Center for
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Spotlight: Water
Business Tools for Managing Water Resources and Risk

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June 2016

NYU Stern Center for Sustainable Business Trend Report: Water

Water, indispensable to human existence, is at the center of most economic activity. Yet even as the quality and quantity of freshwater diminishes as a result of contamination and climate change (causing either floods or drought), water remains one of the world's cheapest resources, and its true value is not reflected in corporate financials. Consequently, while the decline in the amount of quality water threatens the license to operate of businesses dependent on water, the risk is rarely incorporated into a company's risk profile, cost profile, corporate water management policies, or reporting.

The fact that businesses have been slow to recognize water's growing scarcity and value presents a significant long-term economic and environmental risk. Indeed, in the 2015 World Economic Forum, the water crisis was listed as the biggest economic impact facing the world over the next 10 years, with climate change and population growth exacerbating the issue.[1] A business-as-usual scenario could put at risk as much as $63 trillion of economic value, or 1.5 times the global economy today.[2]

Virtually every product and service depends on water. However, water demand already exceeds supply, and by 2030 will significantly outpace supply by 40%.[3] Agriculture is the biggest user of water globally (67% of total usage) and accounts for half of the U.S. freshwater use. Industry accounts for approximately 20% of global use, with the most water intensive industry being energy generation.[4]

Water-intensive industries are often set up in water scarce regions. For example, today half of China's industrial output and 40% of its water-intensive agriculture take place in 11 of the country's driest regions. Unfortunately, water pricing in China is among the lowest in the world so global outsourcing comes to China despite the damage to the long-term water supply.[5]

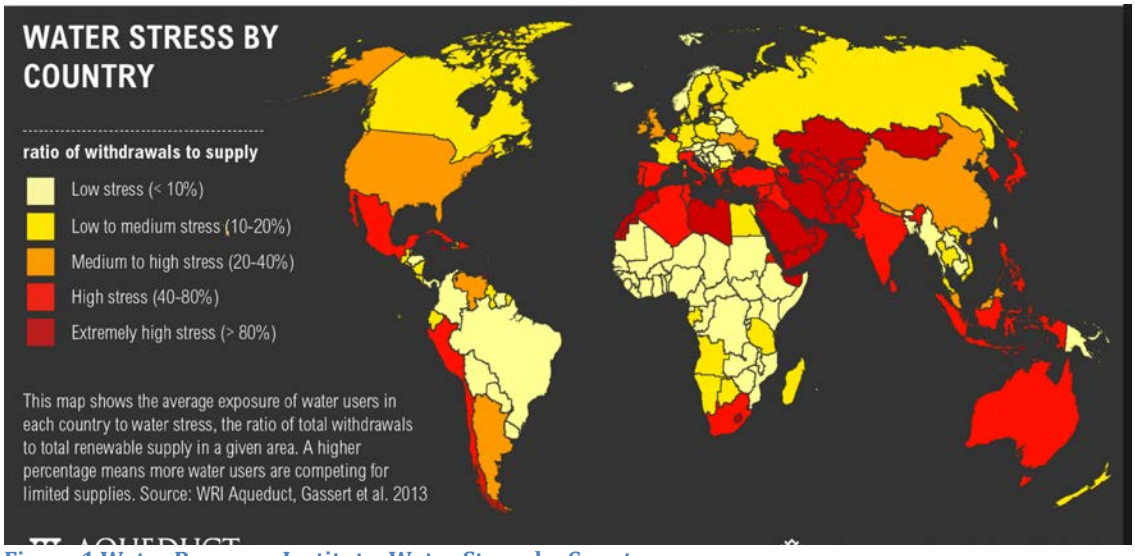

Figure 1 Water Resource Institute: Water Stress by Country

[1] (World Economic Forum)
[2] (IFPRI and Veolia Water North America, 2011)
[3] (2030 World Resource Group, 2009)
[4] (United Nations Environmental Program, 2008)
[5] (Bernick, 2013)

Another example is California, which is the eighth largest economy in the world, and is now in its 4th year of crippling drought, which has major implications for its agricultural production. [6]

Water-related risk is framed as physical risks, regulatory risks and reputational risks across a company's value chain (supply chain, operations and product use). Water-intensive industries may find themselves without adequate water to operate or have their social license to operate withdrawn. In the last few years, some highly visible brands have suffered from water shortages, high commodity prices and/or consumer boycotts due to public perception of water mismanagement, including Kraft, Levi's,[7] The Coca Cola Company[8] and Nike. [9]

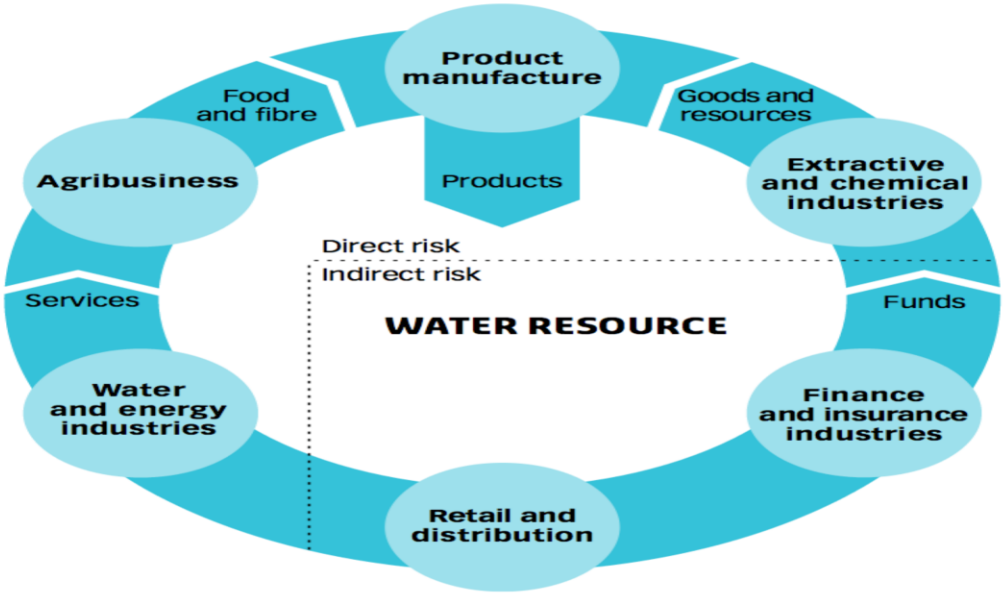

Figure 2 Lloyds 360 Risk Insight Global Water Scarcity: risks and challenges for business. Link between water and key business sectors

And it's not just the manufacturers that are impacted; financial institution investments may be at risk as well. According to a report from Lloyds, "Business water risk is rapidly entering the boardroom and risk managers' realm.[10] A Goldman Sachs "Top Five Risks" conference identified a catastrophic global water shortage as a greater global risk than soaring food prices and exhaustion of energy reserves in the 21st Century."[11]

Moreover, companies and financial institutions have to contemplate *stranded assets* as related to water; i.e., assets that unexpectedly lose some or all of their value due to external events as a result of regulation, technology, physical (resource availability) or reputational risk. For example, a recent report by non-profit CDP describes how mining company Barrick recently suspended construction on a Chilean mine project, after investing $5B, due to concerns by the Chilean regulators about local groundwater contamination (despite sufficient water reserves). Suspending

[6] (Bernick, 2013)
[7] (Clark, 2011)
[8] (the guardian, 2014)
[9] (Clark, 2011)
[10] (Dr. Guy Pegram, 2010)
[11] (Gilman, 2008)

construction resulted in the stranding of $27B in gold and silver assets.[12] CDP also describes *drowning* and *drying* assets. An example of a drowning asset was Anadarko Petroleum, which temporarily closed 675 fracking wells in Colorado due to flooding. CDP estimated the revenue impact of this shutdown to be approximately $.8B to $1.2B per week. Anadarko did not disclose the length of the shutdown.[13]

Prominent Water Frameworks and Tools to Evaluate Water Risk:

1) True Water Cost: The World Bank has produced the following general accounting principles to guide companies in assessing the true cost of water to their business:

- Full supply cost
  - Covers the cost of supplying the water by the utility including operational, maintenance and capital cost
- Full economic cost
  - Covers the full supply cost associated with alternative use of the water resource and the economic cost imposed on other users as well as economic externalities (impact of upstream pollution on users further downstream).
- Full cost
  - Covers the aforementioned supply cost and economic cost as well as potential environmental externalities including the impact on public health and ecosystems [14]

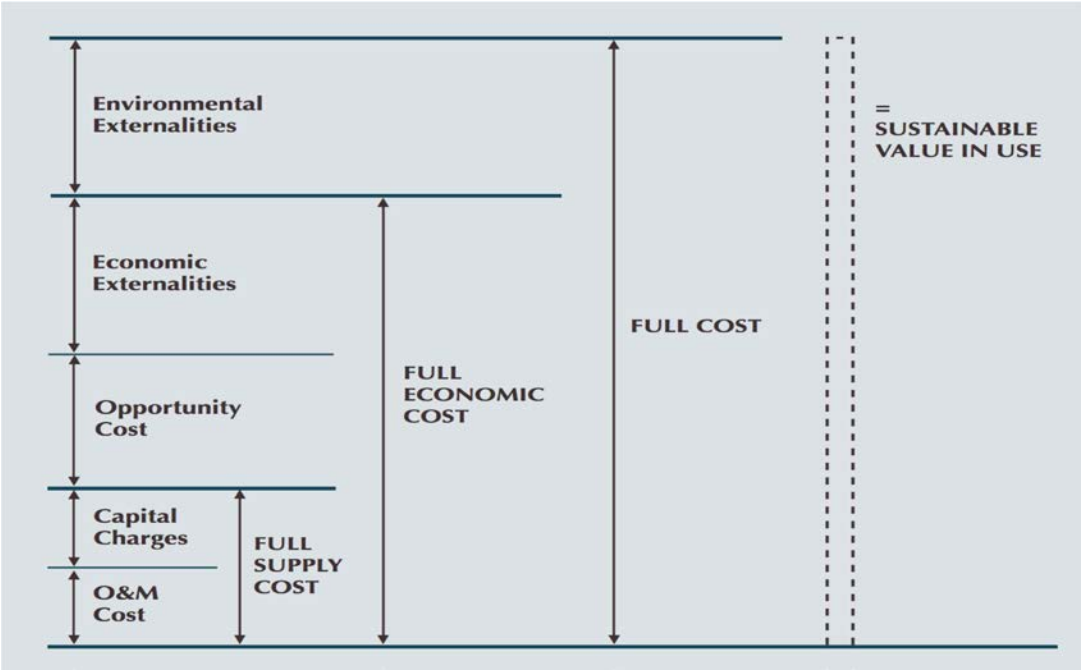

Figure 3 Global Water Partnership: General Principles for Cost of Water

[12] (Lamb, 2015)
[13] (Lamb, 2015)
[14] (peter rogers)

2) Water footprint- Footprinting is used to measure the total annual volume of freshwater used to produce goods and services throughout all stages of production, including water that is used to produce goods and services that are imported into the system It recognizes three types of water:
    a. Blue- Water volume taken from surface waters and aquifers;
    b. Green- Water volume of evaporative flows (found in soils, not major bodies of water);
    c. Gray- the theoretical volume of water needed to dilute pollutants discharged into water bodies that do not exceed regulatory standards.[15]

3) Life Cycle Assessment- a system designed to measure the environmental sustainability of all stages of a product's life (from cradle to grave). Water is one of the elements that can be studied, but it generally is used to assess a broad portfolio of environmental inputs and impacts. This approach can help to make comparisons amongst products and can help in the design phase to reduce water[16]

4) WRI Aqueduct Risk- is a free online tool that allows one to map and analyze current and future strain on global water resources in the regions where a company operates. The company can categorize overall water risk through an aggregated measure of all selected indicators from the Physical Quantity, Quality and Regulatory & Reputational Risk categories.[17]

5) WBCSD Global Water Tool- A free online tool that aims to couple water use, discharge and facility information with watershed and country level data. It helps measure water use in the context of availability. Dow Chemical used the tool to quickly look at their facilities and overlay them with water stress information for 2025 to understand where their future risks lay.[18]

6) Gemi Water Sustainability Tool- A free online tool that helps companies understand their relationship to water by identifying risk and the business case for action. Rather than provide a method to measure quantity, impact and risks of water use, it asks questions to facilitate understanding of water sustainability issues. This tool is much more qualitative in nature and best used for facility use rather than a company as a whole.[19]

The frameworks and tools described above can be helpful in assessing the true cost of water as well as identifying potential cost reductions. Moreover, some companies and NGOs have applied features of these tools to create their own customized approach. For example, one packaged goods company developed a tool that helped determine that the true cost of water for its operations was 2.5 times the actual purchased cost (once hidden costs such as energy, material and treatment were taken into account). [20]

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[15] (Schulte)
[16] (Schulte)
[17] (Institute, 2016)
[18] (Schulte)
[19] (Schulte)
[20] (Colgate)

In another example, a pulp and paper company worked with McKinsey to analyze its water-use costs, including tariffs, charges to dispose of effluents, and water-pumping and heating expenses. It also looked at heat energy lost in its cooling process. This evaluation identified significant cost reduction opportunities and reduced operational expenses by 2.5%, while cutting water use by half. In the process the company recognized that the true cost of water was far above the basic water fees they were paying. [21]

Also of note is the non-profit CDP, which is recognized as the place where the most information on corporate water risk and performance is housed. With 1226 companies voluntarily submitting information, it is now the world's largest and most comprehensive dataset of publically available information on corporate water use. CDP was established 15 years ago to serve investors looking for reliable information about corporate environmental risks and opportunities. CDP's water use questionnaire is comprehensive and is being used by many companies to track water use and benchmark against sector peers.

Shadow Cost/Internal Tax or Tariff

To make decisions that better reflect the true value and cost of water, some companies use internal shadow pricing-- applying an internal "tax" or "tariff" to water consumption that captures the relative scarcity of the resource. This emerging trend began with companies implementing an internal carbon tax strategy to order to plan for increased energy costs, and has migrated to water as a planning tool when evaluating projects or investments. For example, Nestle SA introduces an internal shadow price when assessing proposals to buy new equipment to improve the efficiency of water usage in its factories. Nestle uses a price of just over $1 per cubic meter in sites where water is abundant and five times that in drier areas.[22] This allows the company to better understand and value the true cost of water.

Two Examples of Best in Class Companies

Two U.S. companies that have been recognized as best-in-class in water management by CDP are Ford Motor Company and Colgate-Palmolive.

Ford cut water use by 62% from 2000-2014, achieving their water reduction goal two years ahead of schedule. According to CDP, three important tenets of their water management strategy are: 1) a recognition that clean affordable drinking water is a basic human right that must be respected in all communities where they are based and, 2) a culture of continuous innovation in the way water is being used in their manufacturing processes 3) a requirement that their supply chain conform with responsible water management. Ford recently asked 250 of their top suppliers to report their water management data.[23]

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[21] Measuring the real cost of water. (n.d.). Retrieved May 05, 2016, from http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/measuring-the-real-cost-of-water

[22] A world without water - FT.com. (n.d.). Retrieved May 05, 2016, from http://www.ft.com/intl/cms/s/2/8e42bdc8-0838-11e4-9afc-00144feab7de.html#slide0

[23] (Lamb, 2015)

Colgate reduced water use from 2002-2015 by 48%. Colgate has four goals through 2025 1) Replenish water in water stressed areas. Water stress analysis is now underway. 2) Increase supplier participation in Colgate's water stewardship program. Colgate is working with and its suppliers using CDPs supply chain program to reduce water usage in their water-heavy raw and packaging materials 3) Partner with local and global organizations to bring clean water to underserved areas and 4) Grow awareness of water issues through its award winning Super bowl ad "make every drop count" global campaign.[24]

Summary:

Water is fundamentally a shared resource. As the World Wildlife Fund highlights, "Water is a highly complex, public resource with multiple socially defined functions and values. Its effective management requires the continual reconciliation of trade-offs between private interests and collective well-being, not to mention the fulfillment of a fundamental human right."[25] Corporations must be responsible and recognize water's importance and disparate functions for multiple stakeholders and help to responsibly negotiate trade-offs. [26]

Given this, it imperative that companies:

1. Assess water risk across the business value chain, utilizing available water tools.
2. Ensure the assessment includes the full supply chain (production, transport disposal, etc.), water use and disposal, all water sources, and cross-boundary impacts such as to a river basin or watershed
3. Use a multi-stakeholder approach (key government parties and community and NGO partners) in both assessing impact and finding solutions.
4. Set transparent water risk policies, targets, and reporting. Engage a third party to review and audit annual reporting.
5. Ensure commitment from top corporate decision-makers (C-suite and board of directors) in the company as well as engage all employees in understanding the relevance of water for the business and society.

[24] (Colgate, Colgate Sustainability Report-2015)
[25] (Fund)
[26] (Sarni)

Works Cited

2030 World Resource Group. (2009). *Charting Our Water Future.* New York: McKinsey & Co.

Bernick, L. (2013, April 29). *True Cost of Water*. Retrieved May 11, 2016, from Green Biz: www.greenbiz.com/blog/2013/4/29/true-cost-water

Clark, M. (2011, 11 06). *Business Water Risk: limiting impact through analytics*. Retrieved june 12, 2016, from Earthtimes.og: www.earthtimes.org/business/clothing-companies-concerned-water-risk-1599/

Colgate. *Colgate Sustainability Report-2014.* New York: Colgate.

Colgate. *Colgate Sustainability Report-2015.* New York: Colgate.

Dr. Guy Pegram. (2010). *Lloyd's 360 Risk Insight- Global Water Scarcity:Risks and Challenges for Business.* London: Lloyd's.

Ekins, C. M. (2014, Feb 18). *Nature*. Retrieved May 11, 2016, from www.nature.com: www.nature.com/v517/n7533/full/nature14016

Fund, W. W. *Water Stewardship- Perspectives on business risks and responses to water challenges.* World Wildlife Fund.

Gilman, D. (2008, June 30). *The top five risks conference*. Retrieved 11 2016, May, from www.academia.edu: www.academia.edu/432849/The_Top_Five_Risks_Conference_Key_Takeaways

IFPRI and Veolia Water North America. (2011, March 17). *Greater Efficiency Water Management Will Reduce Risk for Half Global Economy*. Retrieved June 21, 2016, from veolia north America: www.veolianorthamerica.com/en/media/greater-efficiency-water-management-will-reduce-risk-half-global-economy

Institute, W. R. (2016, May 11). *Aqueduct Water Risk Atlas*. Retrieved May 11, 2016, from World Resources Institute-Aqueduct Water Risk Atlas: www.wri.org/applications/maps/aqueduct-atlas

Lamb, C. (2015). *Drying to Drowning Assets-How worsening water security is stranding assets.* London: CDP.

peter rogers, r. b. *water as social and economic good: how to put the principle into practice.* stockholm: Global water partnership.

Sarni, W. *Fueling Growth: You can't always buy what you need.* Deloitte Global.

Schulte, J. M. *Corporate Water Accounting.* Oakland: U.N. Global Compact Office.

the guardian. (2014, june 18). *Indian officials order Coca Cola company to close for using too much water*. Retrieved June 12, 2016, from The guardian: www.theguardian/environment/2014/june/18/indian-officials-coca-cola-plant-water-mehdiganj

United Nations Environmental Program. (2008). *An overview of the state of the World's Fresh and Marine Waters.* Nairobi: United Nations.

World Economic Forum. *Global Risks 2015, 10th Edition.* Geneva: World Economic Fornum.