

# CORPORATE WATER ACCOUNTING, WHERE DO WE STAND? THE INTERNATIONAL WATER ACCOUNTING FIELD AND FRENCH ORGANIZATIONS

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## ABSTRACT

*Purpose – The research objectives of this chapter are threefold. First, we explore what is the current status of corporate water accounting tools and methodologies. Second, we develop a framework for analyzing corporate water accounting and reporting. Third, we investigate what French CAC 40 companies account for and report in relations to the water challenge.*

*Methodology/approach – We collected annual and sustainability reports from all CAC 40 companies as well as their water Carbon Disclosure Project (CDP) responses when available. We also collected all publically available corporate water accounting methodologies to assess the international water accounting field. We coded the data according to our designed framework via qualitative data analysis software.*

*Findings – Although water is seen as equally important to climate change (Association of Chartered Certified Accountants (ACCA), 2009), French multinationals have a very immature reporting on this topic. Most still do not report to the water disclosure questionnaire of CDP in 2014 and rely on*

*basic figures such as global water consumption. We analyzed the multiple water accounting, reporting, and risk assessment frameworks that have mushroomed since 2000, and question the impact of this fragmented field on the maturity of the water performance reporting by French companies.*

*Practical implications – The developed framework for analysis of water reporting can be used for sustainability teaching at university level.*

*Originality/value – We developed the first comprehensive analytical framework for water corporate reporting assessment. Moreover, this research is the first comprehensive study of water reporting in Europe. We therefore contribute to extend our comprehension of corporate maturity in water stewardship and water performance reporting.*

**Keywords:** Water accounting; water reporting; France; water footprint; water disclosure

## LIST OF ABBREVIATIONS

<b>ACCA</b>	Association of Chartered Certified Accountants
<b>AWS</b>	Alliance for Water Stewardship
<b>CDP</b>	Carbon Disclosure Project
<b>CERES</b>	Coalition for Environmentally Responsible Economies
<b>EWP</b>	European Water Partnership
<b>GEMI</b>	Global Environment Management Initiative
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>ISO</b>	International Organization for Standardization
<b>IUCN</b>	International Union for Conservation of Nature
<b>WBCSD</b>	World Business Council on Sustainable Development
<b>WFN</b>	Water Footprint Network
<b>WWF</b>	World Wildlife Fund
<b>WRI</b>	World Resources Institute

## INTRODUCTION

Water is, by abundance, the third molecule in the universe after hydrogen and carbon dioxide (Coulomb, 2013). However, our water resource has been under constantly increasing threats in the past years. Physical water scarcity affects 1.2 billion people (UN, 2007). Another 1.6 billion people face economic water shortage (UN, 2007). By 2025, 1.8 billion people will be living in countries or

regions with absolute water scarcity (UN, 2007). Water demand is an increasing challenge, as for example, the power and energy sectors account for 44% of water withdrawal in the European Union (Ceres & World Business Council on Sustainable Development (WBCSD), 2011). Additionally, water quality is probably one of the most pressing challenges related to water: “in developing countries, 70 percent of industrial wastes enter lakes and rivers untreated” (Ceres & WBCSD, 2011). Its affordability, although it is a “humanity common good” is increasingly challenging, with a water price that is surging. Water is closely related to other sustainability challenges such as health, climate change, and food. Approximately, 2.6 billion people have no sanitation, which would stop the spread of water-related diseases, which are the leading cause of death worldwide (Coulomb, 2013). More than 1 billion people suffer from malnutrition, which is linked to the availability of water for agriculture (Coulomb, 2013). Finally, “water serves as the fundamental link between the climate system, human society and the environment” (Intergovernmental Panel on Climate Change (IPCC), 2007). Water, as climate change, is therefore a significant challenge posed to humanity. Water is as much a global sustainability goal, as it is a very locally embedded sustainability issue. Water accounting needs to address both water as a global challenge through, for example the notion of “virtual water,” but also needs to address the local impact on the river basins through connecting organizational information with locally gathered river basin information.

Water is also essential for socio-economic development (UN Water, 2007) and the future of business depends on the sustainability of water resources (WBCSD & International Union for Conservation of Nature (IUCN), 2010). The World Economic Forum in 2015 rated “water crises” as the number one risk in term of impact (World Economic Forum, 2015). In their Commission Guidance Regarding Disclosure Related to Climate Change from 2010, the SEC warned “changes in the availability or quality of water, or other natural resources on which the registrant’s business depends, or damage to facilities or decreased efficiency of equipment can have material effects on companies.” When introducing their case for the water disclosure project, the CDP stated “the actions of business will have a significant impact on the scale and impact of such scarcity and on the development and implementation of potential solutions” (Irbaris, 2009). Water-related risks are already a reality for many sectors such as agriculture, with flooding, the apparel industry with higher commodity price on cotton, the power industry with droughts in China which have led to decreased hydroelectric power availability, fines that have to be paid for polluting rivers, lakes, and water basins and the bans on the practice of hydro-fracturing (Ceres & WBCSD, 2011).

Although water has not received the same attention given to both climate change and biodiversity globally, corporate tools related to the water challenge have gradually emerged since the early 2000s. Today, contrary to the corporate carbon accounting field, which has a largely dominant accounting standard

(Green, 2010; Ranganathan, 2011), the corporate water accounting field is still scattered and multiple. Multiple actors including the UN CEO Water Mandate, the Alliance for Water Stewardship (AWS), Ceres, the Global Environment Management Initiative (GEMI), the Water Footprint Network (WFN), the World Business Council for Sustainable Development (WBCSD), the World Resources Institute (WRI), the World Wildlife Fund (WWF), and the International Organization for Standardization (ISO) have all been involved into risk assessment, accounting and reporting guidelines and standards related to water. Therefore, our first research question is: what are the water risk assessment, accounting and reporting tools available to corporations for water performance management? From this first research question, we design an analytical performance framework to assess the level of maturity of French companies into water accounting. Therefore, our second research question follows: what do French multinationals account for and report in relations to the water challenge?

The following section reviews water in the accounting literature and the previous reviews of water disclosure conducted between 2004 and 2011. The section “Research Design” describes the research design used to conduct the analysis of both the water accounting field and the water reporting of French multinationals. The next three sections develop the findings in relation to the water accounting field, the analytical framework developed and water reporting. The last section develops the contributions and concludes.

## LITERATURE REVIEW ON CORPORATE WATER ACCOUNTING

Water is a relatively new topic in the accounting literature and even within the social and environmental accounting literature. A first set of studies had investigated accountability from the water industry perspective (Crowther, Carter, & Cooper, 2006; Larrinaga-Gonzalez & Pérez-Chamorro, 2008; Ogden, 1995; Ogden & Anderson, 1999; Rahaman, Everett, & Neu, 2007; Shaoul, 1997; Von Schwedler, 2011). The second and most recent strand of water accounting literature has developed around case studies such as water management accounting in the wine industry (Christ, 2014) and water management and the notion of efficiency (Egan, 2014). This new interest in water accounting has also developed notions such as water-related information as a human right (Hazelton, 2013).

To the same extent, reviews of water information are scarce in the literature (ACCA, 2010; Egan & Frost, 2010; Morikawa, Morrison, & Gleick, 2007; Morrison & Schulte, 2009). Morikawa et al. (2007) reviewed global companies data from the year 2005. The authors analyzed corporate sustainability reports from 139 of the largest companies in what they considered the 11 most water-intensive industry sectors (Morikawa et al., 2007). Morrison and Schulte (2009)

focused on the engagement of corporations with their external environment including the community, suppliers, and policy-makers. The ACCA (2010) review analyzed broad items such as consumption, governance, implementation, and supply chain stewardship. They argued for a common reporting standard for water disclosure, as the current status lags behind the achieved disclosure in greenhouse gases emissions reporting (ACCA, 2010). Ceres (2010) analyzed disclosures from 2008 of 100 publically traded companies in the United States. They scored the companies on a 100-point scale, but none were rated above 43. They concluded that “the vast majority of these disclosures consist of vague, boilerplate language.” The CDP (Irbaris, 2009) had also reported on a 2008 JP Morgan study entitled *Watch Water: A Guide to Evaluating Corporate Risks in a Thirsty World* that they had also concluded “corporate disclosure of water-related risks is seriously inadequate.” Lambooy (2011) has addressed the role of companies in relation to freshwater. She investigated the links between corporations and water, reported on the burgeoning accounting and reporting water tools, and finally addressed corporate reporting using the Ceres (2010) report results.

The last group of literature has started to report on the multiple tools for corporate water accounting and reporting (Chalmers, Godfrey, & Lynch, 2012; Morrison, Schulte, & Schenck, 2010; Russell & Lewis, 2014; UNEP, 2011; WBCSD & IUCN, 2010). Morrison et al. (2010) reviewed the Water Footprint Standard from the WFN, Life Cycle Assessment, the Global Water Tool from WBCSD, and the Water Sustainability Planner from GEMI. This first study underlined three issues: the lack of cooperation and harmonization among key actors, the lack of watersheds-related data compared to direct operations water accounting and finally, the lack of supply chain-related water accounting (Morrison et al., 2010). As for other environmental accountings, such as carbon, the study also pinpoints another key limiting factor for the development of water accounting practices, that is the lack of reliable data at a sufficient level of detail/granularity (Morrison et al., 2010). The “Water for Business” report (WBCSD & IUCN, 2010) starts with an alarming tone “the world is in desperate need of tools for sustainable water management.” It reviews 19 initiatives related to water accounting. Each initiative is presented with objectives, key features, and business involvement. There is no judgment or comparison made on the different tools. UNEP (2011) groups the tools into accounting and disclosure and aims at raising awareness on the tools available to water stewardship. Chalmers et al. (2012) describe how Australian Water Accounting Standards were designed in mimicry of financial accounting standards and reporting. Finally, Russell and Lewis (2014) have recently reviewed accounting and disclosure initiatives, raising questions about the effectiveness and contribution of these standards to organizational and societal use and management of water, as well as about the accountability behind the initiatives themselves.

From this burgeoning literature on disclosure practices and water accounting tools, we seek to further contribute to our understanding of how

corporations address the water challenge. First, we review the recent water disclosure trends in a new geographical area, Europe. Second, we have designed an analytical framework based on water performance and adapted from past studies and existing accounting and reporting frameworks. Lastly, we review existing accounting, reporting and risk assessment tools as a fragmented field that potentially hinders the future development of water stewardship within French corporations.

## RESEARCH DESIGN

### *Data Collection*

First, we collected data in relation to the international water accounting field. Data was collected from 2010 to 2014 on all available water risk assessment tools, water accounting methodologies, water reporting frameworks, and water external ratings. Personal interest<sup>1</sup> into water accounting lead to thorough collecting of water accounting standards over the years. The list was completed based on past publications which had themselves reported on the numerous and fragmented field for water risk assessment, accounting and reporting.

In a second step, we collected public data pertaining to water reporting in the French CAC 40 companies. This includes their sustainability reports (often attached to annual reports in French companies) and their CDP water disclosure responses when available, as well as one integrated report (GDF Suez) and one GRI online dataset. Annual reports are considered “a good instrument to measure comparative positions and trends in reporting” (Guthrie, Petty, Yongvanich, & Ricceri, 2004). In total, 55 documents were analyzed. Our focus was on the contents of published reports and corporate responses to the water information requests from CDP only. Our decision to include CDP water disclosure responses was made because our main was to review not only corporations’ accountability but also their maturity in regards to the water challenge through extensive water performance reporting. Often, companies are keener to disclose detailed performance and risk assessment with their CDP responses than into their environmental reports. Several studies have noted the necessity, when reviewing disclosure documents, to broaden the reporting media considered (Larrinaga-Gonzalez & Perez-Chamorro, 2008). For example, websites reveal an intense communication on sustainability that is not included into traditional sustainability reports (Larrinaga-Gonzalez & Perez-Chamorro, 2008). Other communication means that reveal information from the organization could include investor presentations (present on the companies’ websites) and official blogs on sustainability (e.g., the “down to earth” blog from Danone). We limited our dataset to the set of official reports and CDP responses to analyze a comparable set of data. However, the trend toward online reporting, a continuous update of data throughout the year, as well as

giving access to downloaded organizational data such as financial statements or sustainability indicators will undoubtedly become the core set of data for analysis disclosures in the near future.

### *Data Analysis*

Our analysis involved “codifying qualitative and quantitative information into pre-defined categories in order to derive patterns in the presentation and reporting of information” (Guthrie et al., 2004). The 337 quotations were derived from the analysis. The data was coded using qualitative data analysis software named Atlas.ti software, version 7.

Our pre-defined categories are the analytical framework developed within this study and based on existing reporting frameworks (GRI; CEO Water Mandate disclosure guidelines 2014) as well as past studies made on American companies; therefore, disclosure categories are extracted from well-grounded relevant literature (Guthrie et al., 2004). Since the categories of classification have been extended from past studies, they are clearly and operationally defined (Guthrie et al., 2004). Within the findings section, we report on how the analytical framework was built.

## **THE INTERNATIONAL WATER ACCOUNTING FIELD**

Water accounting is defined as “the systematic process of identifying, recognizing, quantifying, reporting, assuring and publishing information about water, the rights or other claims to that water, and the obligations against that water” (Australian Government Bureau of Meteorology, 2012). As of today, global standards are emerging, such as the recent ISO standard 14046 (2014) and the water footprint by the WFN published in 2011. However, “there is no consensus yet on what exactly the standards should be, never mind consistent or widespread adoption of such standards” (Irbaris, 2009). Water is indeed an “uncooperative commodity” (Bakker, 2004). One of the reasons behind the burgeoning and fragmented field of water accounting is the many methodological challenges to water accounting. First, water is both a global and a local issue. The impact is more or less significant depending on the area, and the type of water it is taken from. Second, measuring “gray water” and water quality poses another challenge to water accounting. Now, CDP (Irbaris, 2009) and ACCA (2010) are calling for a much needed common reporting standard for water disclosure.

Understanding who shapes water accounting and how the new accounting technologies shape our understanding of water (Russell & Lewis, 2014) is critical to analyzing the current status and maturity of corporations in water performance accounting and reporting. Therefore, in this section, we will map

the different initiatives and explore their methodology to understand how they will help corporations enhance their water management.

### *Assessing Business Risks and Opportunities*

The first set of tools within the water stewardship process is the tools designed to help companies assess their business risks and opportunities related to water. We report on the most commonly used which are the Global Water Tool, the Aqueduct tool and the water risk filter. We also report on the GEMI water sustainability tool, which dates back from 2002, although French CAC 40 companies do not mention it.

#### *The Water Sustainability Tool (GEMI) 2002*

The Global Environmental Management Initiative (GEMI) is a non-profit organization with members that are leading companies “dedicated to fostering environmental, health, and safety excellence worldwide” (GEMI, 2002). In 2002, it designed the “Water Sustainability Tool,” as the first ever tool to help companies identify their risks and opportunities related to water. GEMI has for more than 20 years been leading in the development of publicly available, solutions-based tools. Today, more than 30 tools have been designed to help companies improve their operations in relation to the environment.

#### *The Global Water Tool (WBCSD) 2007*

The Global Water Tool is an Excel-based tool initially released in 2007 and now in its 2012 version. It focuses on detecting risks linked to water scarcity and the location of both production sites and suppliers. French company Lafarge was part of the advisory board when the tool was designed. The Global Water Tool has an Indian version and sector-tailored versions. Additionally, the WBCSD has partnered with the GEMI to develop the Local Water Tool, a free tool to assess water risks and opportunities at a particular location. The WBCSD is also a contributor to the Ceres Aqua Gauge.

#### *The Aqueduct Water Risk Atlas (WRI) 2013*

The atlas uses 12 indicators to inform about geographic exposure to water-related risks. Interestingly, it includes non-physical risks, the regulatory and reputational risks to a company’s license to operate. Reputational risks are defined as “potential conflicts with the public regarding water issues that can damage a company’s image or result in the loss of the company’s license to operate in a community” (WRI, 2013).

#### *Water Risk Filter (WWF) 2014*

The Water Risk Filter developed by the WWF is the newest tool available. It allows assessing facility or commodity-specific basin-related water risk

(WWF, 2014). It also contains a mitigation area to help structure responses to the risks identified.

The field of water risk assessment is composed of four main water tools, all freely available online. We can note that the first risk assessment tool was available as early as 2002. Another interesting feature is the author of the last available tool, the Water Risk Filter, which has been developed by WWF. However, we note the scattered tools available to corporations despite previous collaborations, for example, between the WBCSD and the WRI.

### *Corporate Water Accounting*

Corporate water accounting includes accounting standards that allow assessing a corporation or a product's water performance. As of today, there is no universally accepted standard for measuring water use and its impact (ACCA, 2010). Three main standards coexist as of today: the Water Footprint Assessment, developed from 2002 to 2011, and for which a tool is in preparation; the General-Purpose Water Accounting developed in Australia from 2007 to 2012; and the ISO 14046 "Water footprint – Requirements and guidelines" finalized in 2014. The three accountings have different foundations. One has developed a unique methodology (water footprint), the other is based on financial accounting, and the last one is very much driven by the ISO 14044 on life cycle assessment. To date, the water footprint assessment had gained support from many multinationals, but is now facing a new ISO standard based on the Life Cycle Assessment, the "Holy Grail of environmental decision-making" (Bebbington, Gray, Hibbitt, & Kirk, 2001).

#### *Water Footprint Assessment (WFN) 2011*

Arjen Hoekstra first introduced the concept of water footprint in 2002. The water footprint has since been developed by the WFN, which issued a manual in 2009 and a book for water footprint assessment in 2011. The WFN is a 130 organizations network started in 2008, which defines itself as an international learning community. French companies L'Oréal and Lafarge are members of the WFN, and Renault was a member as of 2010.

Water footprinting is defined as "an indicator of freshwater use that looks at both direct and indirect water use of a consumer or producer. The water footprint of an individual, community or business is defined as the total volume of fresh-water that is used to produce the goods and services consumed by the individual or community or produced by the business" (Hoekstra, Chapagain, Aldaya, & Mekonnen, 2011). Its main indicator is water use, calculated along production and supply chains. The water footprint aims "to uncover this hidden link between human consumption and water use" (Hoekstra, 2008). Its first characteristic is to account for indirect water use besides the operational

water footprint. Its second characteristic is to include a sustainability assessment phase after the accounting phase. Three terms have also been coined within the water footprint work into corporate accounting: blue water, green water, and gray water. The next step of the WFN is to develop a tool and the underlying databases to support use and adoption of the accounting standard (Hoekstra et al., 2011).

Although the WFN strives to “prevent what has happened in the case of the carbon footprint: a multitude of different definitions, approaches and methods, so that it is difficult to properly assess claims in this field” (WFN, 2015), multiple competing standards for corporate water accounting have emerged. In a way, WFN is trying to replicate the quasi-worldwide monopoly on carbon corporate accounting standard setting developed by the GHG Protocol (Green, 2010), although this aim has not been achieved yet.

#### *The Australian General-Purpose Water Accounting (WASB) 2012*

In 2008, the National Water Initiative of Australia recommended the development and implementation of water accounting. From 2007, the committee in charge of developing water accounting included financial accounting expertise. The conceptual framework of GPWA was crafted by financial accounting academics and GPWA reports include a Statement of Physical Flows, “similar in nature to the cash flow statement of financial accounting” and a Statement of Water Assets and Water Liabilities (Chalmers, Godfrey, & Potter, 2012). The Water Accounting Standards Board constantly drew on financial accounting concepts, principles, and practices when designing the water accounting standards. “It has applied financial accounting methods of recording and reporting information to non-financial content: water volumes and quality, rather than financial values” (Chalmers et al., 2012).

Although the GPWA is a national standard, and the Board in charge of setting water accounting standards has been disbanded in 2014, Chalmers et al. (2012) reported on the growing international interest for the Australia-developed methodology. They report on trial preparations of GPWA in Africa and Europe, discussions with authorities in the European Union, at the World Meteorological Organization, the United Nations and some interest by the IASB during standards development. Whether the GPWA will cross the borders to become an international standard remains to be seen.

#### *Water ISO Standard 14046 (ISO) 2014*

The ISO released the most recent water accounting standard in 2014. It is entitled “Water footprint – Principles, requirements and guidelines” and is largely based on Life Cycle Assessment (LCA) ISO standard 14044. France has been very active in this standardization process, with the participation of over 20 companies and LCA experts among with Veolia Environnement, EDF R&D and Danone Eaux France. According to AFNOR (2013), the French delegation

played a crucial role in the negotiations toward finalizing the water footprint ISO standard.

### *Water Reporting*

Water reporting guidelines consist of four documents, the GRI 4 key performance indicators on water, the GRI Water Protocol published in 2003, the European Water Stewardship Standard (2012), and the Corporate Water Disclosure Guidelines (2014). The first three documents pertain to defining the relevant water performance indicators to be disclosed. The last one offers a framework for disclosure as well as a list of items to be disclosed, with a two-step approach: basic and advanced (Table 1).

#### *Water KPIs GRI 4 (GRI) 2013 and the Water Protocol (GRI) 2003*

The current set of GRI 4 water indicators are EN 8: total water withdrawal by source, EN 9: Water sources significantly affected by withdrawal of water, EN 10: percentage and total volume of water recycled and reused, EN 22: total

**Table 1.** Secondary Data Collected for Assessing the International Water Accounting Field.

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#### *Reporting*

Corporate Water Disclosure Guidelines, UN CEO Water Mandate 2014

GRI Water Protocol 2003

GRI 4 2014

European Water Stewardship Standard 2012 (European Water Partnership (EWP))

#### *Risks Assessment*

Ceres Aqua Gauge 2011

Water Risk Filter (WWF, 2014)

Aqueduct water risk framework (WRI, 2013)

Global Water Tool (WBCSD, 2012)

Connecting the Drops toward Creative Water Strategies, a water sustainability tool (GEMI, 2002)

#### *Accounting*

The Water Footprint Assessment Manual, Setting the Global Standard (Hoekstra et al., 2011)

The Water Footprinting Manual 2009

ISO 14046 2014 Briefing Note

ISO 14046 Water footprint

Australian Water Accounting Standard 1

Australian Water Accounting Standard AWAS 2

#### *Ratings*

CDP Water Disclosure information request year 2010, 2011, 2012, 2013, 2014

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water discharge by quality and destination, and EN 26: identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting company's discharge of water and runoff. The Water Protocol from 2003 helped multinationals with detailed guidelines on the five indicators. For example, the five key constituents defined to be tracked for EN 22 in 2003 are still applied in water reporting using GRI 4 today.

*Corporate Water Disclosure Guidelines (The CEO Water Mandate) 2014*

The corporate water disclosure guidelines were drafted and released in 2012, and finalized in 2014. They have therefore not yet been applied to corporate reporting. However, the guidelines provide interesting features such as the "company water profile," which gives a high-level overview of a company's water issues and management efforts (Morrison & Schulte, 2014). It has also defined two categories for water disclosure, basic and advanced, that we re-use within our own framework. The guidelines also attempt to encourage evaluation and reporting of impacts on basin conditions (p. 76).

*European Water Stewardship Standards 2012*

This standard has been developed using a multi-stakeholder process and aims at contributing to the European Commission's activities on resource efficiency. It contains 15 criteria and 49 indicators. Those indicators are themselves classified into major and minor categories. This standard includes a certification outline, an audit procedure, and a classification into gold, silver, and bronze status. While this set of indicators is the most comprehensive, it remains to be seen whether companies will apply them as part of water disclosures.

*Investor-Led Initiatives on Water Stewardship*

Ceres is a non-profit organization based in the United States whose work is to mobilize investors and business toward a more sustainable future. It has been leading to world renowned initiatives such as the Global Reporting Initiative and more recently the Global Initiative for Sustainability Ratings with the Tellus Institute, to generate a "non-commercial, generally accepted sustainability ratings standard that meets the highest standards of technical excellence, independence and transparency" (Ceres, 2014). Within their vision for 2020, they advocate for "honest accounting that abolishes the folly of free pollution."

In relation to water, Ceres has published a report on disclosure in 2010 entitled "Murky waters? Corporate reporting on water risk – A benchmarking study of 100 companies" and developed a tool targeted at investors. They found that even for companies that were facing significant water risk, disclosure of risk and performance related to water was surprisingly weak (Ceres, 2010).

The Aqua Gauge is an Excel-based tool and associated methodology “that allows investors to scorecard a company’s water management activities against detailed definitions of leading practice” (Ceres & WBCSD, 2011). It is not aimed at serving corporate water disclosure, but rather its primary aim is to help investors interpret and evaluate disclosed information on water. However, companies can use the tool to do a self-assessment of their water stewardship strategy.

CDP is an investor-led initiative to collect into a repository climate change, water- and forest-related corporate disclosures. It was founded in 2000 and holds the largest database of corporate climate change information in the world, gathered on behalf of institutional investors (Irbaris, 2009). In 2008, the CDP conducted a pilot on water disclosure. In 2010, they asked companies to report on 2009 data, nine French CAC 40 companies responded in the first year. The supply chain program is also opened to water, so that companies can obtain water-related information from their suppliers through the CDP. The water disclosure at CDP has seen a 318% increase in investor signatories since 2010, a strong indicator that water is becoming rapidly a topic that companies cannot avoid to include in their strategy.

## **ANALYTICAL FRAMEWORK**

As for biodiversity reporting (Schneider, Samkin, & Davey, 2014), the lack of prior literature on water accounting and reporting triggered the development of this framework on water disclosures. This framework aims at providing insights into the nature of disclosures in relation to the available tools and methodologies reviewed above. The section “French Multinationals’ Water Risk Assessment, Accounting, and Reporting” will apply this framework to the French CAC 40 companies’ disclosures.

We decided to focus on performance disclosure, contrary to former studies (ACCA, 2010; Morrison & Schulte, 2009), which have focused on governance, stakeholder engagement and water-related risks and opportunities disclosures. The two most comprehensive analysis of water performance disclosure dates back from 2007 (Morikawa et al., 2007) and was conducted on 139 companies with 2005 data, and from 2010 (Ceres, 2010), where the US-based non-profit organization evaluated 100 American companies on 2008 data. Both studies concluded that there was a lack of even basic data on water performance (e.g., discharge information), as well as a lack of local level and supply chain-related data.

Our framework is dedicated to a large extent to performance-related data, comprising: what is measured and disclosed, the quality of the analytical data behind global numbers, and looking for site, product and catchment-specific measures. To analyze the status of reporting, we decided to use the two levels

of maturity developed by the UN (Morrison & Schulte, 2014) and extended to incorporate all items of our framework.

This framework is aimed at being continuously improved in further studies for water disclosure, as companies' reporting mature.

## **FRENCH MULTINATIONALS' WATER RISK ASSESSMENT, ACCOUNTING, AND REPORTING**

French companies are only legally obliged from December 31, 2012 to report on two aspects related to water strategy and accounting (Grenelle 2 Law, Article 225, Décret n° 2012-557 from April 24, 2012): measures to prevent, reduce, or repair releases to air, water, and soil severely affecting the environment and water consumption and water supply according to local constraints. All other water-related matters are voluntary disclosures.

We first give a broad overview of the water profile of the CAC 40 companies. Twelve companies have reported to the CDP on their water questionnaire in 2014 (not all have accepted to have it publically disclosed). Danone, GDF Suez, Pernod-Ricard, Saint-Gobain, Veolia Water are members of the CEO Water Mandate. Lafarge and L'Oréal are members of WFN, and Renault was in 2010. Veolia Environnement, EDF, and Danone were proactive in the ISO 14046 standard setting process (Table 2).

### *Importance of the Water Topic for CAC 40 Companies*

Globally, the water topic is still under-estimated by the French industry: “risks exist, but no substantive impact anticipated” (EDF, Valéo, L'Oréal in 2014, GDF Suez, Vinci, Solvay, Sanofi, Saint-Gobain in 2014 for their supply chain), “water risk is not so high for us” (Sanofi in 2014), “water quality does not represent a major risk” (Saint-Gobain in 2014), “direct water use is not so strategic” (Kering in 2014, although they recognize accounting for impact in their supply chain). It is interesting to note that those quotes are extracted from CDP water disclosure questionnaires, where companies inform an investor group and not their stakeholders as a whole, that are being informed through annual and sustainability reports. The absence of the banking industry is conspicuous, despite the call to action made by UNEP FI in 2005 and renewed by the WWF in 2011. Out of the four companies identified in Les Echos' first CSR ranking (October 2014) as being the best in class, only one, Lafarge, responds to the water disclosure questionnaire, when all CAC 40 companies respond to the climate change questionnaire. However, many are starting to make the pledge to tackle the water challenge such as L'Oréal, GDF Suez, EDF, Sanofi, or Bouygues: “To meet the water consumption reduction targets of the Group in

**Table 2.** Secondary Data Collected for Assessing French Multinationals' Water Risk Assessment, Accounting, and Reporting.

Company	WDP 2009	WDP 2013	CDP 2013 (Climate Change)	Documents Collected
Accor (Hotel industry)	No	No	Yes	Document de référence 2013
Airbus Group <sup>a</sup> (Aeronautical and defence)	No	No	Yes	Corporate Responsibility & Sustainability Report 2013
Air Liquide (Industrial gas)	Yes	Submitted (not published)	Yes	Document de référence 2013 incluent le rapport de développement durable 2013
Alcatel Lucent (Telecom)	No	No	Yes	Rapport développement durable 2013
Alstom (Transport & Energy)	Yes (2010 declined)	No	Yes	Rapport d'activité et de développement durable 2013/2014
ArcelorMittal (Steel)	Yes	Submitted (not published)	Yes	Corporate Responsibility Report 2013
Axa (Insurance)	No	No	Yes	Rapport d'activité et de développement durable 2013
BNP Paribas (Bank)	No	No	Yes	Rapport développement durable 2013
Bouygues (Construction)	No	No	Yes	Rapport d'activité et de développement durable 2013
Capgemini (Information Technology)	No	No	Yes	Corporate Responsibility & Sustainability Report 2013
Carrefour <sup>a</sup> (Distribution)	Yes	Declined (to respond)	Yes	Rapport d'activité et d'engagement responsable 2013
Crédit Agricole (Bank)	No	No	Yes	Rapport RSE 2013–2014
Danone (Food industry)	Submitted (not published)	Submitted (not published)	Yes	Rapport développement durable 2013
EDF (Energy)	Declined (to respond)	Yes	Yes	Rapport annuel 2013
Essilor (Optical services)	Submitted (not published)	Submitted (not published)	Submitted (not published)	Document de référence 2013

*Table 2. (Continued)*

Company	WDP 2009	WDP 2013	CDP 2013 (Climate Change)	Documents Collected
GDF Suez (Energy)	Declined (to respond)	Yes	Yes	Rapport d'activité 2013/Rapport intégré 2014 (on 2013)
Gemalto (New technologies)	No	No	Yes	Gemalto Annual Report 2013
Kering (Luxury)	No	Yes	Yes	Document de référence 2013
L'Oréal (Cosmetics)	Yes	Yes	Yes	Rapport développement durable 2013, fiche environnement GRI
Lafarge <sup>a</sup> (Cement)	No	Yes	Yes	Rapport développement durable 2013
Legrand (Electric material)	No	No	Yes	Document de référence 2013
LVMH (Luxury)	Yes	Yes	Yes	Rapport environnement 2013
Michelin (Tire)	No	No	Submitted (not published)	Rapport d'activité et de développement durable 2013
Orange (Telecom)	No	No	Yes	Rapport développement durable 2013
Pernod-Ricard (Spirits)	No	Yes	Yes	Rapport annuel 2013
Publicis Groupe (Advertising)	No	No	Yes	Rapport RSE 2013
Renault (Car industry)	No	Declined (to respond)	Yes	Rapport RSE 2013
Safran (Aerospace)	No	No	Yes	Rapport d'activité et de développement durable 2013
Saint-Gobain (Construction, glass)	No	Yes	Yes	Rapport développement durable 2013
Sanofi Aventis (Pharmaceutical industry)	Submitted (not published)	Yes	Yes	Rapport RSE 2013
Schneider Electric <sup>a</sup> (Electric material)	No	Declined (to respond)	Yes	Rapport annuel financier et développement durable 2013 et L'essentiel stratégie et développement durable 2013–2014

Société Générale (Bank)	No	No	Yes	Rapport annuel d'activité et développement durable 2013–2014 et rapport RSE 2013–2014
Solvay (Chemicals)	No	Yes	Yes	Sustainability Development Report 2013
Technip (Energy)	No	No	Yes	Rapport d'activité et de développement durable 2013
Total (Energy)	Declined (to respond)	Declined (to respond)	Yes	Rapport RSE 2013
Unibail Rodamco (Real estate)	No	No	Yes	Rapport d'activité et de développement durable 2013
Valéo (Automotive supplier)	No	Yes	Yes	Rapport d'activité et de développement durable 2013
Veolia Environnement	Declined (to respond)	No	Yes	Rapport d'activité et de développement durable 2013
Vinci (Construction)	No	Yes	Yes	Rapport annuel 2013
Vivendi (Media)	No	No	Yes	Rapport annuel 2013

<sup>a</sup>Company names that were in Les Echos' first CSR ranking in 2014.

2020, a water management strategy is being developed by internal experts” (Sanofi annual report including sustainability report 2013). It is interesting to note that only three companies (Danone, ArcelorMittal, and L’Oréal) have a water-related statement from their CEO or a senior manager within their sustainability reports.

Three groups of companies are leading water stewardship: one has a long history of water stewardship, the second has a strong commitment to overall environmental stewardship, and the third group has recently pledged to take on the water challenge. The first group includes ArcelorMittal and Danone. Danone, through its water business, has long worked on preservation of its catchment areas, such as the Evian impluvium, and more recently worked on the ISO standard, as well as a company-wide water footprint accounting system. ArcelorMittal is a major water user and recognizes the potential of climate change impact on its operations. In the Great Lakes, ArcelorMittal has been investing for over eight years into a water stewardship program a total amount of US \$37 million. ArcelorMittal has been a pilot in the CDP water disclosure and reported since its inception. It has also invested into a dedicated water treatment lab, and green technologies to minimize pollutants.

The second group includes Accor and Kering. They both conducted extensive life cycle assessment on the entire company activities, including supply chain data. Included within these detailed assessment, there was water data that is now being used to channel the right strategy.

The last group includes EDF, GDF Suez, and L’Oréal. EDF made a public engagement during the 6th World Water Forum in Marseille in 2012 “*to invest the necessary means in the development, with the scientific community, of the methods and the tools to estimate the water footprint of its activities of electricity production, within the territories which welcome its facilities*” (CDP Water questionnaire on year 2013). L’Oréal created in 2013 a new environmental performance index for their cosmetic formula, the “water footprint” based on the environmental profile of its ingredients in terms of biodegradability and ecotoxicity. GDF Suez is a participant in the CEO Water Mandate and responses to the CDP water disclosure questionnaire. They have started to investigate their supply chain and plan on a deeper analysis in 2015.

We used the water stewardship progression framework developed by the WFN (White, McNeillis, Mathews, & Chapagain, 2013) to assess the 40 CAC 40 companies. It shows a clear trend toward building water leaders (collective action and supply chain engagement groups), while unfortunately seven companies still do not disclose any water-related data. Water stewardship has no common agreed definition; however, it often refers to business action on water challenges (WWF, 2013). Some agree that it is to go beyond internal risk management to more proactive water stewardship in collaboration with local stakeholders (Daniel & Sojamo, 2012). However, we will retain here the definition proposed by the WWF which states that water stewardship is “a progression of increased improvement of water use and a reduction in the water-related

impacts of internal and value chain operations. More importantly, it is a commitment to the sustainable management of shared water resources in the public interest through collective action with other businesses, governments, NGOs and communities” (WWF, 2013). Globally, it is agreed that water leaders go beyond actions within their internal operations, and engage in collective action (see, e.g., ArcelorMittal or Danone). WWF (2013) adds that water stewardship can be composed of water footprinting, risk analysis, metrics, stewardship strategy, public policy guidance, standards development, and partnership with companies in stressed watersheds as well as river basin management. It is an engagement from organizations that hold no government mandate to contribute to the management of water as a common good and to overall water security (WWF, 2013) (Fig. 1).

*Materiality*

Very few CAC 40 companies disclose their materiality assessment methodology and matrix. ArcelorMittal discloses both their methodology and the matrix where they have identified water as one of the six key issues: “*Our materiality*

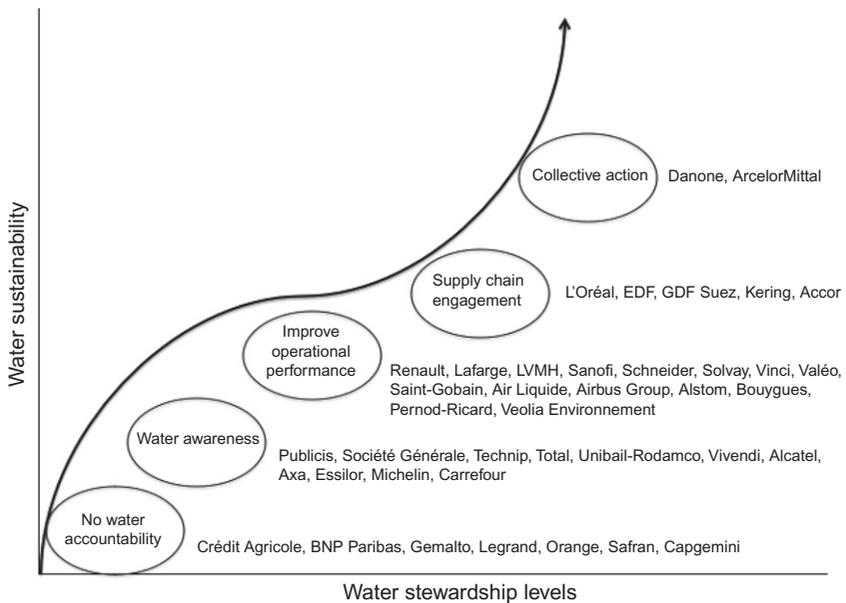


Fig. 1. French CAC 40 Water Stewardship Levels (Based on 2013 Reports). Source: Adopted from the Water Footprint Network report “Energising the Drops: Towards a holistic approach to carbon & water footprint” (2013).

matrix has identified 26 key issues for our business. All deserve focus, but six priority issues have emerged: safety, greenhouse gas emissions, air and water emissions, health, accountable and transparent governance and employee engagement” (ArcelorMittal corporate responsibility report 2013). GDF Suez has also created for the first time in 2014 a materiality matrix on a European basis, Unibail Rodamco has a materiality matrix, which shows water as having an impact on the value of the company, and Lafarge has a small materiality matrix based on GRI guidelines. However, water reporting also includes materiality statements such as the ones made by Bouygues, EDF, LVMH, and L’Oréal, which states the importance of water to their business: “*Water management is a major concern for Bouygues Immobilier in the design and implementation of its programs*” (Annual report containing sustainability report for 2013); “*reducing environmental footprint with a given priority to water*” (sustainability report 2013); “*EDF plays a major role in water management: 75% of France’s surface water reserves are managed by EDF*” (CDP information request for year 2013); “*water is a strategic resource for the LVMH Group activities*” (Sustainability report 2013) (Table 3).

### *Risks and Opportunities Assessment*

Out of the 40 companies, 27.5% report business risks related to water. French CAC 40 companies mainly report on whether their productions are located within water-stressed regions: “*Of the 276 sites analyzed, 30 are located in very high water stress areas (<500 m<sup>3</sup> per person per year), which represents about 5% of the annual water supply of industrial sites of Air Liquide*” (Annual Report including sustainability report for the year 2013). However, many are just starting to tackle the water challenge, such as Bouygues, which states “*A first contextualizing analysis of consumption and water supply according to water stress conditions will be conducted in 2014*” (Annual Report including sustainability report for the year 2013) (Table 4).

French companies used a vast array of risks management tools. The WBCSD developed Global Water Tool is the most used tool, mentioned in nine cases. Other tools include the Aqueduct by the WRI, the Pfister Index, the Water Risk Filter and Aquastat.

Unless companies have answered the CDP questionnaire, there are no mentions of water-related opportunities within their annual and sustainability reports. Within the CDP Water disclosure responses, EDF reports on cost savings opportunities, and Kering mentions “*All the initiatives launched by the Group in terms of sustainability have positive impacts in terms of risk management and, as it is linked to products, could increase Brand value*” (CDP Water questionnaire on year 2013). Vinci goes a step further and has started designing new products related to water: “*We created an International Hydraulic*

**Table 3.** Analysis of Disclosure Frameworks and Past Disclosure Studies.

	CDP (Rating)	GRI	UN Disclosure Standards (2014)	Morikawa (2007)
Business risks and opportunities	Risks and opportunities in own operations and supply chains (physical, regulatory, and reputational)	n/a	Business risks, opportunities, context, and external impacts	Assess Water Landscape and Water Risks, Factor Water Risk into Relevant Business Decisions
Water metrics	Water metrics in own operations and supply chains (footprint, exposure to water stress, etc.)	Total water withdrawal by source; water sources significantly affected by withdrawal of water; percentage of total volume of water recycled and reused; total water discharge by quality and destination; identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting organization's discharges of water and runoff	Performance	Measure Current Water Use, Measure and Report Performance
Water management	Water management, (...) and improvement plans	n/a	Internal actions	Commit to Continuous Improvement
Water governance	Water governance	n/a	Policies, governance and targets, external engagements, compliance	Consult and Engage Stakeholders, Engage the Supply Chain, Establish a Water Policy and Set Corollary Goals and Targets, Form Strategic Partnerships

**Table 3.** (Continued)

	Morrison (2009)	ACCA (2010)	CERES (2010)	CERES Aqua Gauge (2011)
Business risks and opportunities	n/a	Materiality	Risk assessment. Companies were assessed on their self-reported exposure to water-related physical, reputational, regulatory, and litigation risks Opportunities	Identifies and quantifies water-related risks
Water metrics	Transparency, Quantified Water Quantity Data, Quantified Water Quality Data, Measure Supplier Water Performance	Benchmarking and guidelines, consumption	Water accounting. Data on corporate water performance – including metrics on direct water use and wastewater discharge volume and contaminant load, direct operations, and supply chain performance	Data gathering (water use and discharge) and disclosure
Water management	Specific Programs, Policies, or Targets for Water Performance	Implementation	n/a	Business planning
Water governance	Community Engagement, Public Policy, Collective Action, Supply Chain, and Watershed Management	Governance	Stakeholder engagement. Description of water-related policies and management systems	Governance, policies, & standards, engagement with stakeholders

**Table 4.** Analytical Framework Proposed for Water Reporting.

	Basic	Advanced
0		
<i>Water within corporate reporting</i>		
• Designated water section or chapter	x	
• Statement from CEO or senior management regarding water		x
1		
<i>Business risks &amp; opportunities</i>		
• Tools used for risk assessment	x	
• Materiality	x	
• Business risks	High level	Value chain specific or location specific
– The location of identified risks		x
– The types of risks they face		x
– The potential consequences of those risks for the business		x
– The timeframe in which the risks are anticipated to occur		x
• Business opportunities	High level	Value chain specific or location specific
– The location of identified opportunities		x
– The types of opportunities identified (cost saving/new market)		x
– The potential consequences of those opportunities for the business		x
– The timeframe in which the opportunities are anticipated to occur		x
2		
<i>Accounting Framework used/Assurance</i>		
• Accounting framework (ISO, Water footprint, other)	x	
• Assurance		x
3		
<i>Performance</i>		
• Targets	x	
• Global corporation performance		
– Water consumption	x	
– Water use	x	
– Wastewater discharge (GRI 4)	x	
– Wastewater discharge quality (GRI 4)	x	
– Water withdrawals by source type (GRI 4)	x	
– Water sources significantly affected by withdrawal of water (GRI 4)	x	
– Water recycling and reused (GRI 4)	x	

**Table 4.** (Continued)

	Basic	Advanced
• Analytical data for global performance		
– Breakdown by life cycle stage		x
– Use over time		x
– Gray, green, and blue water analysis		x
– Absolute/efficiency		x
• Facility-related performance		x
– Water consumption		x
– Water use		x
– Wastewater discharge		x
– Wastewater discharge quality		x
– Water withdrawals by source type		x
– Water sources significantly affected by withdrawal of water		x
– Water recycling and reused		x
• Product-related performance		
– Water intensity		x
– Water footprint		x
• Catchment-related performance		x
• Supplier performance		x
– Collection of water-related data from suppliers		x
– Assess prospective or current suppliers on water performance	x	
– Measure supplier water performance		x
– Reduction targets for supply chain water use or wastewater discharge		x
4 <i>Governance</i>		
• Management structure (including link with bonuses)		x
• Stakeholder engagement	Participation in global initiatives	Consumer/public engagement and awareness building, place-based collective action, policy advocacy
• Supplier engagement (collaboration/training)		x
• Employee education		x

**Table 4.** (Continued)

	Basic	Advanced
5 <i>Strategy &amp; Implementation</i>		
• Water strategy	Operational improvements (such as product design innovations)	Value chain prioritization, engagement, and improvements
• Water-related management systems, policies, and standards	x	
• Water offset		x
• Form strategic partnerships		x
• Linkage between sustainability issues (climate change, health, food, biodiversity)		x

*Engineering Activity Pivot Club that identifies expertise and designs new, specific offerings”* (CDP Water questionnaire on year 2013).

#### *Accounting Framework*

A few companies have invested into water footprinting. Accor, through their 2011 life cycle assessment (LCA) of their entire company, found out that the agricultural upstream was responsible for 86% of their water footprint. Air Liquide is also channeling water accounting through the LCA methodology, but for their products. Danone is using the infrastructure developed for carbon accounting to extend it for water accounting purposes, including the SAP ERP system. The milk division of Danone also tested a specific agricultural water footprint tool developed with Quantis. EDF pledged to account for their water footprint in 2015 after having measured in 2012 the water LCA of 1kWh of electricity. L’Oréal has designed a specific product water footprint based on understanding better their impact on water quality. Finally, Vinci uses life cycle assessment to understand the water footprint of one neighborhood.

Data is usually verified through the verification of sustainability reporting; however, assurance is often partial such as for Saint-Gobain, which reports eight key performance indicators, but only two are verified, or inexistent, such as for Valéo, for which no indicator is verified.

#### *Performance-Related Reporting*

Many companies have now issued targets, although they are very varied in timeframe, scale, and indicator targeted. Sanofi targets water withdrawal: “–25% in absolute water withdrawal in 2020 compared to 2010,” LVMH has

product intensity targets “*decrease by 10% the amount of water used on the spirit production in litres per bottle for Cognac.*” Valéo mentions a target on production water consumption “*reduction of 10% of the global water consumption of our production and logistic sites.*”

Basic information on performance, even when part of the five GRI KPIs, is not always available. Water consumption is the most reported KPI, with a score of 77.5%. Water discharge is then only reported by 30% of companies. Water withdrawals by source are only reported by 25% of companies.

Advanced information is scarcely available. Facility level reporting is only available in response to the CDP water disclosure questionnaires (for all except Saint-Gobain, Vinci, and Valéo, which do not provide it at all). Product performance data is available for ArcelorMittal, Danone, Renault, GDF Suez, L’Oréal, and Pernod-Ricard. Catchment-related performance is not available; however, Danone report on a scientific tool (Hydre), developed to follow and forecast the evolution of the quantity and quality of water over the entire water catchment. This tool was deployed in 2012.

### *Governance*

The Airbus Group report on awareness campaigns targeting employees on all European sites. Within the strategic partnerships reported, most related to water accounting development, such as Danone with ISO or L’Oréal with Quantis. Stakeholder engagement is addressed by Danone, ArcelorMittal, Axa, Lafarge, Sanofi, and Veolia Water, which developed a tool named “the true cost of water” for municipalities to evaluate the global cost of water including management costs and risk-related potential costs. Interestingly, only L’Oréal mentions its engagement within the French environmental footprint labeling scheme (which includes a water footprint calculation and label) and its engagement within the Product Environmental Footprint scheme at European level.

### *Strategy and Implementation*

The first set of strategic actions narrated is the investments companies have made to improve water performance. For example, Air Liquide has worked on a system of collection and treatment of wastewater in Sao Paulo, in partnership with 10 other local chemical companies, to use this water in industrial processes and thus fully replace water supplied from rivers. ArcelorMittal invested US \$8 million to upgrade the existing coke wastewater treatment plant on their Krakow site. The second set of strategic actions relate to changes in production processes; for example, Kering launched a new tanning process that avoids the

use of metals typically used and reduced by approximately 30% the consumption of water. Finally, Société Générale and Vinci are using information systems to help detect water leaks within their installations. Water policies have also emerged, such as for Saint-Gobain in 2011, or the Charte 21 for Accor hotels, although as for many items of our framework, only 15% of companies report on having a specific water policy.

## DISCUSSION

If climate change is the shark, then water is its teeth and it is an issue on which businesses need far greater levels of awareness and understanding. (Paul Dickinson, *Irbaris*, 2009)

### *Water Risk Assessment, Reporting and Accounting: Now What?*

Is water accounting needed to develop business water stewardship? Yes, according to *WWF* (2013). In many cases, businesses argue that “what is (not) measured, is (not) managed.” By saying that, they are asking for strong water accounting standard, in a field that unfortunately for the moment is still scattered and embryonic. Others will argue not to wait for numbers to act. However, in a generally imperfect world of environmental accounting, we would argue that managers often find within numbers and accounting a comfort zone for setting the performance targets they want to achieve. *SABMiller* (*SABMiller & WWF*, 2009) argued that doing their water footprinting exercise lead them to realize where water was used in the value chain, provided them with critical information on water risk and equipped their senior managers with knowledge to tackle broader issues of water management. Moreover, organizations are responsible to enable stakeholders to understand how they discharge their water responsibility, and therefore this includes accounting to monitor and evaluate achievements (*Lewis & Russell*, 2011).

Since the year 2000, numerous national and international tools for risk assessment, accounting and reporting on water have emerged. US-based think tanks such as the GEMI and the WRI, the WBCSD, the NGO WWF have all been very active in developing the different risk assessment tools. A second group of standard setters including the ISO, which has a very rich and consistent set of environmental accounting standards, the WFN, which is developing a very strong international position on water accounting and the Australian Water Accounting Standards Board have developed three corporate water accounting methodologies. The WASB is disbanded, but will the developed standards and the proximity with financial accounting serve its international diffusion? The WFN seems to have the most legitimacy with its strong 130 organizations network, including backup from multinationals such as Nestlé,

Unilever, or Coca-Cola. However, will the ISO Standard released in 2014 impose itself because of the standard-setter legitimacy or the legitimacy of its scientific basis, the LCA?

Within the water-reporting field, corporations predominantly use the set of performance indicators from GRI 4 complemented with their 2003 water protocol. The CEO Water Mandate has released in 2014 new Corporate Water Disclosure Guidelines that might become the new standard for water reporting in a near future. Its adoption by the CDP water disclosure questionnaire would be a strong support to its worldwide diffusion (Fig. 2).

Chalmers et al. (2012) argue that it is unlikely that one coherent and unique water accounting system will emerge. One of the reasons they give is the support to and the utility of different systems within specific locales. Chalmers et al. (2012) raise a relevant set of questions on the future of water accounting: “is there a case for international water accounting standards governing external water accounting?” and “what institutional framework would be appropriate?” The world of environmental accounting has seen numerous organizations engage in standard setting, including the GHG Protocol, the GRI, the IIRC, the SASB, and the ISO (LCA, MFCA, etc.), with scarce dialogue between the initiatives. Will the recently started Corporate Reporting Dialogue Initiative (2014) lead to that “international environmental accounting standards board” Chalmers et al. are arguing for in the case of water? Hepworth (2012) argues for better tools rather than more. He argues for tools that “both maintain their applicability in the complex settings of developing countries, and can support evaluation of water stewardship performance” (Hepworth, 2012).

### *Accounting and Reporting for Water in the French Business Arena*

Despite close links between climate change and water challenges, our analysis shows that French multinationals are very immature in their accounting and reporting of water-related performance. The European Water Stewardship Standard, with its 49 indicators, is too advanced for the current status of reporting.

A few tentative explanations can be given to this status in water reporting. Internally, companies have increasingly been feeling the “reporting fatigue” with the accumulation of voluntary – but obligatory in practice – ratings such as DJSI, or in France, Vigeo, and questionnaires such as the CDP climate change, which has evolved into not one, but three questionnaires now. Few companies have agreed to respond to all three (climate change, water, and forest). They are increasingly solicited by NGOs on particular topics linked to their raw materials or to their particular sector (e.g., when Oxfam issued a rating of the food industry). With small environmental teams and manual systems, even multinationals are not always equipped to respond to the increasing pressure to constantly report more and better. Second, there is a competency issue

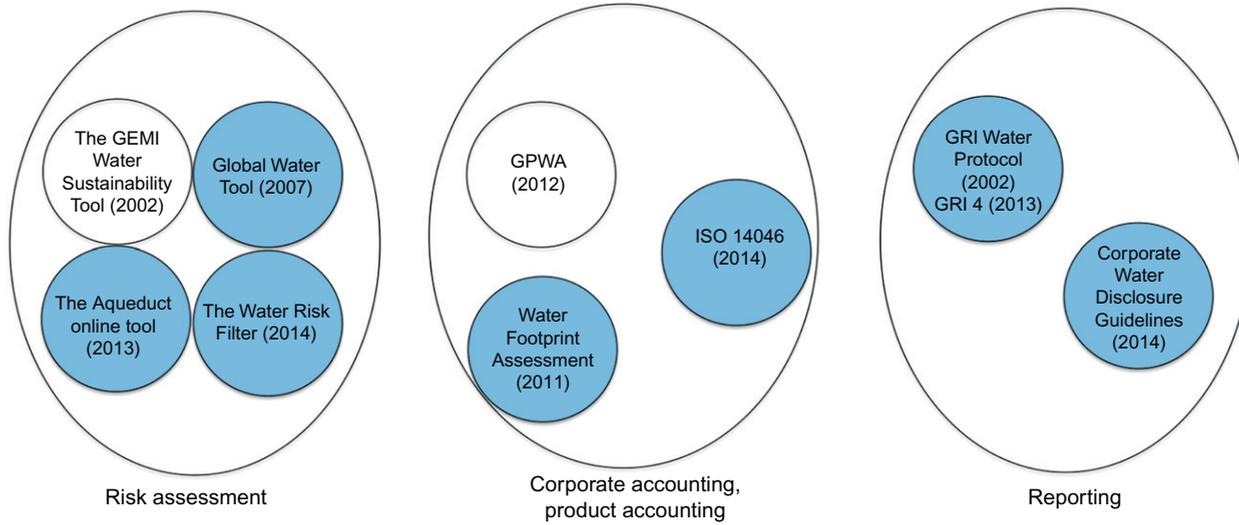


Fig. 2. The Current International Water Accounting Field (in Gray, the Tools Used in the CAC 40 Companies).

related to dealing with complex and nested sustainability topics. Managers have not been trained in their basic education on sustainability topics and the organizational learning process is long and steep.

Externally, we can propose two explanations linked to the international water field. First, there is no dominating water accounting standard. No actor is yet strong enough to support the development of corporate water accounting, even if the WFN has been willing to take the spot the GHG Protocol holds in the GHG accounting arena. Companies are in a situation where they still don't know, whether they should invest into one standard or the other. Second, despite the risks posed by water scarcity and the tight links between water, biodiversity, and climate change risks, water global governance is fragmented and private. Contrary to climate change and biodiversity, whose governance are both driven by United Nations Conventions (the Framework Convention on Climate Change and the Convention on Biological Diversity), water does not have a globally established convention. It does not have a worldwide scientific body as the IPCC or IPBES. Indeed, since the 1977 Mar del Plata United Nations Conference on Water, there has been no more intergovernmental conferences devoted exclusively to water. Is the lack of scientific authority for water governance a key to the immature status of water reporting of CAC 40 companies? A "private" governance body governs the water topic globally. Established in 1996, it brings together 313 organizations from 53 different countries. Named the World Water Council and located in Marseille, France, it says it "has gained its credibility by connecting all key actors, from the field to high-level decision-makers" (World Water Council, 2014). But is it strong enough to defend the water topic within competing sustainability topics, such as the next sustainable development goals? As for the water accounting field, the global water governance landscape is scattered and without leadership, despite the UN Water "inter-agency coordination mechanism" formalized in 2003. Climate change benefits from scientific leadership (IPCC), global UN conventions, and a strong well-known voice (Al Gore). Biodiversity has followed the same path and is structured to lead public as well as private initiatives in a single direction. We believe if the water topic is to be dealt with at the top of public and private agenda, it needs a global public structure, and scientific leadership. Unfortunately, the CEO Water Mandate, the World Water Council and other actors have not given the impetus to water topics that they deserve. Even though water is a very local topic, there is an urgent need for public global leadership.

## CONCLUSION

The research objectives of this chapter were threefold. We first explored what is the current status of corporate water accounting tools and methodologies and mapped the current fragmented field of global water accounting. Second, we

developed a framework for assessing corporate water disclosures. The framework is separated in six categories based on the review of all currently available corporate risk assessment, accounting and reporting tools and methodologies related to water, as well as past disclosure studies. Third, we investigated what French CAC 40 companies account for and report in relations to the water challenge.

The analytical water disclosure framework was crafted on past studies and tailored to capture the majority of performance disclosure by company reporting. The framework should be continuously refined in the future based on continuous assessment of corporate water reporting in different geographical parts of the world as well as different industrial sectors. It can be used within the realm of sustainability accounting and reporting teaching. One interesting possible use would be to compare results obtained through using corporate reporting, the CDP water disclosure data, website data, and shadow accounts. Indeed, Depoers, Jeanjean, and Jérôme (2014) show that performance data are published in very different manners according to the channel used and the group of stakeholders targeted.

Whether the growing number of water accounting innovations is a boon or a bane to the development of future water leadership is still to be assessed. ACCA (2010) and the CDP are both calling for a common reporting standard for water disclosure. Chalmers et al. (2012) raise the question of the possibility to mimic the IASB for water accounting. Many questions remain on the possibility to achieve closer cooperation between the many environmental accounting standard-setters worldwide. The current multitude of methodologies and tools available might hinder the development of environmental accountability from multinationals.

Despite numerous risks including water shortages and poor water quality, which can cause production shortfalls, price volatility, higher energy costs, regulatory action, competition and social unrest (CDP, 2014), water-related disclosures of French CAC 40 companies are still in their infancy. Disclosure of performance is far from standardized, although the GRI key performance indicators have set a simple framework that the most advanced companies are following closely. This study shows however, an important shift toward taking water seriously. A group of future would-be water stewards is emerging with EDF, L'Oréal, Bouygues making considerable investments within water accounting, thereby joining Danone and ArcelorMittal in water leadership.

Although "water scarcity may be the most underappreciated global environmental challenge of our time" (Worldwatch Institute, 2015), it is true that, globally, only a few international corporations have publically taken leadership on water accounting. For example, SABMiller, a global brewery company, has identified water as an opportunity for global leadership. In 2014, they achieved their 25% water use reduction per liter of beer a year ahead of schedule. Nestlé also has a long-term commitment to water stewardship and participated in the WFN, to the elaboration of the ISO 14046 and to the publication of the CEO

Water Mandate Public Disclosure Guidelines (2014). Coca-Cola partnered with Ceres and Irbaris in 2012 to use the Ceres Aqua Gauge risk assessment tool to assess the strengths and weaknesses of its water stewardship strategy. They have set very ambitious targets of reducing their water footprint by 75% in 2020 compared to 2004 levels (CDP, 2014). Danone had until 2012, an incentive system for managers that integrates environmental and social criteria, including water objectives, into compensation (Ceres, 2010). It has also developed a water footprint methodology with Quantis, while participating in the ISO 14046 standard elaboration.

Although “annual accounts of companies constitute important corporate artefacts in their own right” (Crowther et al., 2006), the corporation may not be the right level of analysis for the water scarcity challenge (Hazelton, 2013). Consequently, Hazelton (2013) advocates for advanced consumer labeling and catchment level reporting to complement the actual corporate reporting on water. Moreover, organizations should engage with government and other stakeholders on public policy of water (ACCA, 2009), and not work in isolation or governmental regulation.

We acknowledge that water information presented in sustainability reports and in the responses to the water information requests from the CDP does not present a comprehensive and detailed picture of a company’s water-related practices. However, information on the water challenge represented in the reports we used in our study reflects on what a company finds material and critical for itself and for its stakeholders (Morikawa et al., 2007).

Further research into how water accounting innovations are crafted, standardized, and diffused will help understand what is made visible to organizations for water management and how decision makers are held to account (Russell & Lewis, 2014). Furthermore, studies into water disclosure in other geographical areas will develop our understanding of water accounting practices and which industrial sectors is leading to shape water accountability. Finally, there is a need to connect the analysis between the fragmented global water governance, the fragmented global water accounting field and water accounting practices development within corporations.

Finally, there has been increased request for more “engaged” research (Adams & Larrinaga, 2007) from social and environmental accounting researchers. As water accounting and reporting is an emerging area of practice, researchers can engage in intervention research (Jonsson & Lukka, 2007) in medium-sized companies. Non-participant observation is also an option as companies are “in process” of building capacity in water accounting, reporting, and stewardship. Stakeholder engagement and supply chain accounting are keys to achieving excellence in water stewardship. Researchers, by getting close access to this “accounting in-the-making” topic, will also learn how to make overall social and environmental accounting more relevant to sustainability issues.

## NOTE

1. Personal interest stems from childhood spent in a nitrate water-polluted area, as well as seeing the ocean coast contaminated by green algae.

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