

Nature-related financial risk: use case

Impact of water curtailment on the
credit rating of heavy industry
companies in East Asia

NATURE 
POSITIVE



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The Banking Environment Initiative (BEI) is a group of global banks committed to pioneering actionable pathways towards a sustainable economy. The BEI co-produces horizon-scanning applied research, develops leadership tools and convenes academic and industry collaborations. It is a member-led, not-for-profit group, formed in 2010 and convened by CISL alongside our investor and insurer groups.

Preface

Members of the Banking Environment Initiative and Investment Leaders Group are working with the University of Cambridge Institute for Sustainability Leadership (CISL) and academic partners to determine a common language and framework for financial institutions to identify and assess nature-related financial risks, so that these risks can be measured and managed.

Since forming in 2020, this collaboration has so far detailed the financial materiality of biodiversity loss and land degradation and published its cornerstone [Handbook for Nature-related Financial Risks](#). The Handbook explains how specific sources and types of nature loss, and the response to that loss, result in financial risk, explaining key concepts and providing a method for risk identification and assessment. During the following phase of research, member financial institutions used this Handbook to develop use cases that demonstrate how nature-related risks manifest in their portfolios.

This paper is one of a series of use cases, each assessing a specific type of nature-related financial risk. Financial institutions led their internal risk assessment process and subsequent write-ups in close collaboration with the CISL team, who offered guidance, input and support.

The purpose of these use cases is to enable and galvanise further assessments of nature-related risk across the financial system. Detailing the risk assessment process aims to show ways in which the wider financial industry can make such assessments of its own. All financial firms are vulnerable to nature-related financial risks, and the financial materiality of nature loss evidenced constitutes an urgent call to action.

The more that assessments are undertaken and shared, the easier it will be for others to follow and understand the urgency of managing nature-related risks and taking action to mitigate nature loss. Through the creation of these use cases, financial institutions have started to generate internal engagement regarding nature loss, as well as catalysing new conversations with clients and investee companies. Through these conversations, collaborative strategies can emerge to mitigate nature loss and support a transition to a nature-positive economy.

Authors

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Executive Summary

Our economy depends on water. Seventeen countries today consume more than 80 per cent of their available water.¹ As demand approaches or exceeds supply, water security is put at risk and economies become vulnerable to variations in rainfall. This creates the risk that water supply will be curtailed. It is this water curtailment risk – one type of nature-related financial risk – that is the subject of this use case.

This use case applied a stress scenario to the financials of heavy industry companies in an East Asian country with areas of very high water stress. The aim was to assess the potential impact on credit risk when natural services are disrupted by non-climate drivers such as increasing exploitation of water or upstream land use change, which are amplified during periods of extreme weather variability such as drought. The scenario applied was one in which water was curtailed for three months.

The credit risk consequences were:

- significant deterioration of the average portfolio credit risk rating
- **more than a third of the companies** analysed **moving from Investment Grade to Speculative**

The results from this initial exploratory assessment underscore the need for:

- further assessment of nature-related financials risks, such as water insecurity, given the financial materiality demonstrated by the use case
- the inclusion of water-related risks in financial institutions' risk frameworks
- better data and risk identification tools to enable these assessments to be conducted more easily.

Introduction

Water consumption has more than doubled since the 1960s, and 17 countries withdraw more than 80 per cent of their available supply every year.²

Greater water demand is causing increased water stress, and during extreme droughts companies are now more exposed to water access curtailment. These companies (clients of financial institutions) are not only from sectors such as agriculture but from heavy industries, such as cement and steel, which use water during their production processes.^{3, i}

Water is an essential good provided by nature, yet its provision is threatened by overexploitation, land use change and pollution, as well as the warming of our planet. Overexploitation can lower aquifers, whilst land use change can reduce water availability downstream (e.g. large dams). More pressure on water supplies means higher water stress, calculated by the World Resources Institute (WRI) as “the ratio of total

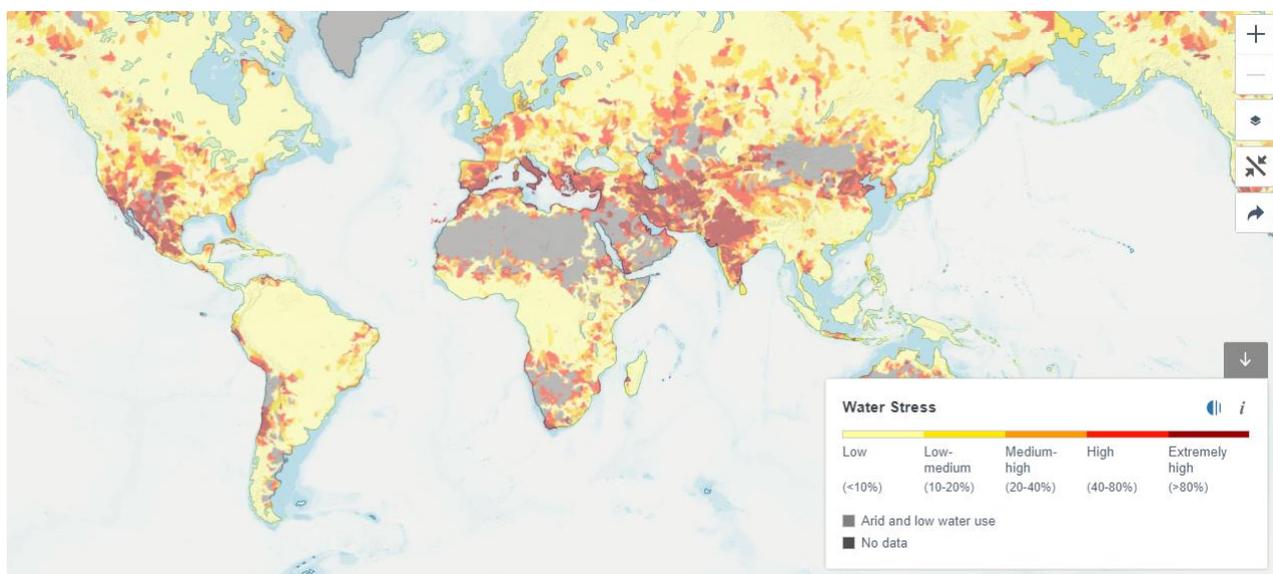
ⁱ These heavy industries are amongst the most exposed to water stress, according to [ENCORE](#).

water withdrawals to available renewable surface- and ground-water supplies”, with higher levels indicating “more competition among users”.⁴

Cape Town is an area of extremely high water stress, attracting a benchmark score from WRI of 5 out of 5 (the highest level). The baseline competition among users for water makes the city more vulnerable to variations in rainfall, meaning companies are at higher risk of having water access curtailed. In 2018, Cape Town was dangerously close to reaching ‘day zero’ – the point at which municipal water supplies would have needed to be switched off. The threat of ‘day zero’ led to the curtailment of water supplies for commercial and industrial sectors by the government.⁵

Other locations around the world have similar water security risks (see Figure 1, below), meaning an unmeasured water curtailment risk faces citizens, heavy industry and its financiers.

Figure 1: Current water stress, globally ([WRI Aqueduct](#))

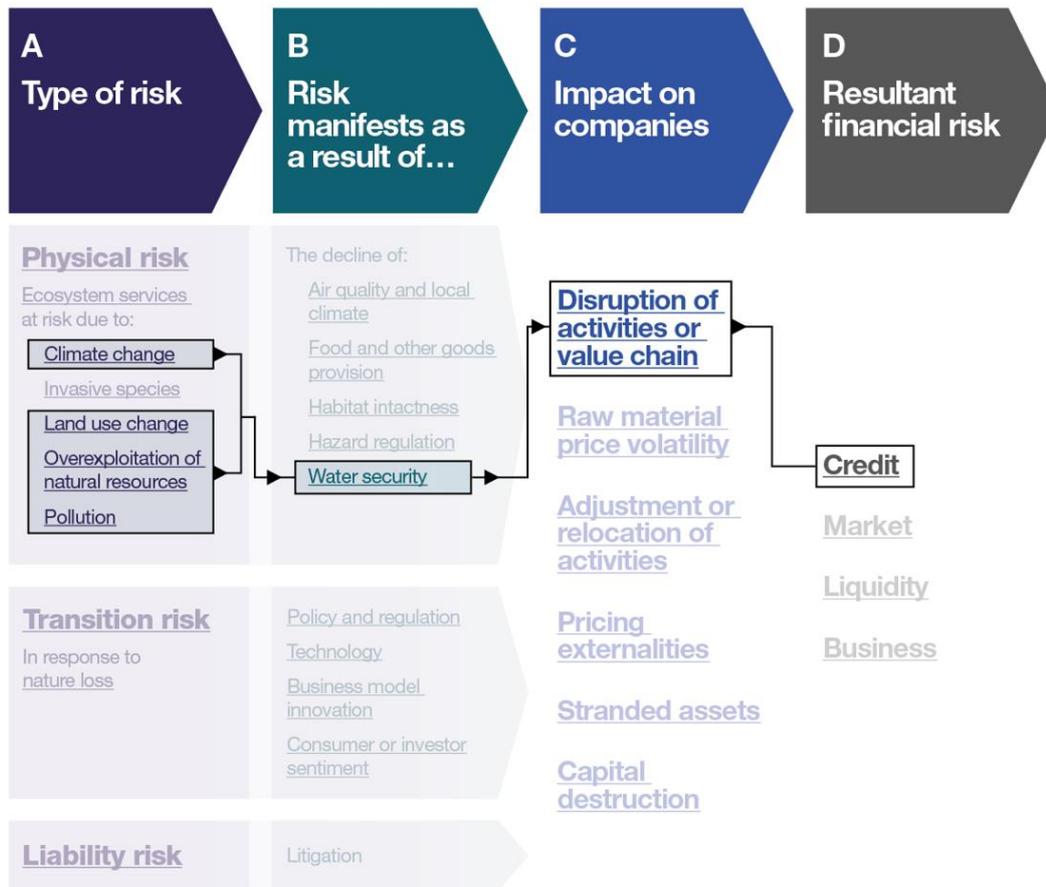


Scenario description

To better understand the nature-related financial risk posed by water insecurity, this use case selected a country in East Asia with basins of comparable water stress to Cape Town – both today and in the future, according to the [WRI Aqueduct Water Risk Atlas](#). The East Asian region was chosen because portfolio data were available and there were countries with areas of very high water stress. The heavy industry sector was chosen based on a preliminary materiality assessment of the loan book, factoring in water-related ecosystem services dependencies. Utilising the CISL Handbook for Nature-related Financial Risks, **the credit risk posed by water stress was estimated for heavy industry companies in the chosen East Asian country of a three-month period of water curtailment.**

As shown in Figure 2, below, the decline of water security [Column B] manifests as a result of the risk factors shown in Column A. Due to the mismanagement of the water resource and/or high levels of competition for water, access can be curtailed during times of acute stress, shutting down production or throttling output from manufacturing sites [Column C]. This impacts company financials, increasing credit risk [Column C -> D].

Figure 2: Framework for identifying and assessing nature-related financial risks (CISL, 2020)



Scenario application

An exploratory analysis was performed to gauge the impact of three months without access to water – the chosen scenario – on the credit risk of the bank’s corporate loan book. The exercise simulated a shock on availability of water, causing a temporary halt in production. A sample of approximately 50 East Asia-based industrial corporates whose business is dependent on water was analysed. Their turnover was stressed by 25 per cent, with variable costs adjusted proportionally, to calculate companies’ internal ratings using internal models.

The analysis is an initial attempt to simulate the effects of such events on the bank’s internal ratings that are used to assess credit risk and to calculate RWA (risk weighted assets) on the corporate loan book.

The resulting stressed ratings were compared to the actual ratings to appreciate the impact of such a shock on the credit risk of the companies in the sample. The stressed ratings were also used to calculate a stressed RWA that gives an idea of the impact of such an event on the overall risk charge of the sample.

Findings

The analysis showed that the stress scenario (shock) had a significant impact on the sample analysed:

- The sample's RWA increases by ~20 per cent in the year immediately following the shock.
- Most of the companies in the sample are subject to a downgrade of internal rating of at least 1 notch, with cases of extremely severe downgrades also occurring.
- The credit risk of a significant share of companies in the sample moves from investment grade to speculative grade.

The difference in rating impact on the companies analysed is mainly due to their cost structure and starting point rating before the shock. Companies with higher fixed costs are more impacted as the decrease in turnover cannot be absorbed by a reduction in costs. Companies with a 'top notch' starting point rating are also more impacted, as credit quality standards for 'low risk' ratings are very stringent and a deterioration of financial performance can easily trigger significant downgrades.

Reflections

This explorative analysis highlights how nature-related risks can have a significant impact on the credit risk of banks' lending books. **These risks are not currently considered in banks' credit risk management methodologies, which creates a potential risk to banks' financial stability.** Therefore, the development of an industry-wide framework and relevant tools to assess nature-related financial risks and embed them into banks' risk management practices is of key importance.

Due to its exploratory nature, this analysis is subject to significant limitations. In particular:

- The analysis only focuses on one aspect of credit risk management – the RWA impact – and does not simulate the impact on other key measures such as loan loss provisions.
- The analysis only focuses on internal ratings and does not assess eventual impacts on other variables entering RWA calculations, such as loss given default (LGD).
- The sample of companies used is very limited and not representative of the corporate loan book.
- The way the scenario was translated into financial impact is simplistic, as it focuses only on turnover and variable costs, leaving all other inputs to internal rating models unchanged (e.g. assessments of companies' outlook).

Nonetheless, the approach taken follows the same principle as other stress testing analyses, and the results provide preliminary indications of the additional, highly material, risk posed to heavy industry in areas of high water stress.

Mismanagement and overexploitation of water resources make companies that rely on this water more vulnerable to extreme variations in climate. As the planet warms, the probability of these extreme variations, such as drought, increases. In other words, climate change is only one driver of nature-related risk, and, were water resources better managed, the underlying drivers of water curtailment risk would not exist and companies and their financiers would be less exposed.

The findings underscore the urgent need to further assess nature-related financial risks, how they manifest and the potential consequences for banks' portfolios.

References

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