

## **Embedding Environmental Risks in Finance: Current Methods and Ongoing Challenges**

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### **Abstract**

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Recent studies and institutional reports have highlighted the growing materiality of environmental risks for the finance sector. Alternative risk management tools accompanied a number of these studies and reports; however, many of these tools are still in their nascence and fewer still have been mainstreamed across industries in order to provide the requisite level of information that investors need for robust decision making. By combining desktop analysis, survey results, and workshop data from the United Nations Environment Programme Finance Initiative (UNEP FI) network, we provide an overview and analysis of the current suite of environmental risk management tools and guidelines in this paper. It focuses specifically on those that address biodiversity and ecosystem services as well as water-related risks by exploring who they service and locating gaps in service in an effort to help lenders and investors understand weak spots. Significant challenges remain to embedding a growing market for innovative environmental risk frameworks into existing financial processes such as credit risk analysis and investment decision making. Despite the many significant and apparent barriers to their implementation, the paper suggests a number of internal and external steps that finance institutions could take to foster a deeper operationalization of environmental risk into the sector as a whole.

## **Embedding Environmental Risks in Finance: Current Methods and Ongoing Challenges**

If anything is to be learned from the financial crisis in 2008, it is that all risks need to be fully identified and disclosed. As pressure increases on the world's natural resources, concerns over environmental degradation have shifted from the fringes of altruistic concern to tangible global economic losses. It is becoming increasingly apparent that incumbent frameworks for risk analysis and management do not sufficiently capture the full range of threats to the finance sector.

Similar to the pre-crisis underappreciation of systemic risk by the financial industry and its regulators, environmental risks are not receiving scrutiny commensurate with their potential impact. Systemic risk refers to the potential collapse of a system, resulting from the failure of a single entity or cluster of entities that are interlinked and interdependent (Kaufman and Scott, 2003). The avoidance of risk includes separating investment banking from commercial banking (known as the Volcker rule) in order to inhibit banks from using depositors' funds for selling or trading securities. Another important development requires banks to shore up capital cushions (known as Basel 3 and effective as of 2019), thus forcing them to increase their capital from 8% to 10.5% and to have at least 7% of this in equity. Governments are also stepping up action to deal with the "too big to fail" and "too interconnected to fail" dilemmas, in the United States for example, through the Dodd-Frank Act (*Economist* 2011). Recently, ecologists and economists alike have drawn parallels between the systemic risk of the financial sector and the systemic risk associated with ecosystems (May et al. 2008; Haldane and May 2011). Both are complex, dynamic systems that are susceptible to collapse when a tipping point is reached. Additionally, the systemic risk in both systems is not always fully understood or accounted for.

As we begin to better understand the services that ecosystems provide and then quantify the costs of environmental degradation, a number of macro trends begin to emerge that entail short-, medium-, and long-term risk for financial institutions (FIs). Macro trends include changes in land use, weather patterns, ocean currents, and sea level, as well as a rapid decline in both biodiversity and the population size of many species. As a result of these trends, FIs may be exposed to losses in the short and medium term from flooding (or conversely, water scarcity), storm surges, erosion, and higher energy costs; and in the longer term from decreased food production, increased health risks, and general instability from loss of natural resources.

Our aim in presenting this research is to better understand how water, biodiversity, and ecosystem services (BES) criteria are currently integrated into investment and lending decisions, to locate the major barriers to mainstreaming these issues, and to understand the

broader concept of risk to the sector as a whole. The analysis and presentation of these issues should serve as a baseline from which to drive development, not only toward future work that embeds a broader and deeper concept of risk within the sector, but also toward a more aggressive research agenda on environment and finance. The paper draws on stakeholder dialogues, surveys of leading FIs and the thoughts of environmental finance leaders in an attempt to

- Capture the key tools and frameworks that are being used by or developed for bankers and investors;
- Identify the main barriers to the integration of BES and water risk in financial decision making and to ascertain the bridges for resolving these challenges.

## **Background**

Although many businesses have been addressing environmental issues for decades, until recently (that is, in the past two decades), banks have been relatively indifferent to these issues (European Environment Agency 2001; Lascelles 1993, 1997; Mulder 2007). This is largely due to general confusion concerning the importance of environmental issues paired with uncertainty about how to measure their effects. In addition, banks have difficulty reconciling short-term private gains with long-term social (and private) impacts and in communicating about both. Lastly, prices of natural resources also do not reflect possible future shortages or their unsustainable use.

Despite the mounting environmental and social challenges the world faces, only a small number of leading companies are taking significant action on these issues. Most businesses are unaware of the issues or the action needed to mitigate risks in the future. There are a multitude of initiatives and tools aimed at companies, yet many remain unsure of fundamental priorities in the journey toward better management of environmental and water issues. The multitude of local risks that can occur across large companies and complex supply chains are difficult to understand and quantify. More broadly, negative and positive environmental information is not well incorporated into the capital markets for pricing companies. Until now, the efficient market hypothesis has been weak for environmental, social, and governance (ESG) factors, due to lack of data. However, this situation is changing as more and more companies begin to provide data on a large set of metrics that are being reported by data aggregators such as Bloomberg.

Evidently, environmental risks are difficult to assess, quantify, and predict. Therefore, it is crucial to ensure that companies have robust systems and processes in place to deal with these issues. In addition to the company itself taking action, it is critical for the company to understand and influence its supply chain, mainly because sectors that source large quantities of natural resources from suppliers are the most sensitive to risk. With the

emergence of better data from sources such as the Carbon Disclosure Project for Water Disclosure and Bloomberg, assessment and quantification of environmental risks is improving.

The financial sector has a key role to play in identifying and quantifying these risks and incorporating them into decision making. When FIs embed ESG related risks into their investment decisions, it drives their clients to better account for externalities on the ground. The first European and U.S. banks to integrate environmental considerations into their credit lending activities did so roughly two decades ago (Weber et al. 2008; Thompson and Cowton 2004). However, the types of environmental risks that are addressed are often those required by legislation or that make direct short-term business sense (Coulson 2002). More “exotic” environmental risks, such as water scarcity, species loss, and ecosystem degradation, are either overlooked completely or not addressed systematically by the majority of large banks (Mulder and Koellner, forthcoming).

In general, environmental risk is still seen as an extraneous issue in mainstream finance and investment; nevertheless, as stipulated above, a growing number of tools and frameworks in their nascence are attempting to tackle the issue of integrating environmental risk into financial analysis, products, and decision making.

One commonly discussed setback is scale. Adding another layer of complexity in the form of ESG data can often seem overwhelming with so many companies and assets to assess. For example, an asset manager’s portfolio may contain hundreds of companies that are potentially exposed to every aspect of biodiversity and water risks. Ultimately, it is not the role of the investor to advise companies on the risks they face, but companies need to articulate their data in a comparable way that will then make sense in traditional financial analysis.

### **Analytical Framework**

Lessons from the financial crisis indicate that FIs did not, and still do not, fully recognize the importance of systemic risk, either as it pertains to the sustainability of the finance sector or as repercussions on society as a whole. In this paper, environmental risks are posited as another form of systemic risk, as they relate to water and BES.

Biodiversity is commonly defined as “the variability among living organisms, which includes the diversity at ecosystem, species and genetic levels,” as stated in Article 2 of the Convention on Biological Diversity. Humankind benefits from a multitude of resources and processes that are supplied by natural ecosystems. Collectively, these benefits are known as ecosystem services and include products such as clean drinking water and processes such as the decomposition of wastes. The Millennium Ecosystem

Assessment (2005) identified four main categories of ecosystem services: provisioning, regulating, cultural, and supporting. In the context of this article and to add clarity, these terms are combined under the term *biodiversity and ecosystem services*, or BES. Water risks relate to both quantity and quality issues, which not only have consequences for riparian ecosystems and human health, but also directly impact business operations in water intensive sectors, including but not limited to agribusiness, energy and mining.

As highlighted in the introduction, this paper aims to identify and provide an overview of the tools and frameworks to assess BES and water risks, and to identify the gaps in meeting the needs of the finance sector. Other objectives include outlining the key drivers for the materiality of BES and water risk in the finance sector and identifying the main barriers to integrating these issues in financial decision making. In order to address these issues, data have been gathered from desktop literature review, a series of workshops, a survey, and discussions in which the above-mentioned issues were discussed with a number of UNEP FI members and nonmembers alike throughout 2010 and 2011 (4 workshops; 100 stakeholders participating; 48 survey respondents). Qualitative data from these surveys and workshops were then coded and analyzed using MaxQDA, the software program for qualitative text analysis. Results are not intended to provide a comprehensive guide to the full suite of tools and frameworks available to bankers and investors for the management of environmental risk; rather, they present a snap shot of the methods and initiatives that a cross section of FIs are using to address environmental risk.

## **Results and Discussion**

Our analysis of recent surveys from UNEP FI (2010) and working group discussions indicate that the motivations that account for water and BES risk are primarily related to reputation and image. Campaigns and initiatives by non-governmental organizations (NGOs) and other stakeholders play a dominant role in the innovation and uptake of environmentally oriented information, policies, and risk assessment strategies within a number of banks and investment institutions. More interestingly, a survey showed that financial professionals are moving away from the historical emphasis of focusing only on reputational risk issues, by indicating that BES and water issues can lead to greater exposure to regulatory risk by banks, operational risk for clients, and hence enhanced credit risk for lenders, and legal liability risk.

There are also some key differences between the drivers affecting water risk and those concerning BES risks. Water is highly interlinked with climate, and some banks have indicated that a growing focus on climate change risk has led to a heightened awareness that business exposure to water risks must also be better understood. Water risk is seen as a potential cost issue and as a potential disruption to operations from flooding or drought. BES drivers on the other hand still remain less tangible or less easily monetized, which

leads to a stronger reliance on external drivers such as biodiversity campaigns from NGOs and regional or intergovernmental bodies, and innovations through mechanisms such as Reduced Emissions from Deforestation and Forest Degradation in Developing Countries (REDD+).

### ***Risk Frameworks and Tools***

Key tools and frameworks are currently available to help different subsectors to better understand and incorporate BES and water risk into financial decision making (Table 1).

**Table 1: Tools and Guidance Frameworks for Water and BES Risks**

| <b>Tool Type*</b>                      | <b>Water Risks</b>  | <b>Target Audience</b> | <b>BES Risks</b>   | <b>Target Audience</b>   |
|--|---|------------------------|--|--|
| <b>Databases / Guidance / Training</b> | UNEP FI Chief Liquidity Series  | Bankers and investors  | UNEP-World Conservation Monitoring Centre & Integrated Biodiversity Assessment Tool (IBAT) | Extractives and other businesses                                   |
|  | CERES Investor Network on Water   | Investors              | WRI's Ecosystem Services Review  | Private sector   |
|  | IFC Online Training on Environmental and Social Risk for Sustainability                     | Finance sector         | IFC Online Training on Environmental and Social Risk for Sustainability                    | Finance sector   |
|  | UNEP FI: Environmental and Social Risk Analysis (ESRA) training                             | Finance sector         | UNEP FI: Environmental and Social Risk Analysis (ESRA) training                            | Finance sector   |
|  | CEO Water Mandate: online information portal  | Private sector         | TEEB: The Ecosystem Services Review  | Business & Finance sectors   |
|  |   |                        | PWC Training: Master Classes and Peer-to-Peer learning                                     | Internal stakeholders  |
|  |   |                        | Global High Conservation Value (HCV) Toolkit   | Forest managers, investors, donors, and conservation practitioners |
| <b>Metrics / Benchmarking</b>          | CERES: framework to assess and benchmark corporate water management for engagement purposes | Investors              | Natural Value Initiative: Ecosystem Services Benchmark                                     | Investors  |
|  |   |                        | Global Footprint Network: Ecological Footprint Data  | Private sector including investors                                 |

| Tool Type*  | Water Risks   | Target Audience       | BES Risks  | Target Audience                                     |
|---|---|-----------------------|--|---|
| <b>Management &amp; Assessment Frameworks – Performance Standards</b> | IFC Performance Standards (1, 3 &6)   | Finance sector        | IFC Performance Standards 6 (Biodiversity Conservation & Sustainable Natural Resource Management)  | Finance sector                                      |
|   | IFC Environmental Health and Safety (EHS) Guidelines  | Finance sector        | IFC Environment, Health and Safety Guidelines (EHS)  | Finance sector                                      |
|   | Equator Principles framework, underpinned by the IFC Performance Standards and EHS Guidelines | Project finance       | Equator Principles framework, underpinned by the IFC Performance Standards and EHS Guidelines      | Project finance                                     |
|   | DEG & WWF: Water Risk Assessment Tool   | Investors and bankers | World Business Council for Sustainable Development (WBCSD) Guide to Corporate Ecosystem Evaluation | Business and Governments                            |
|   | WRI Aqueduct: database of water risk indicators RepRisk                                       | Investors             | WBCSD & PWC Sustainable Forest Finance Toolkit   | Financiers of forest-related sectors                |
|   | Water Footprint Network   | Private sector        | Forest Footprint Disclosure (FFD)  | Investors   |
|   | WBCSD Global Water Tool   | Private sector        | Business and Biodiversity Offset Program (BBOP) Principles, Criteria and Indicators                | Private sector                                      |
|   |   |                       | Roundtable on Sustainable Palm Oil Principles, Criteria and Indicators                             | Palm oil companies, buyers of palm oil, and bankers |
| <b>Reporting</b>  | CDP Water Disclosure Project  | Investors             | Global Reporting Initiative (GRI)  | Investors   |
|   | Global Reporting Initiative   | Investors             | Integrated Reporting   | Private sector                                      |
|   | Integrated Reporting  | Private sector        |  |   |

Source: UNEP 2011.

While there are a number of tools and initiatives focused on assessing and demonstrating the materiality of financial risks related to BES and water, it is how organizations use these tools that will determine whether or not these risks are properly factored into financial decision making. Encouragingly, a number of FIs have developed their own internal products and initiatives to either engage with clients on issues such as resources efficiency or to screen investments (such as environmental social risk indicators, internal sustainability criteria, individual statements and alliances).

A recent review of 50 large banks revealed that 33% have Environmental and Social Risk Assessment policies in place that are often based on the World Bank's Environmental Health and Safety guidelines (Mulder and Koellner, forthcoming). More interestingly, 32% of the surveyed banks have developed sector specific guidelines for clients and projects in the forestry sector. These guidelines often stipulate that the bank refrains from investing or financing any activities in protected areas—"red-lining investments"—or involving illegal logging, and that they support certification for sustainably harvested timber (such as the Forest Stewardship Council (FSC) certification). For clients that source wood from countries with a high prevalence of illegal logging, JPMorgan Chase now sets, for example, deadlines for verifying the legal origin of the wood (FSC 2005). On the other hand, many fewer banks have developed sector specific guidelines on biodiversity and ecosystems for: oil and gas (20%), mining (18%), agriculture (16%), construction and infrastructure (8%), fisheries sector (6%), and tourism and leisure (4%) (Mulder and Koellner, forthcoming). Partnerships with NGOs were also a recurrent theme within member organizations, which draw on the expertise of international environmental organizations to better understand how BES or water risks might be assessed across a portfolio.

A number of asset managers and investors also indicated that in addition to the tools listed above, engagement and divestment were valuable approaches for driving more responsible investment, although divestment was seen as a last resort and is rarely employed. Interestingly, a number of FIs suggested that information on these risks needed to be easy and accessible in order to be useful. However, queries are often raised regarding the expediency of some of the main reporting and disclosure initiatives for targeted use (that is, integration into investment decision making). Another challenge for disclosure projects is the handling of non-listed (private equity) companies, since their authority originates from the investment community. The International Integrated Reporting Committee is working toward solutions to some of these perceived problems in order to deliver Integrated Reporting (IR) information that can easily be incorporated into investment decision making. Innovation in and integration of BES and water issues appears to take place mostly in lending and less so in asset management or other forms of equity investment. Unsurprisingly, the Equator Principles (EP) and the underlying IFC Performance Standards dominate the landscape in project finance, with many viewing the process as an important one for mitigating the risks in project finance.

### ***Barriers and Bridges to Integration***

It is clear that the natural capital upon which society depends is not being adequately recognized, valued, or preserved. Common barriers were identified as major challenges to the implementation or mainstreaming of BES and water risk frameworks into financial decision making. Despite these major barriers, there are also some key examples of how



FIs are overcoming the challenges. In some areas of innovation, investors can play forward-thinking roles in treating natural capital issues as drivers of shareholder value. While regulatory drivers provide a vital stick to the finance industry, market drivers and consumer choices (Forest Stewardship Council, Marine Stewardship Council), can be the carrots that motivate increased positive behavior. FIs should be looking at where those eco-conscious consumer trends are heading, and how their institutions are placed to support developments in market behavior.

It is helpful to view both the major challenges and the potential solutions that exist for better integrating environmental risk factors into finance (Table 2). The potential solutions represent goals identified by stakeholders and some strategies already implemented within various organizations.

**Table 2: Challenges and Solutions to Embedding Water and BES Risks in the Finance Sector**

| Key Challenge        | Specific Barriers  | Potential Solutions   |
|----------------------|--|---|
| <b>Business Case</b> | On the risk side there is a need for more iconic, compelling examples that demonstrate and quantify the value of natural capital.<br><br>In addition, it appears as though there are few investable projects and companies that fully integrate BES and water risks in their supply chain and business operations. | Build up the business case for investing in BES in particular, but also water. Highlight opportunities clearly so as to help eliminate the assumption that few projects and companies that integrate BES and water risks exist. |
|                      | Lack of valuation and metrics  | Need to agree on proxies and investment schemes. Outline “how to” methodology for integrating well defined BES and water related metrics into decision making standards.  |
|                      | Lack of incentive structure: difficult not to do “dirty” business  | Include ESG analysts on investment committees and have them work closely with portfolio managers.<br><br>Focus on addressing investments in banks investors, rather than simply engaging with clients.                          |
|                      | Insufficient screening criteria: lack of appropriate financial package to support innovative companies.  | Improve offerings for small and medium enterprises (SMEs), as most opportunity for BES resides in the SME space.  |

| Key Challenge   | Specific Barriers  | Potential Solutions   |
|---|--|---|
|   | Costs around BES/water don't accrue to the company (private vs. public wealth).  | Link approach to bonuses, which can be based on performance as well as ESG criteria and ratings.  |
| <b>More difficult to quantify and monetize than climate risk/action</b> | Climate risk is clearly monetized e.g. there are models on pricing climate risks but not yet for water/BES risks (despite the fact that water can have a price). | Increase vital NGO Partnerships, such as WWF & DEG joint project, which assess and quantify water/BES risks.  |
| <b>Lack of Sophistication - Skills Gap</b>                              | Risk models: lack of transparency/sophistication   | Role of UN PRI / UNEP FI to provide training, however investors need to commit to capacity building and integration of learned skills/tools.  |
|   | Unsophisticated/immature approach: market leaders  | Benchmarking exercises (e.g., NVI) highlight lack of sophistication and demonstrate the need for increased peer-to-peer learning.   |
|   | Client side: lack of transparency within the supply chain  | Demonstrate liabilities under the law/regulatory risks. Companies should ask suppliers to respond to the CDP (both carbon and water).   |
|   | Credit Ratings Agencies (CRAs): credit risk and credit ratings do not factor in ESG data.  | CRAs should incorporate ESG data into their models. The demand for this information must come from FIs.   |
|   | Financial institutions: lack of sophistication in understanding critical factors affecting both sectors and countries.   | Capacity building through existing networks such as Equator Principles Association or UNEP FI<br>ESG data should feed into credit risk analysis.<br>Increased sustainability performance disclosure and integration into mainstream financial platforms such as Bloomberg<br>Securities regulators and governments should strengthen ESG disclosure requirements. |
|   | Limitations of disclosure projects   | Closer collaboration between investors and disclosure projects (though platforms such as UN PRI and UNEP FI) to develop a more customized approach  |
| <b>Integration across sectors/scales?</b>                               | Limitation of moving beyond simply SRI/ESG analysts/departments  | Again, include ESG analysts on investment committees and have them work closely with portfolio managers.  |

| Key Challenge  | Specific Barriers   | Potential Solutions  |
|--|---|--|
|  | Temporal mismatch between long-term investment timelines & rating timelines (from CRAs)                               | Closer collaboration between investors and CRAs (through platforms and projects) to better address longer term risk assessment.  |
|  | Temporal mismatch between environmental materiality and investment decision making                                    | Closer collaboration between investors, rating institutions, and NGOs to better address longer term creeping systemic risks.   |
| <b>Communication/<br/>Language<br/>barriers -</b>      | Education / communications: much of the mainstream finance sector is not using this information.                      | Get mainstream FIs (e.g. Bloomberg) to include water and BES information within their platforms.   |
|  | Business language of biodiversity is missing.   | Improve capacity of financiers: increased training (PwC/UNEP FI). Educate bankers internally and increase the integration of scientific information in the finance sector. |
|  | Metrics: Error range too high to be understood or accepted by risk managers in the finance sector.                    | Improve transparency of uncertainties.   |
| <b>Fragmentation -<br/>Harmonization</b>               | Lack of standards/cohesion  | Harmonize standards across the board to assist with mainstreaming.   |
|  | Banks using EPs   | Assist EPs to move beyond project finance. Create equivalent for other types of FIs.   |
|  | Information is not easily accessible across different sectors/resources (many separate suppliers).                    | Full integration of nonfinancial data information within financial data suppliers.   |
| <b>Regulation &amp;<br/>Enforcement<br/>inadequate</b> | Lack of pricing mechanisms, mitigation and methods  | FIs should call on policy makers to implement the right incentive structures.  |
|  | Biodiversity as a policy issue has proved very difficult (especially in the application of the mitigation hierarchy). | Clarify definitions, improve business case, and build capacity within both FIs and governments around these material issues.   |
|  | Regulatory indicators act as disincentives.   | Call for improved regulation leading to improved incentives for FIs.   |

Source: UNEP 2011.

Many of these challenges are interlinked, and most of the solutions are not unique to the particular challenge that they address. Perhaps the main challenge with ESG data is that much of it is qualitative and needs to be converted into meaningful quantitative metrics. A recent study “Rate the Raters” (SustainAbility, 2010) identified a number of pitfalls with the approach of ESG rating agencies, in terms of their highly qualitative approach and also the lack of transparency in their rating models. In order for mainstream financial analysis to successfully incorporate environmental factors into their existing models, data needs to be better aggregated and synthesized into standardized financial metrics.

Data availability, quality, and uncertainty are also key challenges for the ESG and the sustainable finance and responsible investment (SF/RI) research industry. Despite recent growth, the speed at which this collective community is attempting to cover such a large landscape of companies and sectors with mainly public information results in a major undertaking. Encouragingly, a number of mainstream financial agencies such as Bloomberg, Thomson Reuters, and Risk Analytics are beginning to move into this space; however, the depth of their commitment has yet to be proven. The regulatory challenge remains a complex and crucially strategic issue. While regulatory signals for increased financing of cleaner business are still wanting, in other areas, such as the CBD fulfillment in Europe, the limitations of regulation and the capabilities of strong institutions to overcome these challenges have been identified.

Some of the most recognized initiatives within finance have been disclosure projects such as the Carbon Disclosure Project (CDP) and the Forest Footprint Disclosure (FFD), but significant challenges are evident in ensuring that investors are actually using this information within investment decision making. Disclosure projects should be reflecting on whether they are indeed asking the right questions, not just for increased engagement but also to feed directly into investment decision making. Improved collaboration between investors and disclosure projects and using questionnaires such as the SAM Sustainability Index would be useful media forms through which to ensure that the generated information is actually being integrated; it could also drive companies to report on meeting investor needs.

Significantly, the percentage of companies covered through Bloomberg and other market data platforms that disclose company sustainability performance is still exceedingly low. This pervasive lack of transparency continues to act as a barrier to long-term sustainable investment; however, this barrier is being addressed through initiatives such as the UN PRI Sustainable Stock Exchange Global Dialogue (UN PRI 2010) and the Integrated Reporting Initiative (<http://www.theiirc.org/>).

Additionally, the scale of engagement differs between investment and banking companies and between debt and lending companies. Since an investor may likely have a narrow relationship with a portfolio company, engagement is limited and therefore needs to be highly organized. A bank that provides credit loans, on the other hand, would have a more direct relationship, and thus stronger links through its engagement. However, having a common methodology for the use of these tools is essential for increased proactive engagement—with the end goal of encouraging improved environmental stewardship.

## **Conclusion**

At the end of the day, FIs should aim to ensure long-term growth of revenues and profits for their institutions through more risk-inclusive models that factor in ESG risks, including BES and water, in a systemic way. This will ensure that BES, water, and other ESG issues are better accounted for than they are at present. Despite a growing recognition of this core concept, integrating risks and opportunities associated with water and BES remain highly complex and often unpopular. In general, results from UNEP FI stakeholders point to an increasing proliferation of tools and guidance on environmental risk for the finance sector as a whole. However, this proliferation in and of itself can increase the complexity of integrating environmental risks into finance, and must be addressed.

There is a growing risk that nonstandardized solutions will continue to increase the complexity of integrating multiple tools into investment decision making. A broader adaptation of tools such as the EP and IFC performance standards, combined with more robust, readily available metrics and databases, may facilitate the integration of water and BES risks into mainstream financial decision making.

Improved understanding of BES and water risk is essential; however, the majority of clients and investee companies must match this understanding with transparent disclosure. There is common agreement that leadership and best practices must be rewarded and supported through improved incentives and regulations. Leaders who advocate such improvements must be championed for providing a solid business case for mainstreaming water and BES risks and opportunities. Furthermore, efforts to quantify the global environmental costs and loss of natural capital (UN PRI and UNEP FI 2010) should be both escalated and refined. With annual environmental costs from global human activity in 2008 estimated at US\$ 6.6 trillion, potentially rising to US\$ 28.6 trillion per year in 2050 under “business as usual” scenarios, this risk can no longer take a back seat to mainstream financial indicators. Despite the growing range of products introduced to address environmental risk in the finance sector, ongoing difficulties remain in translating awareness into actual policies and lending and investment practices.

We have outlined a variety of tools and potential solutions that are vital in the movement toward fully integrating material environmental risk into financial models and decision making. Awareness is growing of the need for policy-makers, businesses, citizens, and FIs to quantify and value their impact on BES and water, but significant challenges must be overcome. Together we must all contribute to actively restructuring the current financial model we depend upon.

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## **Biographies**

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