the emergence of notable accounting tools including the water footprint assessment methodology developed by the Water Footprint Network;⁶ the lifecycle analysis approach, which takes into consideration all steps of sourcing, production, usage and disposal rather than just direct operations; and the World Business Council for Sustainable Development's (WBCSD) Global Water Tool. But much confusion still surrounds the individual suitability and application of various tools and methods to achieve the best local results.

This report, prepared by our Climate Change and Sustainability Services team, aims to provide businesses with a rundown of the issues surrounding water footprinting and water scarcity, including the tools available to manage it.

If you would like to discuss any of the issues in this report, please get in touch with your usual Ernst & Young contact or call any of the people listed on the inside back cover.

¹ Carbon Disclosure Project Water Disclosure: The Case for Water, *Carbon Disclosure Project*, November 2009; and CDP Water disclosure Global Report 2011: *Raising corporate awareness of global water issues*.

² JPMorgan, Global Equity Research, *Watching Water: A guide to evaluating corporate risks in a thirsty world*, March 2008.

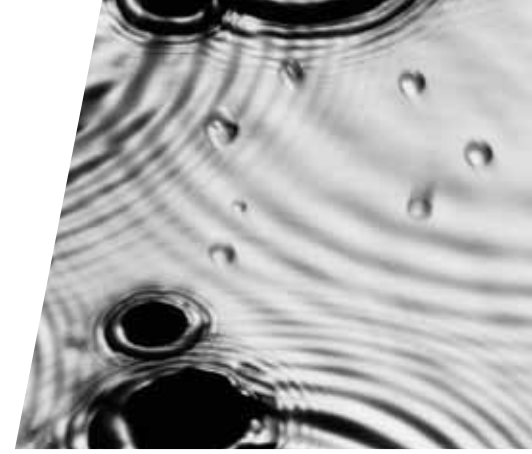
³ Ceres (authored by the Pacific Institute), *Water Scarcity & Climate Change: Growing Risks for Businesses & Investors*, February 2009.

⁴ Pacific Institute – UN Global Compact, *Climate Change and the Global Water Crisis: What Businesses Need to Know and Do*, May 2009.

⁵ CEO Water Mandate, *Corporate Water Accounting: An Analysis of Methods and Tools for Measuring Water Use and Its Impacts*, public draft November 2009.

⁶ www.waterfootprint.org

2. Major gaps expected in water supply and demand



The 2030 Water Resources Group (WRG) – an organization sponsored by the World Bank Group’s International Finance Corporation – published its *Charting Our Water Future* report in 2009. This report provided unprecedented clarity on the scale, costs and trade-offs of solutions to water scarcity.

For many countries, dwindling water supplies pose a fundamental challenge to economic and social development. By 2030, over a third of the world’s population will be living in river basins that will have to cope with significant water stress, including many of the countries and regions that drive global economic growth.

Figure 1 summarizes the WRG projections for how worldwide water supply and demand will change between now and 2030, predicting major supply gaps.

In assessing the implications of these statistics, we need to remember that the figures are an aggregation that obscures the dramatically different picture at local level, where the most significant challenges lie – and in most cases, this means in developing countries. Figure 2 shows the threat from water scarcity in different regions of the world.

Figure 1: Water demand and supply 2030 projections



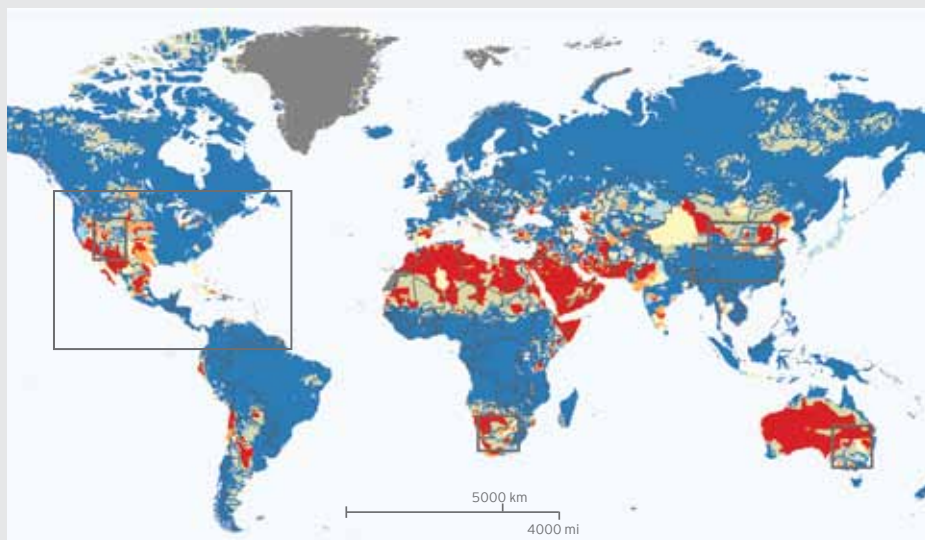
Source: 2030 Water Resource Group and International Food Policy Research Institute (IFPRI)

⁷ Total withdrawal, assuming no water productivity gains

⁸ Existing accessible, reliable, sustainable supply

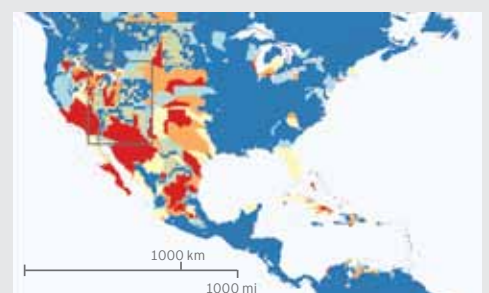


Figure 2: Geographies affected by water scarcity



Baseline water stress

- Low (<10%)
- Moderate (10%-20%) of available freshwater is used. Renewable freshwater is a limiting factor for households, industry and irrigated agriculture.
- Medium-high (20%-40%) of available freshwater is used. Limits in renewable freshwater supply create competition among water users.
- High (40%-80%) of available freshwater is used. Renewable freshwater is scarce relative to demand. Access to water is a major on-going political, legal and regulatory concern.
- Extremely high (>80%) of available water is used. Renewable freshwater is extremely scarce relative to demand.
- Arid and low water
- Missing data



Source: World Resources Institute

Maps above are developed by the World Resources Institute's under the Aqueduct program.⁹ The baseline water stress indicator estimates the degree to which freshwater availability is an ongoing concern. High levels of baseline water stress are associated with increased socioeconomic competition for freshwater supplies and heightened political attention to issues of water scarcity.

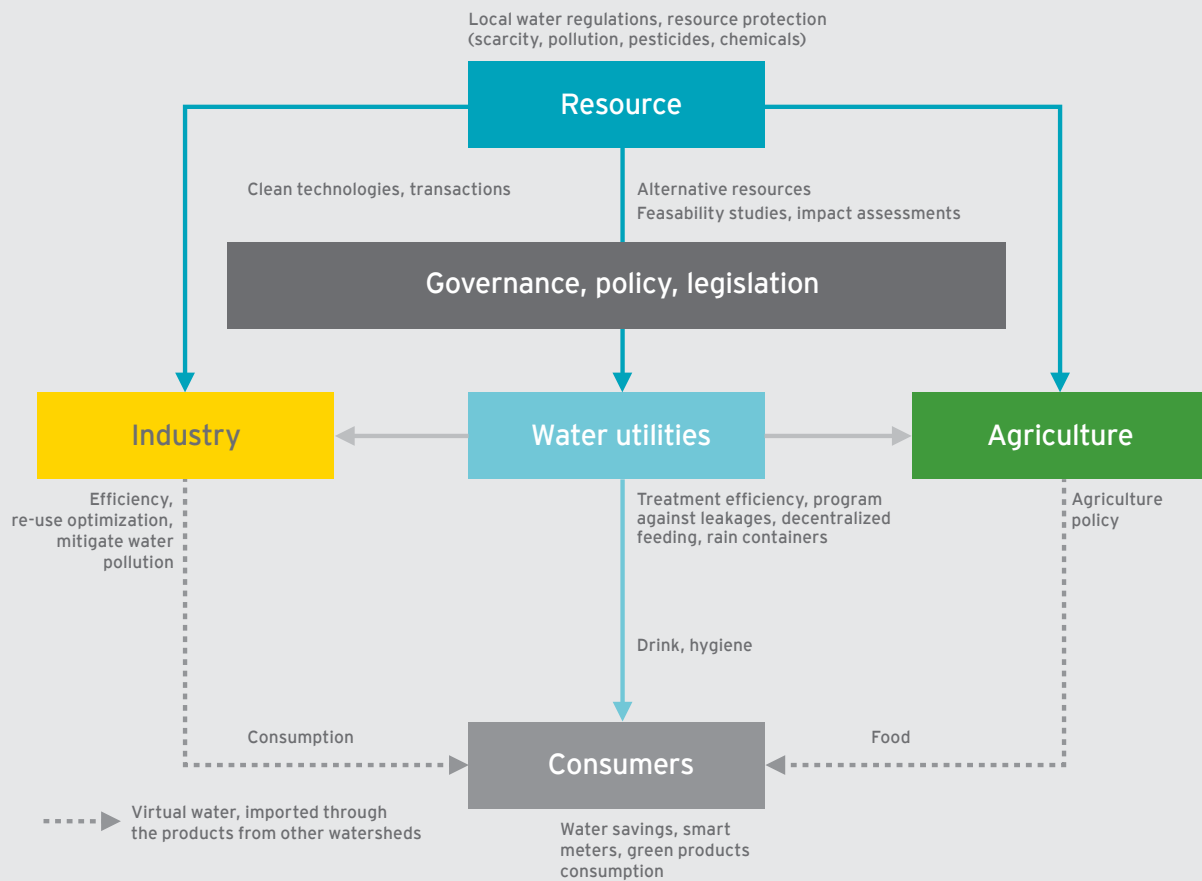
⁹ insights.wri.org/aqueduct

Tackling this problem is not just a question of resolving supply issues: we need an equal focus on controlling demand, as this could create far greater progress to a resolution. Figure 3 shows the main flows of water use and potential demand-side solutions for each sector. The graphic shows how water may be:

- ▶ Directly consumed by people, industrial processes and agriculture from local watersheds
- ▶ Imported (virtually consumed) from other watersheds through agricultural production or through industrial products that need water for manufacturing or cooling

Achieving water sustainability requires utilities, agriculture, industry and private consumers to achieve the right balance of supply and demand.

Figure 3: Water consumption flows and leverages



Source: Ernst & Young

Figure 3 highlights the central role of water utilities in coping with water issues. But considering water demand as a whole, we can see that all businesses could be affected.

By definition, water utilities and businesses respond to customer demand, implying that there are limited leverages at the business level. But there is always some space to make businesses smarter water users. Sections 3 and 4 of this report present an overview of water management for utilities and other businesses.



3. Providing access to water resources: utilities on the front line

Utility companies are strongly affected by increasing water scarcity. Their presence across the whole water production, distribution and treatment value chain requires them to offer solutions that are customized to their clients' needs, while addressing three key challenges:

1. **Accessibility of resources:** as populations continue to grow and urbanization increases water consumption per capita, utilities have to find new ways of accessing water resources. Desalination technology has developed strongly in the last decade, particularly in water-stressed countries. But this solution cannot be adapted everywhere, as it requires proximity to sea water, needs significant investment and consumes energy. Alternative solutions such as water re-use and recycled water offer significant potential, provided they become acceptable to users.
2. **Increased investment demand and affordability:** addressing water scarcity can demand significant investment from utilities. This is clear from major projects of the type currently under consideration in the water-stressed regions of Nevada, US, where a pipeline could potentially be built to transport water from water-rich regions to urban areas. Making water drinkable also requires new forms of pre-treatment and treatment as the concentration of pollutants increases. Ultimately, this may increase the cost of producing water, and reduce access to it.

3. **Acceptability of water prices:** as the cost of treating, producing or recycling water increases due to the factors mentioned, utilities have to work on solutions to make water prices acceptable to the public. Focusing more on reducing network losses will decrease lost volumes and reduce costs. Utilities are also increasingly developing services around the core business of selling water, offering clients efficient water management solutions and help in addressing the challenges raised by water scarcity.

Given these challenges, improved water governance is key to sustainable water management.

Governance measures need to regulate the interactions between competing uses of water; raise awareness of water-efficient solutions; and implement targeted pricing policies, such as compensating utilities for their environmental performance, rather than on the basis of volumes distributed.

Defining adequate incentives to develop water-efficient practices and technologies will require a significant change of perspective for the utility sector, where contracts have historically been based on volumes.



H el ene Valade
Sustainable Development Director
Lyonnaise des Eaux (Suez Environnement)

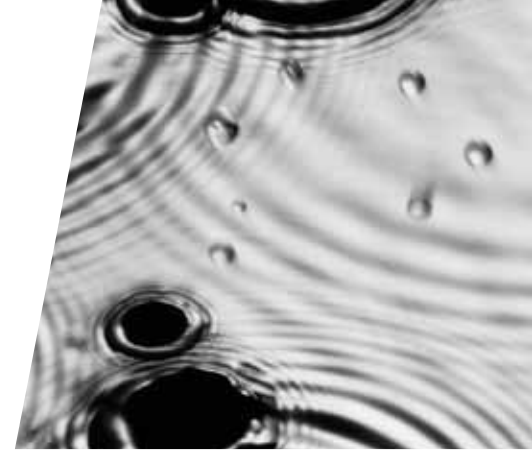
"We are working with a selection of clients, together with local authorities and other stakeholders, to transform our contractual business model – including pricing, which up to now has been based solely on the volume of water sold. The objective now is to include contractual and financial incentives to hit environmental targets such as CO₂ emissions reduction, biodiversity, land protection and resources efficiency."

"Our goal is to make 'business as usual' as efficient as we can to protect local watersheds. But we also want to enable people to manage their own water consumption, and potentially price the water depending on its final use."

"Several of our proposals are already delivering results. Revenue based on environmental performance can reach 15% of the total revenue of the contract."



4. Water management for business



Corporate awareness lagging behind carbon

There is still a long way to go before water gains equal recognition with controlling carbon emissions as a prominent corporate issue that companies must deal with – both in terms of developing strategies to cope with climate change and in terms of controlling use of water resources in particular.

A 2010 report from the Coalition for Environmentally Responsible Economies (Ceres),¹⁰ which benchmarked 100 firms on their corporate reporting related to water, found evidence that most companies provide basic disclosure on overall water use and water scarcity risks, with mining and beverage companies in the forefront. However, the report clearly demonstrated that the firms surveyed were falling far short of what they could be achieving in terms of potential benchmark scores, with a need for significant improvement. The areas in need of the most significant improvement include consideration of the supply chain, setting up indicators and governance structure related to water issues.

The water footprint as a starting point

The starting point for companies navigating risks related to water is to understand what impact their operations, products and services are having on water resources. Once you know what water resources you are using, you can take action on improvements.

Many reporting companies draw on the sustainability reporting framework and guidelines of the Global Reporting Initiative (GRI) organization, an international NGO based in Amsterdam. This framework sets principles, standard disclosures and indicators that organizations can use to measure and report economic, environmental and social performance.¹¹

GRI reporting water indicators are integrated into leading water management tools, such as the World Business Council for Sustainable Development's (WBCSD) Global Water Tool, indicating that these metrics are accepted as a *de facto* standard for reporting on water.¹² Oversight and pilot testing of the new WBCSD tool was provided by GRI and WBCSD member companies including Alcan, Alcoa, Shell, Dow, Dupont, Rio Tinto, Lafarge, Holcim, Pepsico and Suez.

The U.S. Securities and Exchange Commission highlighted the water issue in new interpretive guidance, which clarifies what public companies need to disclose to investors about the climate-related risks and opportunities that they face. The guidance, issued on 27 January 2010 at the request of leading institutional investors, comments: *"Changes in the availability or quality of water can have material effects on companies."*



Marcus Norton
Head of CDP Water Disclosures
CDP

"Many of the world's largest companies have already suffered detrimental impacts relating to water – from scarcity, flooding or pollution; from tightening regulation; or from reputational damage. By completing the CDP Water Disclosure questionnaire, businesses have learned what questions to ask internally, putting them in a position to mitigate risks and identify and seize opportunities."

"Companies are at very different stages in their thinking about water and the sophistication of their responses to water challenges varies widely, but all those that have responded to CDP have demonstrated a commitment to engage and communicate to investors in a centralized, coordinated way."

"CDP Water Disclosure continues to widen its reach and build a base of disclosing companies to illuminate what businesses are doing to measure and manage water use. We believe that this is crucial if businesses, investors and other stakeholders are to take informed action in managing this vital and scarce resource."

¹⁰ Murky Waters? Corporate Reporting on Water Risk: A Benchmarking Study of 100 Companies, Ceres, February 2010.

¹¹ The GRI G3 Guidelines, the world's most widely used sustainability reporting framework, has a number of water related metrics that companies use to manage their water-related impacts of business.

¹² The Global Water Tool consists of an input sheet and an online map which allow companies to gather data on key GRI water indicators and make management decisions to reduce their risks and maximize water conservation opportunities.



Water risk assessment

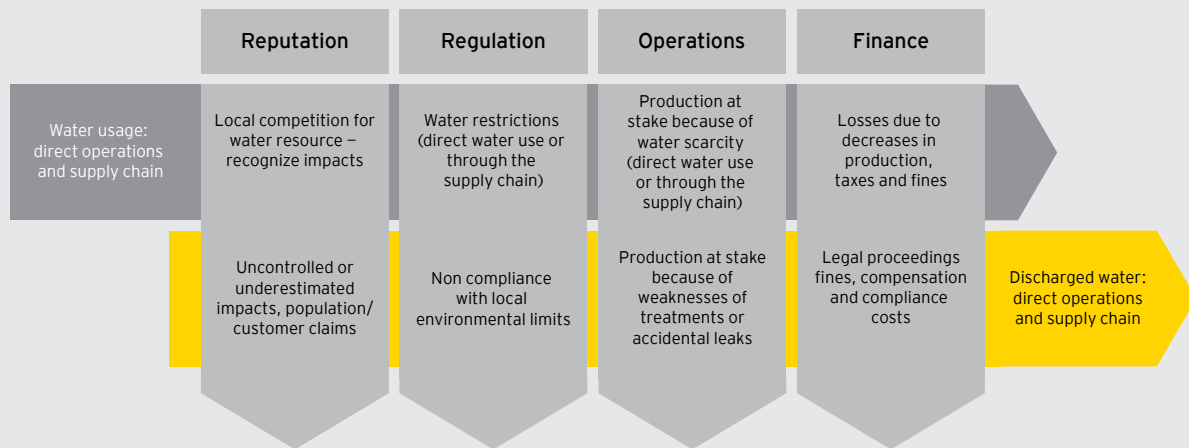
Mapping water risks within the whole supply chain remains a major challenge for businesses. At the operational level, Ernst & Young sees four main types of risk for processes and local operations (see Figure 4). This provides a helpful starting point in understanding the risks your business might be facing currently or in the near future.

As water scarcity quickly evolves alongside fast population growth and climate change, risk assessment should be updated

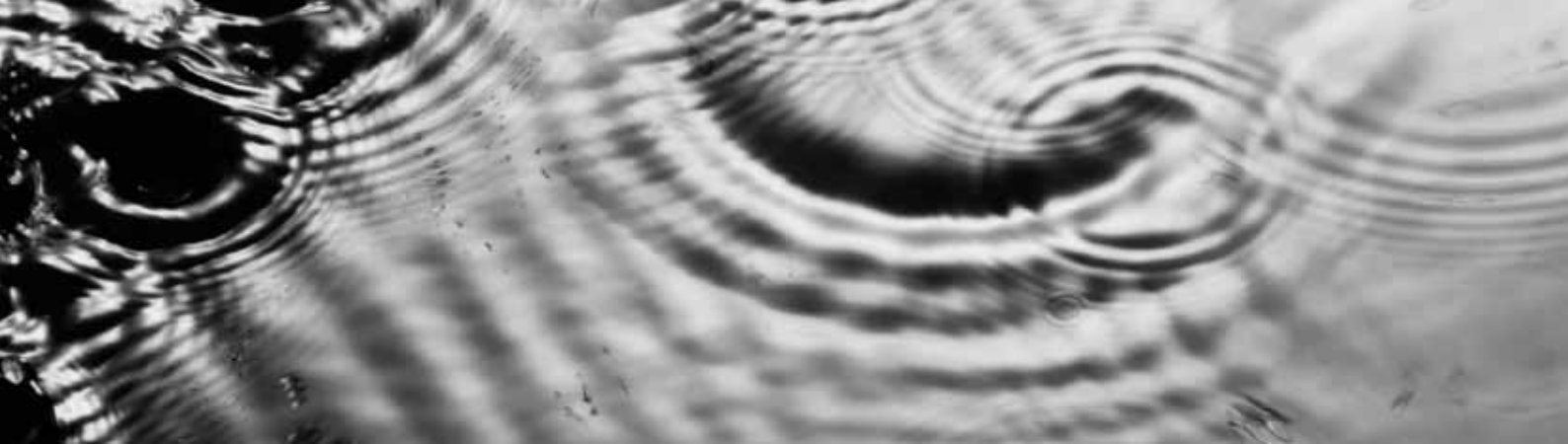
regularly. Public and private stakeholders have developed many tools and initiatives to help businesses and local authorities answer the question: “Does our direct and indirect (supply chain) water consumption have significant issues – and if so, where?”

The challenge is to define these issues correctly. Water issues vary widely at the local level and supply chains stretch around the world, so a single functional unit creating products or services may generate several water-related issues for businesses to manage.

Figure 4: Mapping risks related to water



Source: Ernst & Young



As risk assessment tools and initiatives proliferate, they may overlap or complement what you already have in place in your business. The WBCSD and IUCN (International Union for Conservation of Nature) released an overview of 19 initiatives and approaches in March 2010¹³ and is committed to updating this overview as initiatives mature and new ones emerge. Table 1 summarizes some of the most prominent tools and initiatives currently in use.

Depending on their priorities, different businesses will be interested in different tools or initiatives – for example:

- ▶ Organizations focusing on strategy, policy and top-level endorsement will find the CEO Water Mandate useful
- ▶ Companies focusing on corporate management or risk assessment should take a detailed look at the Aqua Gauge (from Ceres) or the Global Water Tool (from WBCSD)

- ▶ Companies interested in water footprinting of operations, products or projects should refer to ISO Guidelines (ISO 14046 on water footprint) or get in contact with the Water Footprint Network or the Life Cycle Initiatives (see charts on pages 11 and 12)

The sheer number of tools shows the growing concern that stakeholders feel, but it increases the risk of using different or inconsistent terminologies, which at present makes it more difficult to interpret and compare results. Stakeholders and consumers will probably go through a process of consensus and normalization within the next few years. In the meantime, although the methodologies used are not mature, they are making significant progress.



Laurent Auguste
CEO
Veolia Water North America

“Our study of the greater Milwaukee area’s water and wastewater systems (serving more than a million people) assessed the interaction of carbon and water and their associated economic and environmental impacts.”

“The methodology, using our Water Impact Index, assigned a value to water based on quality, quantity and resource stress. It is believed to be the first combined analysis of the water-energy nexus in a major community. As the only United Nations Global Compact City focused on freshwater management, Milwaukee is required to conduct a variety of water-quality projects that other cities can emulate.”

¹³ Water for Business, Initiatives guiding sustainable water management in the private sector, Version 2, March 2010.



Table 1: Water related risk, footprint tools and initiative

Name	Description	Characteristics
<p>The CEO WM</p>	<p>The CEO WM¹⁴</p> <p>The CEOWM seeks to build an international movement of committed companies, both leaders and learners. It is open to companies of all sizes and from all sectors worldwide whose CEOs are willing to endorse the initiative.</p>	<p>Collaborative partnership and knowledge sharing</p>
<p>WBCSD and the Global Water Tool</p>	<p>The WBCSD and the Global Water Tool¹⁵</p> <p>The Global Water Tool is a practical tool developed by the WBCSD to visualize, analyze and prioritize water risk. This tool is available for free, runs on Microsoft Office Excel and generates online maps that combine information related to the organization's installations with external datasets. The WBCSD Advisory Board includes 22 private companies and is led by CH2M HILL, the GRI, The Nature Conservancy and data providers (FAO, WHO, UNICEF, WRI and the University of New Hampshire).</p>	<p>Collaborative partnership, knowledge sharing and tool</p>
<p>The Aqua Gauge</p>	<p>The Aqua Gauge¹⁶</p> <p>A new framework and tool for assessing corporate water risk management. Building from the Ceres Roadmap for Sustainability, the Aqua Gauge is designed to enable investors and companies to better understand water risks and the leading practices used to manage them.</p>	<p>Management tools</p>
<p>Veolia Water Impact Index</p>	<p>Veolia Water Impact Index¹⁷</p> <p>This methodology, developed by Veolia Water, expands on existing volume-based water measurement tools by factoring in three essential elements:</p> <ol style="list-style-type: none"> 1. Volume – quantity of water used, extracted and released 2. Stress – the level of stress on water resources derived from the Water Stress Index, local hydrology and freshwater scarcity 3. Quality – overall water quality, extracted and released <p>The Water Impact Index targets industrial and municipal water managers and provides a detailed, holistic approach of parameters for effective water management.</p>	<p>Method and tools</p>

¹⁴ www.unglobalcompact.org/Issues/Environment/CEO_Water_Mandate

¹⁵ www.wbcsd.org/web/watertool.htm

¹⁶ www.ceres.org/issues/water/aqua-gauge/aqua-gauge

¹⁷ www.veoliawaterna.com/sustainable/water-impact-index

Table 1: Water related risk, footprint tools and initiative

Name	Description	Characteristics
<p>Water Footprint Network</p>	<p>Water Footprint Network¹⁸</p> <p>WFN develops standards and practical tools to support people and organizations. It also provides guidelines on reducing the negative impacts of water footprints. The WFN is open to partners from stakeholders in water resource management: academic institutions, government agencies, non-government organizations, businesses and international organizations. Members include the University of Twente in The Netherlands, the Swiss Development Agency (SDA), the World Wide Fund for Nature (WWF), Nestlé and the International Finance Corporation (IFC), a member of the World Bank Group.</p> <p>The WFN released <i>The Water Footprint Assessment Manual</i> in March 2011.¹⁹</p>	<p>Collaborative partnership, methods and tools</p>
<p>International Organization for Standardization</p>	<p>ISO 14046²⁰</p> <p>The International Organization for Standardization (ISO) is currently developing an international standard based on existing major initiatives and approaches. The ISO 14046 intends to coordinate agreement in some 20 countries and establish a common methodology with strategic stakeholders such as the WFN, United Nations Environment Programme/Society of Environmental Toxicology and Chemistry (UNEP/SETAC) and the WBCSD.</p>	<p>Method</p>
<p>Life Cycle Initiative</p>	<p>LCA²¹</p> <p>The Life Cycle Initiative is a partnership between UNEP and SETAC. The target audiences are the scientific community and businesses.</p>	<p>Method</p>

Table 1 offers some general insight on main tools, methods and initiatives available today. Other tools such as as GEMI Water Sustainability tool and WRI Aqueduct are also promising. Up coming tools such as WWF-DEG Water Risk Filter and the Water Footprint Assessment Tool should complete the list in the short term. The CEO Water Mandate and the WBCSD published^{22, 23} usefull screenings to deepen your knowledge.

¹⁸ www.waterfootprint.org

¹⁹ www.waterfootprint.org/?page=files/WaterFootprintAssessmentManual

²⁰ www.iso.torg

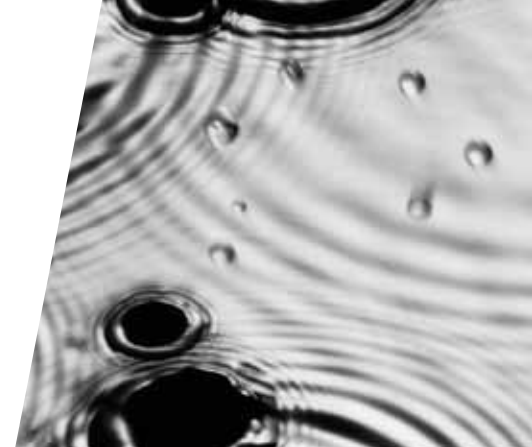
²¹ lcinitiative.unep.fr

²² ceowatermandate.org/files/corporate_water_accounting_analysis.pdf

²³ www.wbcd.org/web/water4business.pdf



5. Views from the water experts



We asked water experts Sébastien Humbert and Sylvain Lhôte to share their current thinking on water risk assessment in business.

Sébastien co-founded the environmental consultancy Quantis in 2005 and is currently developing ISO 14046 on water footprints. At the time of this interview, Sylvain was director of European affairs and sustainable development at Borealis, a leading provider of chemical and innovative plastics solutions. He was also Vice President of the WBCSD Water Board, which develops the Water Footprint Network.

Q: What's your view of the state of water sustainability initiatives and tools today?

Sébastien Humbert: Methodologies can be summarized by methods addressing quantity (volumes) and/or quality (pollutions) of water; concepts of water stress (risks); and impacts (damages). There are different initiatives based on each of these methods. In terms of quantity, there is a predominance of the fairly well-known method of the Water Footprint Network. If you want to look at water stress levels, the Global Water Tool and other methods such as the one developed by S. Pfister allow users to watch local stresses. Impact methods are unfortunately at an early stage of academic development. The different tools and initiatives may be interconnected and a single initiative or tool may use different methods.

Sylvain Lhôte: The objective of the Global Water Tool is to map operational water risk wherever a company operates. This tool goes beyond the calculation of a water footprint. Global Water Tool's users get automatic access to an overall risk analysis,




in visual form, from very little input data: just GPS site coordinates and water consumption. They can use the tool directly without going through the complexity of the water footprint process. But the Global Water Tool is also very complementary for companies that have worked – or are working – on the water footprint itself.

Q: How are companies responding to current initiatives and methods?

Sébastien Humbert: More and more companies want to jump on the water footprint bandwagon. But due to the complexity of the subject, there are only a few companies really comfortable enough to move from understanding their consumption per site to a full supply chain water footprint assessment. I've observed a growing curiosity, but the complexity of existing methods is tenfold compared to measuring carbon emissions, making it difficult for many companies to engage consistently. The main obstacle is the complexity and the different responsibilities for these issues within organizations. Volumetric approaches are the most effective operationally, but everything related to pollution, water stress and impact is complex and hampers development.

Sylvain Lhôte: I totally agree with Sébastien. The complexity needs to be simplified and the methods have to converge in the short term. This is absolutely critical for further development of water footprinting. Eventually, a range of complementary tools will exist. We have to develop homogeneous tools that are more applicable for business than those we have seen in use for carbon footprinting. We must learn from that experience.

Simplified Glossary

-  Blue water: fresh water from surface or ground water
-  Green water: water from rainwater and moisture
-  Grey water: freshwater required to assimilate the load of pollutants (expressed as fresh dilution needs)

For complete definitions, see link
www.waterfootprint.org/?page=files/Glossary



Q: What sort of businesses should be making water accounting a priority?

Sébastien Humbert: Any business operating in a sector that uses a large amount of water needs to take action. That means, for example, the agro food industry or utilities producing electricity – especially hydropower, where the impact on the regional aquatic environment has been completely underestimated – and sectors experiencing problems with water pollution, such as the mining sector.

Sylvain Lhôte: The link between water and energy production has so far not been sufficiently taken into account, and we are now realizing this is a key issue. People are mobilizing in this area, trying to improve knowledge of all energy production stages, particularly in the context of low-carbon energy production. Sébastien rightly stressed hydropower, and it's also a concern for other types of energy such as biofuels. This is a really important question to ask ahead of a long-term redeployment of energy production. The WBCSD is currently developing the Global Water & Energy Tool, which aims to help energy producers map risks.

Q: Are water footprints good tools of communication?

Sylvain Lhôte: They might help raise public interest in the first place but they are too complex to be used as a PR tool – very important point – is the fact that the “blue, green and grey water” (see pullout box, page 14) concept itself doesn't necessarily have the same meaning for everyone.

Take a simple example: when we talk about “grey water” to a farmer, he thinks of recycled water. But in water footprints, grey water is a theoretical pollution concept. So the first hurdle is to communicate water footprint concepts within the knowledge, practices and experience of each sector. This makes understanding by a wide audience extremely difficult. I don't see how we will be able to go beyond a simple understanding of the water footprint, if the concept remains that complex. We have to simplify things. But shortcuts are never good for the quality of analysis. The question should be: “How can we better reflect sustainable water management through the sustainable development indicators that are being developed?” One thing that we might do is integrate the water footprint into in the overall footprint of a product; we could communicate the information on an “ecolabel”; or we can create improved life cycle assessments. The goal is to make sustainable practices or products stand out. To my mind, there's a fairly widespread agreement among all us practitioners to avoid marketing water footprints on the product itself: that doesn't make any real sense.

Sébastien Humbert: My attitude is somewhat different from Sylvain's in terms of marketing water footprints. I understand that some might want to add environmental marketing information on product labels. I tend to like the idea of displaying environmental information for two main reasons: first, it opens the debate. In France, experimenting with environmental labeling helped to raise awareness among almost all businesses that were affected – and that wasn't just large firms under environmental or consumer NGO constraints. Second, because it sets up a “contract” of responsibility between businesses and consumers, where consumers acknowledge that they may have to pay more for a product that has been manufactured with extended values.



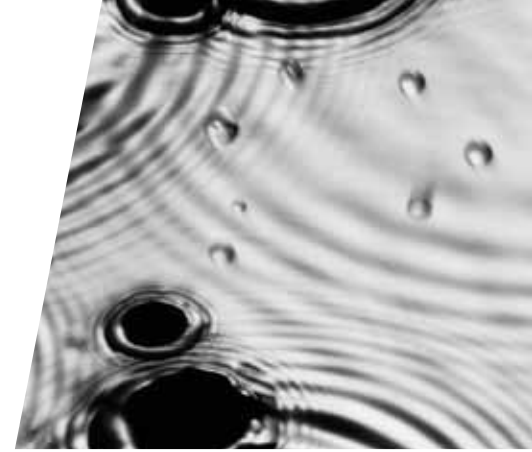
Sébastien Humbert is the Scientific Director and Co-founder of the environmental consultancy Quantis and an expert in life cycle assessment and water footprinting methods such as UNEP/SETA. He is co-author of ISO 14046 (water footprinting), which is currently in development.

Humbert has a PhD in Civil and Environmental Engineering from the University of California, Berkeley.



At the time of the interview, **Sylvain Lhôte** was Director of European affairs and sustainable development at Borealis, a leading chemicals and plastics provider. He also led the WBCSD's water stewardship project group. Since the beginning of 2012 Sylvain has moved position to lead Alcoa's government affairs in Europe. Dorothea Wiplinger, Borealis' CSR Manager is now leading Borealis water programme.

6. Case study: UPM, a frontrunner in water assessment



Understanding water use in the paper industry

Water is one of the most basic and important resources for UPM's operations, effectively making the company part of the global freshwater cycle. Efficient and sustainable use of water is one of the main objectives of UPM's responsibility principles and targets. The company has joined the United Nations Global Compact's CEO Water Mandate, a unique public-private initiative designed to assist companies in the development, implementation and disclosure of water sustainability policies and practices.

UPM initiated a partnership with the WFN to develop a common approach and to understand the role of water in paper production. This partnership included running a case study on the UPM Nordland Papier mill in Germany. The study assessed the operational and the supply chain water footprints. In addition, the local water context was analyzed through a sustainability assessment.

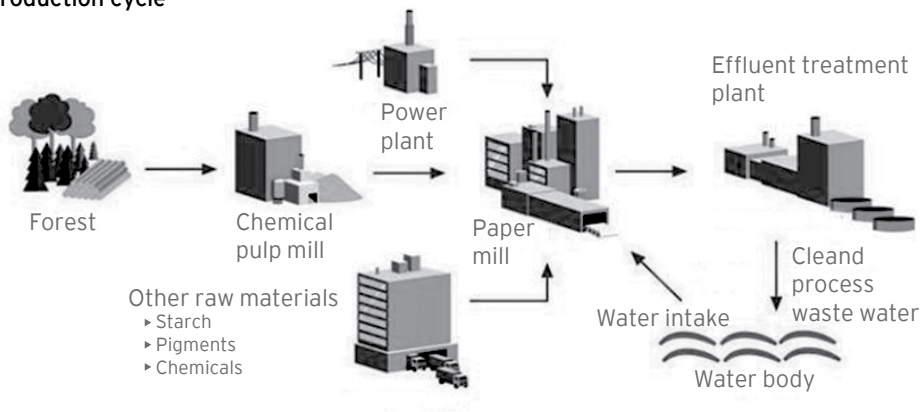
The objectives of this initiative were to:

- ▶ Calculate the total water footprint of the two paper grades – wood-free uncoated (WFU) and wood-free coated (WFC) – produced at UPM Nordland Papier mill
- ▶ Assess the sustainability of Nordland's water footprint and both paper grades
- ▶ Develop the water footprint methodology for paper products, with a special focus on the green water footprint (which is linked to forestry)
- ▶ Increase the understanding of the paper production supply chain water footprint

Deploying the water footprint assessment methodology

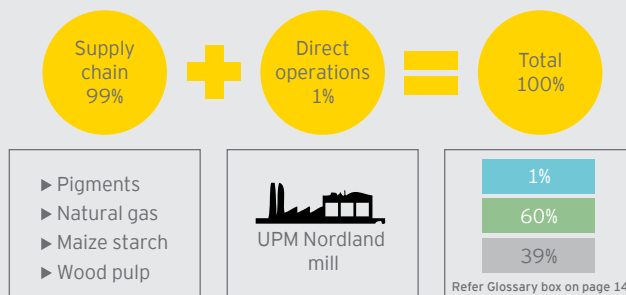
The first phase of the study was to set the scope of water footprint accounting, with reference to the paper production cycle (see Figure 5). The main raw material inputs selected for the study are chemical pulp (three main UPM suppliers in Finland and Uruguay), maize starch, pigments and fillers, natural gas and water.

Figure 5: The paper production cycle



Source: UPM

Figure 6: Water footprint results for the UPM Nordland mill



Source: UPM



These results show that over the full water footprint, the green water footprint is by far the most important. It represents the volume of forest evapotranspiration during tree growth. This measure might seem surprising, but raw material selection is in fact one of the biggest water management leverages. In fact, only a small proportion of freshwater is lost in the UPM Nordland mill production process – the so-called blue water footprint. The grey water footprint consists of the water needed to assimilate the mill's effluent pollutants to a natural quality status. It is based on a unique parameter, which is considered as the most critical, and is a best estimate at this stage.

The results give a total water footprint between 13 liters per A4 sheet of paper produced for WFU paper and 20 liters per A4 sheet for WFC.

Learning and developing the WFN tool

UPM identified four main lessons from the study:

1. A water footprint figure is not an exhaustive indicator in itself: you also need – at least – to run a sustainability assessment to support decision-making.
2. The issue of evapotranspiration in the green water footprint accounting method still needs to be reviewed and discussed. UPM believes the current method does not accurately represent the impact of forest management on water cycles. Further cooperation between WFN and the forest industry is needed to improve the methodology.

3. The blue water footprint is the water lost from evaporation during the production processes. Although this water is no longer available locally, it does return to the global water cycle. Future studies could consider a wider definition of the term “lost water.”
4. The grey water footprint gives additional information for permit level requirements, but should not be considered a conclusive assessment of the environmental impact of mill effluent. Since there are no common local water quality requirements, the choice of the leading effluent parameter and the threshold for pollutants can cause variability and lack of accuracy in the results.

Analysing local water scarcity

The second phase was the local sustainability assessment, where water scarcity hotspots were identified and water footprints compared to actual water availability. UPM used the WBCSD Global Water Tool to support its assessment of local water scarcity for four specific catchment areas. The criteria UPM used were chosen based on each mill's location and community, permit allowance, operational efficiency, forest management, certification and labels and the catchment's ecological status. Based on these criteria, the company considered its operations and overall water footprint for the four assessed mills to be “water sustainable.”



Jesse Rep
Senior Environmental Specialist, UPM-Kymmene

“UPM considers the water footprint study a valuable exercise. However, it became clear that the method itself needs further development to make it more accurate and meaningful for forest industry products such as pulp and paper. When the current shortcomings are properly addressed, water footprinting may become a powerful tool in the sustainable management of freshwater resources and stakeholder communication.”

“In 2012, we will be working with the Water Footprint Network and the Confederation of European Paper Industries (CEPI) to build on the current study and further develop the WFN methodology for forest industry products.”

7. Taking the next step

Asking the right questions

Getting familiar with water concepts, water scarcity and the likely impacts on your supply chain is increasingly important for business. It's vital to understand that managing water is not just a matter of accounting for cubic meter consumption. Companies face a major challenge to define a sustainable water management strategy which aligns with their business strategy. This is a new discipline for the majority of corporate and public sector managers: a helpful starting point is to focus first on some fundamental questions, as follows:

Private sector	Public sector, local municipalities
<ul style="list-style-type: none"> ▶ Does the company's long-term strategy take into consideration that water is emerging as one of the critical components of sustainable and reliable operations? ▶ Are water issues included in my risk assessment and mitigation plans? Do I understand the potential increase in shareholder and stakeholder concerns about the impact of water on the company's operations, corporate responsibility and sustainable strategy? ▶ Where are my operations and value chain most at risk? ▶ Is a reliable access to water a key consideration for any new facility planning decision-making? Am I integrating water scarcity 2030 projections at my new plants? ▶ Do I use best-in-class practices and technologies in water management around my global operations? Are the company's production processes, or those of key suppliers, vulnerable to water shortages? ▶ What are the water footprints of my organization and products? Should we disclose an individual product's life cycle water footprint on product packaging? ▶ Do my operations fully comply with local permits? ▶ Have I identified water-related tax incentive opportunities? 	<ul style="list-style-type: none"> ▶ Have you taken into consideration reliable clean water access, good water management and deployment of appropriate water technologies in your urbanization plans? ▶ Do you have plans to deploy educational programs about water issues, including water management and recognition of the real value of water, in your municipality? ▶ Is water policy efficient in mitigating resource competition? ▶ How should we set our pricing strategy across users and geographies? Are current prices and taxes adequate to meet the next decade's challenges? ▶ How can we review contractual arrangements with private utilities to include environmental and water performance? ▶ How can we improve investment programs to enhance efficiency in mitigating impact and delivering desired outcomes? ▶ What is our water technology deployment plan to ensure good water management including prevention, detection, recycling, etc. ▶ Have you considered any alliances and partnerships to enhance your water management practices?

Key success factors

Introducing water sustainability to your business strategy is likely to spark change in many aspects of running the business, from management systems and technology to reporting and employee awareness. In our work with organizations who are pioneering new sustainable approaches to water use we have noted some key success factors:

- ▶ Familiarize yourself with water footprint and scarcity concepts and definitions
- ▶ Benchmark your performance against your peers, both within and outside your business sector
- ▶ Prioritize actions where you have identified your main water risks; adapt objectives at local level, depending on local water scarcity, and ensure rigorous compliance with local regulation
- ▶ Define standards for new planned operations, especially in water-stressed areas
- ▶ Update your reporting approach, specifically around water metrics
- ▶ Integrate the water footprint into executive management incentives
- ▶ Review management systems, for example, to integrate water into your environmental management systems (EMS)
- ▶ Assess opportunities to invest in water-efficient technologies such as improved metering or high-efficiency irrigation technologies
- ▶ Set up and communicate a group-wide policy on water use and your commitment to reduce it.
- ▶ Raise awareness among your key stakeholders – including employees, clients, suppliers, investors and authorities – of how water issues impact your organization and what action you are taking



8. How Ernst & Young can help

Ernst & Young can help you to enhance your understanding of the complex concepts and risks associated with water scarcity. We can help you define, deploy and monitor your business strategy in terms of:

- ▶ Understanding water risk
- ▶ Managing compliance with regulation, including local permits
- ▶ Developing an efficient water strategy
- ▶ Benchmarking against leading practices and peers
- ▶ Understanding innovation and the latest cleantech developments
- ▶ Evaluating the business case and financing of water investment
- ▶ Developing a corporate or product water footprint
- ▶ Communicating externally on water-related issues

Getting value from sustainability

Ernst & Young helps clients accelerate their transformation toward a more resource-efficient and low-carbon economy – from understanding business risks and opportunities, managing regulatory changes, delivering strategy, bringing innovation and competitive advantage, financing green investments, monitoring performance and adding rigor to public disclosures.

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We would like to thank the water industry leaders and sustainability experts who contributed to this report, including:

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EYG no. DX0118



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EMEIA MAS 506.0112