



UNEP **Finance Initiative**  
Innovative financing for sustainability



# Chief Liquidity Series



**Water-related Materiality Briefings  
for Financial Institutions**

**Issue 3** • October 2012

# **Extractives Sector**

Geographies

**Australia**

**Brazil**

**Canada**

**China**

**South Africa**



## **Local guidance on a global issue**

A briefing series by the Water & Finance Work Stream of the  
United Nations Environment Programme Finance Initiative

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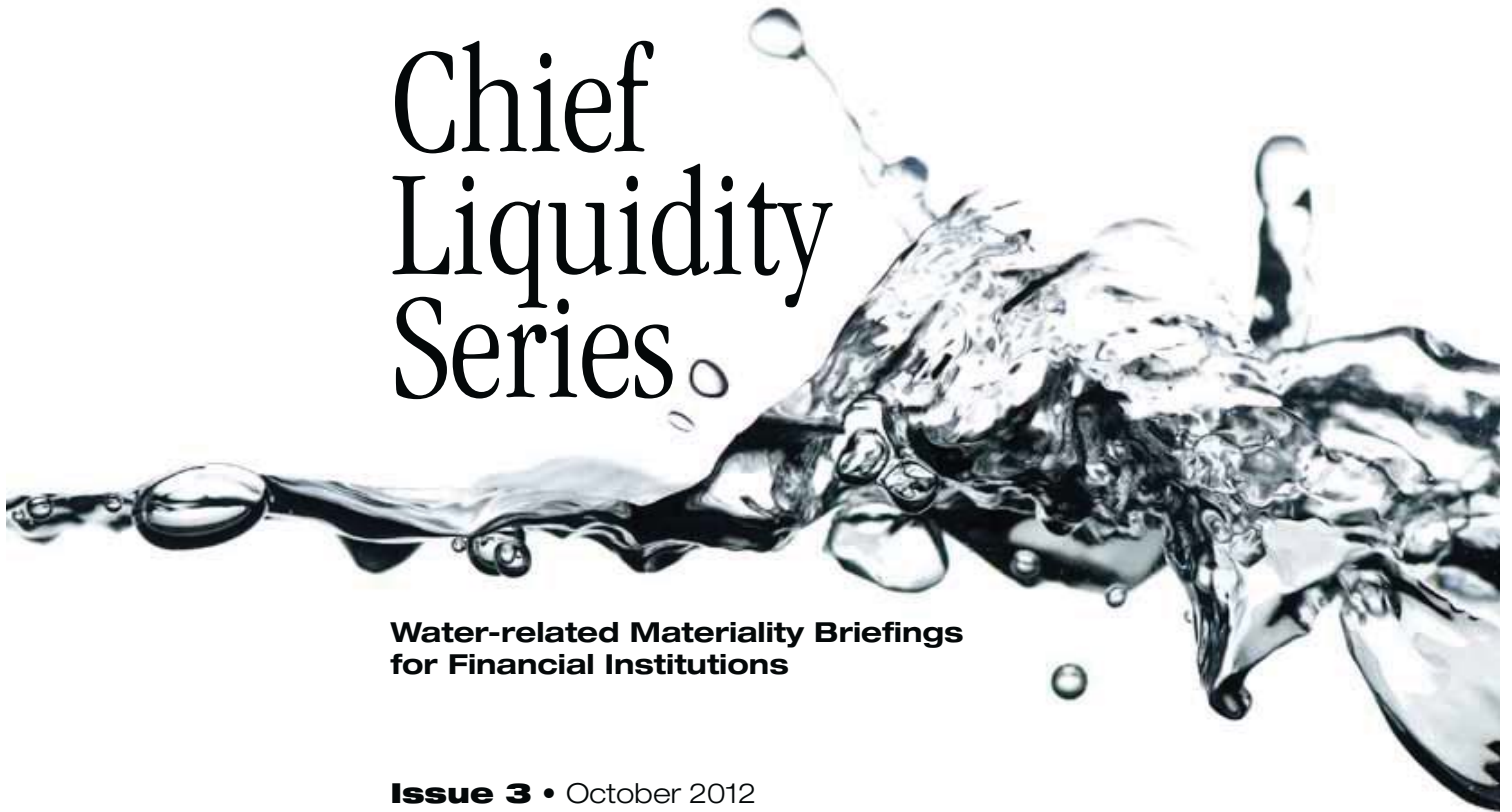
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Prepared for UNEP Finance Initiative by



**PEGASYS**  
Strategy and Development



**UNEP Finance Initiative**  
Innovative financing for sustainability

## Foreword from the United Nations Environment Programme Finance Initiative (UNEP FI)

Since the second issue of the Chief Liquidity Series for the Power Sector was finalized in August 2010, the world's water problems have further exacerbated. From droughts in the Yangtze River basin and floods in China, the record drought in the USA leading to higher soft commodity prices and floods and droughts in Australia, it becomes more and more apparent that the nexus between energy, food, water and climate change is increasingly becoming visual by the day.

This third issue of the Chief Liquidity Series focuses on extractive industries. Given that extractive industries are also depending on water for a range of operations, it is crucial for the sector itself and for financiers, investors and insurance firms that service these companies to understand how changing availability and quality of water can impact extractives, how these companies can mitigate these risks, and how financial institutions can assess, value and integrate such considerations in due diligence procedures, risk management, loan agreements and the selection and weighing of stocks.

Mining and oil and gas operations constitute the backbone of many countries around the world. It is therefore crucial to see how these industries can continue to deliver in a 21st century that is likely to be more water scarce because of population growth and growing demand for limited water resources.

UNEP FI encourages its members and the wider financial sector to read this publication and to use the information in dealing with their clients in extractive industries.

A handwritten signature in black ink, appearing to read 'Yuki Yasui'.

**Yuki Yasui**  
Officer-in-charge UNEP Finance Initiative



**UNEP Finance Initiative**  
Innovative financing for sustainability

## Foreword from the UNEP FI Water and Finance Work Stream (WFWS)

Unlike agriculture and the power sector where the link with water has been clear, the extractive industries have been divorced from water considerations in the past. In recent years the dependence of the extractive industry on water and the impact of previous short-sighted mining activities causing acid mine drainage and contamination of land have come to the fore.

The extractive industries have been regulated in many jurisdictions away from regulatory considerations around natural capital preservation and conservation. In actual fact the extractive industries have in the past stood in direct contradiction to the aims of natural capital preservation and conservation.

Mining in the 21st Century has similar to the agricultural and power generation sectors reconsidered its use of natural capital and put systems in place to efficiently use water. Regulatory developments as a result of NGO and public pressure have seen strict environmental requirements emerging from mining authorizations. Water use and waste management have emerged as the most important considerations in environmental impact assessments of proposed mining activities.

What this publication aims to do is to create awareness of the risks associated with financing extractive industries in a world where natural capital is a finite resource and demand is already exceeding supply. These risks include physical risks such as water scarcity and droughts, regulatory risk such as enforcement of water regulations and restrictions and reputational risk where the extractive industries impact on society's need for clean water.

Mining operations take a lifetime to complete in some cases and the financial support is spread over periods exceeding 20 years. With the current projections of the impact of climate change on temperature and water the variables have become uncertain. Financiers will have to look well into the future and pre-empt the physical, regulatory and reputational risk associated with financing extractive industries.

A handwritten signature in black ink, appearing to read 'Vicky Beukes'.

**Vicky Beukes**

Sustainability Manager, Nedbank  
Co-Chair of the UNEP FI WFWS

A handwritten signature in black ink, appearing to read 'Sasja Beslik'.

**Sasja Beslik**

Chief Executive Officer, Nordea Funds  
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# 1

## WATER RISKS FOR EXTRACTIVE INDUSTRIES AND FINANCIAL INSTITUTIONS

### Water risks for extractive industries and financial institutions

Water resources are under unprecedented strain. Whether the focus is on biodiversity, energy, agriculture or social needs, water lays at the heart of these defining challenges to a growing planet. Population and economic growth with improved living standards in many parts of the world will likely double the consumption of water in the next 20 years.<sup>1</sup> At the same time, more than one billion people on Earth already lack access to fresh drinking water.<sup>2</sup> It is estimated that by 2025 approximately 2.7 billion people will face severe water shortages if consumption continues at current rates.<sup>3</sup> Unsurprisingly, water is therefore deemed the most contested resource of the 21st century.<sup>4</sup> It is against this backdrop that water has become a crucial issue for businesses around the world, as it informs reputational, operational and regulatory risks.

One of the key challenges for decision-makers in policy and business will be to ‘de-couple’ their view of economic growth from water consumption and pollution. Achieving this goal will have benefits for the environment and society, as well as ensure long-term economic growth. In light of these factors, businesses and financial institutions that are able to ensure the ‘water sustainability’ of their operations and investments will have a competitive advantage.<sup>5</sup>

In 2007, UNEP FI’s Water and Finance Work Stream published the publication ‘Half Full or Half Empty’<sup>6</sup> providing a set of universal but indicative guidelines for water-related risks as well as opportunities for financial institutions. Over time it has become clear that financial institutions need a more sectoral and geographic view of how water risks and opportunities are material to their clients and therefore to their own loan portfolios, investments and other products.

The *Chief Liquidity Series* (CLS) seeks to equip financial institutions with a better understanding of water challenges around the world, how this impacts business performance and what financial institutions can do to be better informed and what tools to use to work with clients in addressing water-related issues so as to reduce risks linked to loans, investments and insurance contracts. This CLS series aims to guide banks, investors and other financial institutions on how to assess the operations of clients and investee companies with regard to water impacts and their exposure to water risks. Water pressures and their implications for business and finance generally manifest locally and will vary considerably by sector and geography.

This 3rd issue of the CLS series focuses on a number of sub-sectors within the broader extractive industry. Water is a crucial input in the production process of many aspects of this industry’s sub-sectors. Any delays, disruptions or shutdowns as a result of lack of water can have an immediate effect on business operations.<sup>7</sup> Water is also a resource in high demand with multiple shared users - making the behavior and performance of the mining sector important for social and reputational reasons. Given the fact that extractive industries are often the only primary industry operating in water-scarce areas, and in many cases extractives disrupt the natural landscape and its water provisioning capacity, sometimes permanently, this provides a strong case for focusing the 3rd issue on the broad extractives sector.



### How to use these briefings

This issue explores water challenges for extractive industries in the following countries and on the following sub-sectors:

Country	Sub-sector
Australia	Coal and seam gas
Brazil	Gold
Canada	Oil sands
China	Coal and base metals
South Africa	Coal and precious metals

The report is divided into two parts. The first addresses the conceptual framework of water risk focusing on specific risks to the extractive industries and how this relates to financial institutions. Departing from the other reports, this report focuses on the institutional landscape created by water risk. The second part discusses the different ways in which water risk can manifest in a particular region based on hydrological, environmental, social, political, and economic factors. The report concludes with a reflection on the integration of the two sections and suggests indicators for water risk in the extractive industries.

## PREVIOUS BRIEFS AND KEY LITERATURE

In the past decade, much analysis and literature has been dedicated to exploring and quantifying water risks for businesses.<sup>8</sup> This work has been heavily influenced by the concerns surrounding climate change, the global financial crisis, decreasing freshwater supplies and increasing public awareness around water. Both NGOs and financial institutions have written widely on the issue, seeking to provide advice to companies and investors on how these risks will manifest and be managed. Previous CLS reports on agribusiness and the power sector provide insight into water risk in those industries. With the addition of this report, the CLS series presents a clear picture of water risk across a number of key water intensive sectors for financial institutions' consideration.

### **Chief Liquidity Series - Issue 1: Agribusiness<sup>9</sup>**

The first report of the Chief Liquidity Series focused on agribusiness. The aim was to examine the water sustainability issues specific to agricultural operations to inform financial decision-makers, and in particular, credit institutions. Five different geographies, Australia, Brazil, India, South Africa and the Mediterranean Basin, were selected to demonstrate the ways in which water risk intersects with growth and sustainability of the agriculture sector and in light of climatic changes.

### **Chief Liquidity Series - Issue 2: Power Sector<sup>10</sup>**

The second report of the Chief Liquidity Series focused on the power sector. This report segmented its analysis into the same geographic regions as CLS 1 for consistency. It examined the complexities that arise in local situations around water and power generation and focused primarily on thermal power generation and provides a brief treatment of the difficulties associated with hydropower.

### **Mine the Gap - World Resources Institute<sup>11</sup>**

In September 2010, the World Resources Institute (WRI) released the report, 'Mine the Gap', which sought to provide an overview of the water risk that mining companies face. This overview is aimed at investors to understand the nature of the water risk for mining operations and the quality and quantity of water risk information released by mining companies. The report indicates that companies experience water risk through availability (the lack of water for operations) and quality by means of downstream impact on the basin. As mining requires a great deal of water (in particular for precious metals), WRI reports that mining companies have long been aware and attentive to water risk issues. WRI identifies regulatory, legal, and reputational risk as primary factors that arise from quality and quantity issues related to mining.

### **Towards Sustainable Mining - Citigroup<sup>12</sup>**

In 2006, Citigroup released a report which sought to evaluate sustainability practices of global mining companies. The report argues that sustainability practices will significantly impact the long term value generation capacity of mining companies as stakeholders begin requiring better company practices globally. The report identified and examined five pillars, which are commodity exposure, country exposure, mine development, HSE in operations, and sustainability governance, of sustainable development in the mining sector, detailing the factors which would determine long term financial success.

### Watching Water - JPMorgan<sup>13</sup>

In 2009 JPMorgan Global Equity Research released a report as a guide to investors on evaluating corporate risks in an increasingly water scarce world. The report reviews the conceptual framework of water risk and examines how these risks manifest in different industries including power generation, extractive industries, food and beverage, manufacturing, insurance, and leisure. The main lessons from the report are as follows:

- Exposure to water scarcity and pollution may be greater in the supply chain of companies as opposed to their own operations, depending on the industry.
- Power generation, extractive industries, and the food and beverage sector are particularly exposed to water-related risks.
- Corporate disclosure of water risks is inadequate and often misplaced in environmental sustainability reports rather than regulatory filings.

### Lloyd's 360 Insight Water Risk - Pegasys/WWF<sup>14</sup>

In early 2010, Pegasys in association with WWF published a report on water-related risks for investors as part of the Lloyd's 360 Insight series. The report identified a number of factors to consider when assessing corporate water risk, including:

- Water is extremely sensitive to local constraints and factors. Two neighboring water basins may face entirely different issues.
- Water is a finite, yet renewable resource. It is constrained not only physically but in many places legally through historical water rights agreements.
- It is variable in both long term and short term availability. Unlike other natural resources, it is challenging to determine future water availability based on changing hydrological cycles and climate variability and change.
- Water availability heavily influences food and energy markets. A drought in a region can drive up food prices, while scarcity in another can lead to reduced energy output.
- In many developing countries managing corporate water risk may be more proactive due to varying degrees of institutional capacity.

Additionally, a number of organizations have initiatives or publications which focus on different aspects of water risks for the business community. The table below provides an overview.

Organization	Initiative	Target Audience
UNEP FI	Half full Half Empty	Financial sector
WWF and DEG <sup>15</sup>	The Water Risk Filter	Private sector incl. finance
Water Resources Institute	Mine the Gap	Financial sector
International Council on Mining and Minerals <sup>16</sup>	Water Accounting Framework	Private sector
CERES <sup>17</sup>	The Ceres Aqua Gauge	Private sector incl. finance
Citigroup	Towards Sustainable Mining	Private sector, financial sector
JPMorgan	Watching Water	Private sector, financial sector
Lloyd's Bank	360 Insight Series – Global Water Scarcity	Financial sector
Minerals Council of Australia <sup>18</sup>	Strategic Water Management in the Minerals Sector	Private sector

Organization	Initiative	Target Audience
Carbon Disclosure Project <sup>19</sup>	Water questionnaire	Financial sector
World Business Council for Sustainable Development <sup>20</sup>	Global Water Tool	Private sector
UN Global Compact - CEO Water Mandate <sup>21</sup>	Water Disclosure and Policy Guidelines and “state of play” of emerging practice on corporate water accounting	Private sector
World Economic Forum <sup>22</sup>	Water Disclosure Methodology and Indicators of water management	Private sector
Pacific Institute <sup>23</sup>	Research on “state of play” and emerging practice on corporate water reporting	Private sector

## WATER RISKS IN EXTRACTIVE INDUSTRIES

The materiality of water for businesses will not ebb away, but is becoming more real by the year, especially for sectors that are water intensive or for which water is a crucial aspect in the production process. Although financial institutions are not in the business of managing water, it is paramount for risk managers, credit analysts, portfolio managers and loan officers to understand how water can be material to their corporate clients or companies they have invested in. For example Newmont's US \$ 5 billion Minas Conga project in Peru experienced significant delays as a result of concerns regarding the impacts of the mine on water availability. This not only resulted in costs associated with the delay, but also required an investment of approximately US \$150 million from the investment partner Minera Yanacocha.<sup>24</sup> Protests near Xstrata's Tintaya mine killed two and left dozens injured.<sup>25</sup>

Water-related risks depend on numerous factors, including hydrology, the strength of civil society, the role of the regulatory environment and enforcement capacity of governments to name a few. The use of water and its interaction with other stakeholders are as much of interest as the actual *consuming amount*. To accurately assess water-related risks to investments and loans, financial institutions need mechanisms to measure them. However, this task poses a number of challenges, since water often serves competing purposes, namely as a business input, an environmental requirement, and a social good.<sup>26</sup> All three domains are priced and valued differently; yet the multiple roles, users and benefits of water are central to any risk analysis. There is a number of potential cost drivers associated with water risks, including:

- Compensation payments
- Production suspension
- New or higher regulatory costs
- Higher resource costs
- Higher insurance premiums
- New capital expenditures
- License loss
- Diminished good will

The effects of water risk could cause any of the above depending on the nature of the risk and its severity. The ways in which water risks may become material to extractives, financiers and investors are provided as follows:

1. Conceptual framework to understand water risk
2. Water risks for extractive industries
3. Water risks in extractive industries sub-sectors
4. Water risks for investors in extractive industries
5. Responding to water risks in the extractive industries

### 3.1 Conceptual framework to understand water risk

Within the context of this briefing we have chosen a methodology to frame water risks for extractives using three main categories: (1) physical or operational risks, (2) regulatory risks, and (3) reputational risks<sup>27</sup>. In addition we also differentiate between basin and company specific risks (See Figure 1).

**Figure 1**  
Company and basin-related water risks

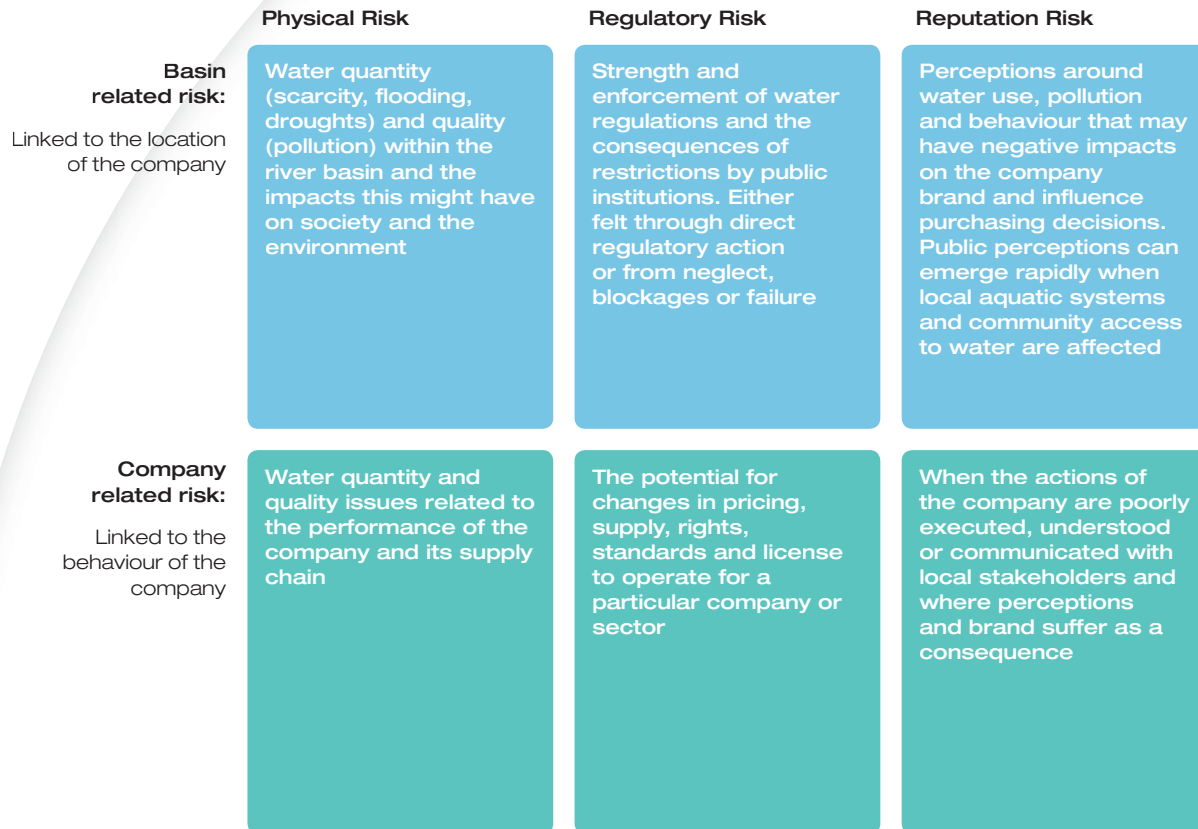
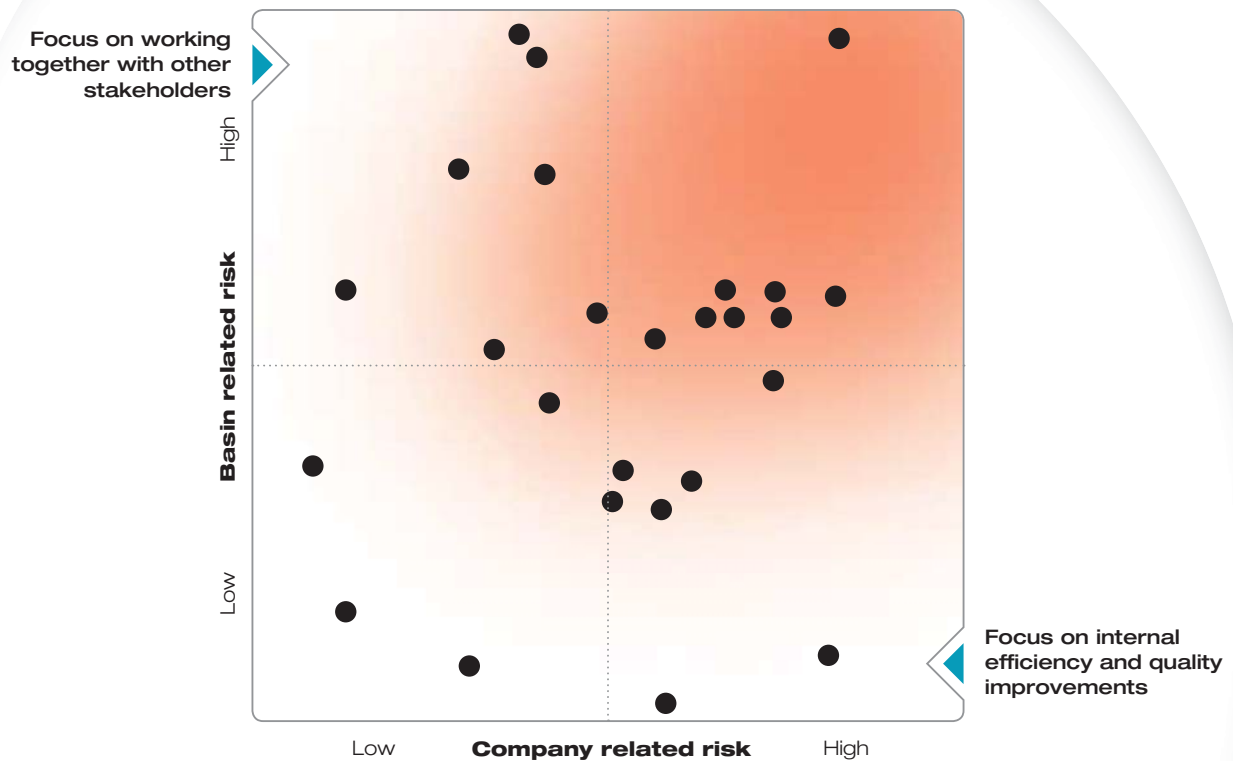


Figure 1 is based on the structure of The *Water Risk Filter*, developed by WWF and DEG in 2011.<sup>28</sup> This tool allows companies, investors and financiers to factor in different types of risks in a given location. This reflects risks incurred through company actions as well as –other stakeholder activities.

By splitting the basin and company related risks, this risk framework results not in a single risk level per investment, but rather a high level strategic guidance for the investor (Figure 2). The investor is given a clear understanding of the types of issues that the company might face and any subsequent responses. Depending on the position as a minor, major or sole investor, the financial institution might request that its client take actions that help reduce risk and create a more attractive investment.

**Figure 2**

Conceptual framework of the Water Risk Filter



The focus of many companies is to assess and mitigate risks directly influenced by the company itself, which is reflected in the horizontal axis of the framework.<sup>29</sup> When company-related risks are high, the chief focus will be on water efficiency and quality improvements. This approach however may be insufficient to drive down risk as reflected in the importance given in the *Water Risk Filter* to risks driven by external factors. In order to reach a level of sustainable water resource management, a company (or any stakeholder for that matter) will require that not only their own house to be in order, but that they are engaged in the external environment where risks are present. In this case, the focus lies in improving and supporting better basin cooperation and dialogue, to engage stakeholders and improve the general state of how the river basin is governed. Almost always, a combination of internal and external action will be required to manage risks. For investors and banks, the main task is to understand where the pressures and risks emanate to ensure that the company is responding in the most constructive - and most risk effective way.

**Box I:**  
**Local opposition to mining developments can stem from water concerns**

In 2002, after several years of community opposition to a proposed gold mine by the Canadian firm Manhattan Minerals in the agricultural region of Tambogrande, Peru, 94 percent of the population voted against permitting the mine. Opposition to the project was based primarily on the mine's expected impact on water resources central to the local economy. Peru's Ministry of Mining upheld the referendum and stopped the project, preventing the company from developing an ore body with a projected value of \$1.33 billion. Similarly, Nevada-based Meridian Gold had to halt development of an open-pit gold mine upstream from the tourist town of Esquel, Argentina in 2006, when less than 20 percent of the town supported the project in a referendum. In response, the government passed a law imposing a three-year moratorium on mining activity in the region.

Source: Barton, B., 2010. *Murky Waters - Corporate Reporting on Water Risk*. Ceres: Boston



In regions where water is becoming scarce, regulation is likely to make it more onerous for access to mining operations and the public will become more aware and apprehensive about a business's relationship to water.<sup>30</sup> This is particularly true where local communities do not have access to sufficient amounts of freshwater to fulfill their basic needs, or where the values they apportion to water are being eroded by poor water quality. Government's management mandate in these instances is to ensure that water is being managed in the 'public interest'. These interlinking questions should be a concern to financial institutions. An operation that is actually or allegedly polluting a water source may receive high penalties from a local regulator in addition to compensation payments to communities.<sup>31</sup> The resulting reputational damage may influence valuation of the company's equities. Operations may continue, but will do so at a much higher cost affecting long term profitability and capacity for financial returns. From the perspective of financial institutions, key questions that arise in examining these risks include:

- Is there sufficient water available to sustain a client's operations?
- Are there any potential water-related issues and risks that are important to understand in this river basin?
- What is the institutional capacity and regulatory regime in the country area of operations?
- Does the client / company have a track record of good performance and engagement?
- Is the client adhering to the highest environmental standards of use and discharge?
- Does the client have the capacity and is it applying to accurately forecast the relevant water dynamics and manage use when projects are operational?
- Does the client / company have policies and management systems in place to manage any water related risks?
- Does the client or company disclose its risk exposure to water through annual reports, SEC filings (in the case a client/company is based in the US) or sustainability report?

The above points reflect a balance of dependency, impact and behavior considerations. All will need to be considered in any assessment of a client, with the recognition that the local situation will determine which of these are more material than the other.

The complexity of water risks makes it difficult for financial institutions to hardwire it deep into credit risk analysis and investment decision making.<sup>32</sup> Still, there is scope to believe that companies that demonstrate proactive management of water risk and engagement with other stakeholders could be regarded as attributing a lower risk which could hence be reflected in terms of loan or investment contract. This view is consistent with positions from a number of investors who state that while water footprints and risk assessments are useful and informative, they are more concerned with how a company is reacting to these footprints and risks.<sup>33</sup> It is critical that investors understand water challenges differently from other environmental issues such as carbon. The management of water risk requires a more nuanced approach such that the willingness and ability of companies to engage external and internal risk factors is seen as the most useful indicator to evaluate instead of the absolute amount of water use.

### **3.2 Water impacts and dependencies by extractive industries can turn into risks**

Extractive industries experience water risk differently from many other industries. Mining operations cannot be relocated, making the sector particularly susceptible to changing local water availability and pressure from local communities to reduce water use and water quality impacts. Since they often do not have the luxury to site and mine in areas of low water risk exposure, this means that extraction, treatment, and sometimes processing is done in areas under high levels of water constraint. Since the location is fixed, these operations receive water from an individual catchment or transfer scheme thus create significant opportunities for risk to emerge.<sup>34</sup> The oil and gas sector faces a variety of water-related risks. Leaks, spills, and the disposal of produce water pose contamination risks, while extraction, upgrading, and refining can require large quantities of water, thus exposing companies to water supply risks.

With spatially bound operations, examples of re-directed rivers and special water supply channels for mines in water scarce areas have shown that water is very expensive to move.<sup>35</sup> The extractive industry is a large contributor to local economies through direct job creation, wealth creation, and positive economic externalities for other local industries.<sup>36</sup> Yet despite the positive economic benefits the extractive industry creates, operations have often come at high environmental and social costs.<sup>37</sup> Using the framework presented above, the typical risks related to the extractive industries are described in **Table 1**.

**Table 1:**  
**Framework for Water Risks in the Extractive Industries**

Dimensions of Water Risk in Extractive Industries			
	Physical Risks	Regulatory Risks	Reputational Risks
<b>Basin specific risk</b>	<ul style="list-style-type: none"> <li>• Availability of freshwater limited as a result of other user requirements such as demographics, shifting economic activities or environment policy</li> <li>• Other basin users might pollute water resource</li> <li>• Climate change might alter hydrology of basin and user needs</li> </ul>	<ul style="list-style-type: none"> <li>• Institutional weakness or failure can affect quantity or quality</li> <li>• International basins at risk if other riparian state(s) have poor regulations</li> <li>• Local companies favored over multi-nationals for licensing and fees</li> <li>• Demographic and environment policies which affect supply</li> </ul>	<ul style="list-style-type: none"> <li>• Poor performance and diligence on social and environmental concerns may lead to justified outrage</li> <li>• Large (mining) companies are also easy scapegoats for basin wide water risk issues around quality and quantity even if they are not the primary contributing party</li> <li>• End users may chose not to purchase product from a particular basin if there is high risk</li> </ul>
<b>Company specific risk</b>	<ul style="list-style-type: none"> <li>• High reliance on freshwater with high water quality impacts</li> <li>• Mines geographically fixed so continual adverse conditions cannot be solved by relocating</li> <li>• Disruptions of operations due to extreme weather events</li> <li>• Constant assurance of supply requires external and higher risk engagements</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing competition with other users might lead to water rights curtailment or revocation</li> <li>• Increasing cost for rights, storage, waste treatment, and discharge</li> <li>• Government may reject licenses based on stakeholder concern</li> <li>• Inconsistent and unstable regulatory regime</li> </ul>	<ul style="list-style-type: none"> <li>• Concerns of stakeholders around quality and quantity from company operations can cause distribution to operations or increase cost of doing business</li> <li>• Depletion of resource may create negative perceptions elsewhere in the basin</li> <li>• Higher profile within the basin creates easy targeting</li> </ul>

Water plays a vital role in the mining extraction process and most large scale mines require water to perform a variety of functions, including cooling and lubricating heavy drilling equipment, transporting and processing ore, managing waste tailings, and suppressing dust. Impacts are experienced through soil erosion, sinkhole formation, high biodiversity loss and the contamination of soils.<sup>38</sup> This high use of water can strain freshwater resources for other uses such as agricultural, other industry, and urban supply as well as ecosystems.<sup>39</sup>

Ore mining and processing both have the ability to contaminate surface and groundwater. Many mining operations extract ore from below the water table, requiring them to manage flows in mines by extensive groundwater pumping, which can affect local hydrology and ecosystems.<sup>40</sup> Acid runoff and decant affects water quality directly by reducing pH levels and increasing concentrations of toxic metals or heavy metals like copper, lead and mercury. In addition, spills of coal sludge or cyanide can severely affect freshwater resources.<sup>41</sup> Closed mines can also pose significant long-term environmental liabilities, as they must be pumped and treated for a very long time to prevent contamination of shared surface and ground water.<sup>42</sup> Contamination of water may occur as follows:

- Waste rock that is determined unfit for mining may contain heavy metals compounds which, if left exposed creates, drainage problems.
- Abandoned mines may create water quality problems as acid drainage may continue long after mine closure in particular if appropriate environmental closure processes were not followed.
- Open pit walls may cause drainage problems if not properly managed through the mining process.
- Tailings impoundments are large areas that contain the remaining material after the mining process and can cause pollution through leaching if not properly managed. Extreme weather events may also disrupt impoundments releasing toxins into the air and local watersheds.<sup>43</sup>
- Dewatering process leads to often unaccounted for changes in hydrology and water supply in what are often operating environments where agrarian livelihoods are prominent.

The concerns are well known in the environmental community and often legislated in highly regulated developed countries. However there are often significant challenges for water quality in countries with weaker legislation, or inadequate enforcement of legislation. Even under high regulation, water quality problems may not be identified or predicted fully in environmental impact assessments and cumulative impacts may be missed. If not properly accounted for, these can result in social and political backlash with substantial financial consequences.<sup>44</sup>

Beyond pollution, water scarcity is a main concern for many mining companies. Water scarcity is often the result of a combination of physical (naturally dry conditions) and governance factors (poor regulation and management). The lack of sufficient amounts of freshwater needed for operations has been the main cause for the closure of a number of large mines, for example in Chile and South Africa.<sup>45</sup> The balance between the dependence on the resource and the impacts of the resource use are dependent on the local situation.

### 3.3 Water risks in mining for precious metals, coal, base metals and oil-sands

The impact of the extractive activities on water varies between the different subsectors. The sub-sector focus provides an opportunity to draw out a more detailed perspective for selected regions and explore various solutions (**Table 2**). The subsectors selected for this report are as follows:

- **Coal:** one of the largest mining subsectors, which has particular quality and quantity impacts on water as well as a high dependency.
- **Base metals (copper and iron ore):** also one of the largest mining subsectors which occurs in different regions around the globe with varying impacts on water resources
- **Precious metals:** less water intensive than other subsectors but high value specialty metals such as chrome and platinum also have implications for beneficiation.
- **Oil sands:** rapidly growing subsector currently characterized by water intensive extraction process and water quality impacts that are not clearly understood, as well as other environmental impacts such as carbon emissions and landscape modification.

**Table 2****Water Risks in the Extractive Industries Subsectors<sup>46</sup>**

	Mining methods	Water use	Water risks		
			Physical / Operational	Regulatory	Reputation
<b>Coal</b>	<ul style="list-style-type: none"> <li>• Open pit mining</li> <li>• Underground mining</li> </ul>	<ul style="list-style-type: none"> <li>• Dewatering for operations and water used for dust suppression, washing, and slurry transport. Volumes vary by coal type and region</li> </ul>	<ul style="list-style-type: none"> <li>• Acid mine drainage</li> <li>• Acid rain</li> <li>• Large water usage in scarce areas</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy regulation and financial consequences for clean up</li> <li>• Impairment of future licenses</li> </ul>	<ul style="list-style-type: none"> <li>• Social action from affected communities</li> </ul>
<b>Oil sands</b>	<ul style="list-style-type: none"> <li>• Surface mining of relatively shallow deposits (less than 250ft)</li> <li>• In-situ production for exploitation of deeper deposits</li> </ul>	<ul style="list-style-type: none"> <li>• Used primarily during extraction phase separating bitumen from sands. On average, 12 to 14 barrels of water are required to produce one barrel of oil. 80 -95% of water is recycled so approximately 2.5 barrels of fresh "new water" is used<sup>47</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Over extraction during low flows</li> <li>• Water quality impacts not clearly understood</li> <li>• Access to fresh water</li> <li>• Tailings embankment failures</li> </ul>	<ul style="list-style-type: none"> <li>• Regulations for water taking based partially on first-in-time basis</li> <li>• Water regulation for this type of mining is immature, but this might change</li> </ul>	<ul style="list-style-type: none"> <li>• International and domestic pressure from perceptions of water pollution</li> <li>• Local pressure from competing users of water</li> </ul>
<b>Base metals</b>	<ul style="list-style-type: none"> <li>• Underground mining</li> <li>• Open pit mining</li> </ul>	<ul style="list-style-type: none"> <li>• Dewatering for operations and water used for dust suppression, processing to increase quality of ore, and transport via slurry pipelines</li> </ul>	<ul style="list-style-type: none"> <li>• Acid mine drainage</li> <li>• Dissolved heavy metals</li> <li>• Surface runoff problems through erosion and carryover of tailings and mining residues.</li> <li>• Large water withdrawal in scarce areas</li> <li>• Submarine and riverine tailings disposal</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy regulation and financial consequences related to pollution and for clean up after closure</li> </ul>	<ul style="list-style-type: none"> <li>• Significant social unrest due to large water consumption and pollution</li> </ul>
<b>Precious metals</b>	<ul style="list-style-type: none"> <li>• Underground mining</li> <li>• Open pit mining</li> <li>• Typically smaller mines than base metals and coal mines</li> </ul>	<ul style="list-style-type: none"> <li>• Dewatering for operations and water used for hot and cold water pressure washing</li> <li>• Separation medium</li> </ul>	<ul style="list-style-type: none"> <li>• Very high tailing to ore ratio</li> <li>• Gold/Silver cyanide/mercury pollution</li> <li>• Acid mine drainage</li> <li>• Tailings embankment failures</li> <li>• Large water withdrawal in scarce areas</li> <li>• Submarine and riverine tailings disposal</li> </ul>	<ul style="list-style-type: none"> <li>• Often in regions with limited regulation or enforcement</li> <li>• Closure and remediation considerations related to acid mine drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Under special attention of human rights watchers</li> <li>• Proximity to indigenous peoples and communities with agrarian livelihoods creates special concerns</li> </ul>

Regulatory risks for oil and gas, metals and minerals change by region and between mineral types. Regulations for coal, base metals and precious metals have been established over the past 50 years. For the most part there is a clear understanding of the environmental risks from these mineral processes as many take years to materialize and are then validated through research. Therefore regulatory regimes are relatively stable or at a minimum predictable regarding costs and penalties.<sup>48</sup>

This global regulatory history is unavailable in the context of oil sands and other new oil and gas extraction technologies such as hydraulic fracturing (fracking). Even regulatory regimes in the institutionally strong countries such as Canada have not come to terms with the environmental and social impact and costs of these operations.<sup>49</sup> However over time, as environmental and social impacts become apparent and are scientifically validated, the regulatory regime will adjust according to social, political, and economic pressures. **Table 3** provides a snapshot of recent legislation passed in countries to ban or limit hydraulic fracturing.

**Table 3:**

**Examples of countries that have banned or placed moratoria on hydraulic fracturing**

Country	Legislation on hydraulic fracturing
France	The French government banned hydraulic fracturing in 2011, largely due to concerns about its impacts on water quality. The law not only blocks future development but also revokes existing permits, effectively stranding significant investments by a number of companies. This includes Europe's third largest oil company Total SA, whose Montelimar permit was canceled. <sup>50</sup>
USA	Hydraulic fracturing is banned in Vermont and North Carolina and under moratoria in New Jersey, Maryland, and New York (although there may be regional allowances). <sup>51</sup>
South Africa	International bans and moratoria are in place in South Africa, the Canadian province of Quebec and Bulgaria. <sup>51</sup>
Canada	
Bulgaria	

The assumptions about profitability for the sector might then change and financial institutions should be prepared to address these trends by remaining abreast of the changing regulatory thinking and structure.

Beyond new technologies, regulatory regimes will have to adjust to the impacts of climate change, which are predicted to impact availability of freshwater resources and the concentration of hazardous materials.<sup>52</sup> These effects of climate change will likewise affect the profitability of extractive industry projects and therefore should also be closely monitored.

### 3.4 Water risks for banks and investors in relation to extractive industries

Many financial institutions are carefully scrutinizing new mineral investments in water scarce areas in South Africa and Australia. Water risk has the potential to stall future investments in extractive industries, yet financial institutions often struggle to ask information on all relevant aspects of water risk, and to translate the raw data into risk levels.<sup>53</sup>

As a result of increasing water constraints in a number of countries and regions around the globe, financial institutions have started to actively demand disclosure of the use of water and its management from both listed and non-listed companies.<sup>54</sup> Ceres, a US investor network, assessed corporate disclosures of water-related risks in SEC Filings. The US Securities and Exchange Commission (SEC) has required companies to disclose financially material risks from climate change to their investors. These risks include “significant physical effects of climate change, such as effects on the severity of weather (for example, floods or hurricanes), sea levels, the arability of farmland, and water availability and quality. All 12 mining companies (100%)

researched disclosed to the SEC about physical and regulatory water-related risks they face, followed by litigation (67%) and reputation (42%).<sup>55</sup> Generally, corporate disclosure of water risk information to external audiences such as investors is inconsistent and incomplete. This is largely due to the complexity of the water topic and the local nature of risk and response.<sup>56</sup> This is also a fast area of debate and action of new and improving initiatives such as the CDP Water Initiative and the CEO Water Mandate.<sup>57</sup>

Based on six interviews with UNEP FI members, most acknowledge that their current water risk assessments are not sufficient and need improvement, and that they are looking for innovations on this in the market.<sup>58</sup> In discussions with financial institutions, varying perspectives on water risks in relation to clients in extractive industries emerged.

- (1) **Asset management.** At present, very few FIs seek to monitor and mitigate water risk across their equity and bond portfolios in a systematic way and on a regular basis. Water risks only become material in the case that one investment continually experiences water-related disruptions. The important focus is to broadly understand risk factors, response strategies, and proactive corporate action such that investments may be more effectively managed. In the case of green funds, reputational risk is also regarded as being a very important risk factor.
- (2) **Corporate finance.** In this broad asset class reputational and market oriented risks are regarded as important factors. Corporate finance will have the most impact by ensuring that progressive water management policies are developed and adopted by a company.
- (3) **Project finance.** FIs indicated that they undertake detailed analysis of the basin and its risk factors for projects that have an impact on water resources. The important focus is to understand the inherent risks of a project and the individual sets of response strategies that should occur to mitigate risks.

Interviews were carried out with IDC, Nedbank, Robeco, Citi, Royal Bank of Canada, and Calvert. The following answers illustrate some key insights and differences between the respondents. See Appendix I for full list of questions used as a framework for the interviews.

### **What is the importance of water risks in due diligence and portfolio phases?**

- Most FIs that were interviewed are aware of water challenges and risks, yet often have difficulties to properly assess water risks due to the complexity of water issues. For others, water was not an issue on the top of their minds. There is overall a growing awareness that water risks can pose significant threats to the economic viability of investments. Some are actively supporting the development of tools which will enable them to assess and quantify water risks.
- Most banks consider high-level water aspects (water withdrawals and discharge water quality) in their environmental and social risk analysis. Most investors do not weigh water factors in their valuations. Robeco – a Dutch asset manager part of Rabobank Group – is an exception (see Box II).
- Some FIs perform regular (annual) assessments of the environmental and social risks within their investment portfolio, in which water aspects are taken into account.

### **Are water aspects embedded in investment policies?**

- None of the interviewed FIs had water specific investment policies. Most incorporated water aspects in their environmental and social policies. A few have incorporated water aspects in specific mining investment policies and any prospect investment must be compliant to these policies. However the level of concreteness seems to vary significantly. Most would welcome the development of standard water-related elements that they can include in their policies.

### **What is the influence of water on credit risk and return on investment?**

- All had experienced (potential) investments that had stalled, or whereby their bank had divested based on water-related issues or risks. Examples mentioned to stall (investigation into) investments included



the lack of planning for sustainable water management and an unreliable future water supply. Examples of reasons mentioned to divest investments included severe water scarcity and therefore water supply constraints and withdrawal of water licenses due to non-compliant practices.

### Do FIs engage in global processes related to water risk?

- Many of the interviewees are signatories to the Equator Principles and some participate in UNEP FI's Water and Finance work-stream, the CEO Water Mandate and reply to the questionnaire from the Carbon Disclosure Project. Few are actively involved in the development of the Ceres Water Gauge or the WWF-DEG Water Risk Filter.

#### Box II: Robeco's approach to assess water risks of clients

Water is included as part of the overall environmental assessment and incorporated into the valuation of the company (accounted for in discounted cash flow calculations). Robeco (which owns Sustainable Asset Management (SAM) which provides the intelligences to the SAM Dow Jones Sustainability Index. SAM performs all the environmental assessments based on a large (approximately 1000) set of indicators/questions that the company has to answer deemed to be material for their sector or sub-sector. About 10-15 of these questions are water-related. SAM provides the results of the quantitative analysis in the form of scores to Robeco's analysts and portfolio managers as an initial screening. Robeco's analysts combine this information with their own research and an assessment from EIRIS which provides an additional qualitative assessment on environmental performance. A final decision is made based on these analyses. This is one means of assessing water related risks in a portfolio. The types of methodologies that are applied depend on the type of asset class.

### 3.5 Corporate responses to water risks in the extractive industries

Response strategies vary from mining company to company, with some adopting aggressive approaches to managing water risk, while others have either failed to acknowledge their impacts or seriously addressed issues that have impeded operations. From the perspective of a financial institution, it is often difficult to determine what responses are important from their clients or to understand what constitutes 'best in class' water responses and policies.

**Internal Actions:** In their own operations, many companies have embarked on water efficiency programs, which are primarily driven from locations of water scarcity or extreme hydrological variability. These programs and the applicable technologies are often adopted into operations globally, such that each facility achieves a corporate-prescribed level of water efficiency. However in some cases there is the realization that they cannot manage the full extent of water risks simply by increasing the efficiency of operations. In areas of water scarcity, the behavior of local stakeholders may greatly impact the ability to receive freshwater of the required quantity and quality. In these instances the companies have actively partnered with local institutions and stakeholders to ensure a long-term water supply. For instance, Anglo-American's platinum operation created a long-term partnership with the municipality in Rustenberg South Africa, which includes funding infrastructure and institutional training in exchange for a secure water supply contract over the course of the life of the project.<sup>59</sup> Similarly, De Beers in South Africa have partnered with WWF-SA to work with local stakeholders in Limpopo to address shared risks of increasing water demand and climate change.

**External Actions:** Over the course of the last several decades international, regional, and local NGOs with a focus on environmental and social concerns have contested the extractive industry on a number of fronts. By creating networks between local concerns and international resources, extractive industries have been held to a higher account of its practices, especially where water is of primary importance to local ecosystems and communities. In turn many financial institutions have begun to demand better behavior from companies and developed industry-wide standards on environmental concerns such as the Equator Principles. Many are engaged and collaborating with local, regional, and international organizations to address water concerns, which are gradually being reflected in corporate policy.

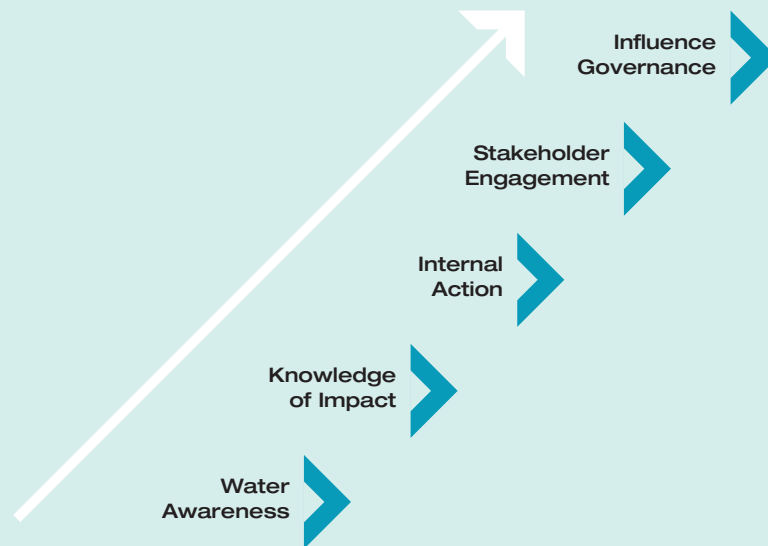


The confluence of internal and external pressure has prompted proactive external engagement often referred to as 'water stewardship' (see box III). These policies are not the norm in the industry but have been explored by companies such as Rio Tinto, Anglo-American, and Suncor. There is still a great deal of work to be done to better operationalise good water stewardship across the extractive industry, and even in those companies that have adopted water policies and actions. There are international initiatives which are led by multi-stakeholder forums such as the CEO Water Mandate under the UN Global Compact and the Alliance for Water Stewardship (AWS) among others. These initiatives seek to set guidelines for corporate engagement with external stakeholders on water, create usable metrics and standards to address water risk, and create platforms for partnerships to address local water issues.<sup>60</sup>

**Box III:  
Understand water risks through water stewardship**

The process of understanding water risk and addressing it through a progressive set of steps is commonly referred to as water stewardship. The water stewardship 'journey' refers to a framework in which corporations can minimize their impact on the water environment, engage and collaborate with other users to reduce impacts, and help strengthen the way in which river basin resources are managed. It is across this range of iterative steps that companies can build strategies that encompass both internal and external actions and seek to build a more directed and less *ad hoc* approach to long-term water risk.

**Schematic overview of water stewardship**



Source: WWF International

A key component of water stewardship is the engagement with local stakeholders - in particular, local public institutions. For the mining industry, this institutional engagement will be the primary focus of stewardship practices. While mining companies can usually source the water necessary for operations and ideally be able to comply with discharge standards, a failure to address these in socially and environmentally sensitive ways are as problematic as operating where weak or ineffective water management institutions pose significant problems. This lack of adequate oversight or mismanagement of the river basin can amplify the water risk that a company faces with many response strategies requiring active engagement and even financial or capacity support to institutions to assist in addressing local management failures (Pegram et al, 2009). As such, the FI's attention to their clients' responses should be guided by a stewardship approach and not just one of efficiency and compliance.