



Water Risk Filter Brief

WATER RISK SCENARIOS

TCFD-ALIGNED SCENARIOS TO HELP COMPANIES
AND INVESTORS TURN RISK INTO RESILIENCE

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1. Introduction

Water is the lifeblood of our societies and economies; it is essential to all people and businesses. However, 17 per cent of the global population and 10 per cent of the world's GDP currently come from regions of high-water risk – and by 2050 this could increase to 51 per cent and 46 per cent respectively. The **World Economic Forum's Global Risk Report** has ranked water crises among the five top risks in terms of impact for ten consecutive years. Water risk is a real and existing threat to companies' bottom lines, with a combined business value at risk of US\$425 billion, according to **CDP 2019** data.

With water stress increasing due to climate change and soaring demand for water from expanding populations, urbanisation and economic development, **companies** and **investors** are increasingly concerned about how water risks may potentially impact their operations, supply chains and investments – now and in the future. As the timing and magnitude of future water risks due to climate change and socio-economic factors are highly uncertain, it is challenging for companies and investors to understand potential risks and opportunities for their businesses or investments in order to ensure long-term resilience. One way to assess such business implications is through the use of scenario analysis as recommended by the Task Force on Climate-related Financial Disclosure (**TCFD**) as well as by the EU Non-Financial Reporting Directive (**NFRD**).

Already a leading online tool for companies and investors to assess and respond to water risks, the **WWF Water Risk Filter** is now expanding to provide forward-looking scenarios of

water risks, based on climate and socio-economic changes, and aligned with TCFD and EU NFRD recommendations.

The aim of this brief is to provide an overview of the new WWF Water Risk Filter scenarios and guidance on how scenario analysis can help companies and investors to understand future water risks and build resilience in an uncertain future.

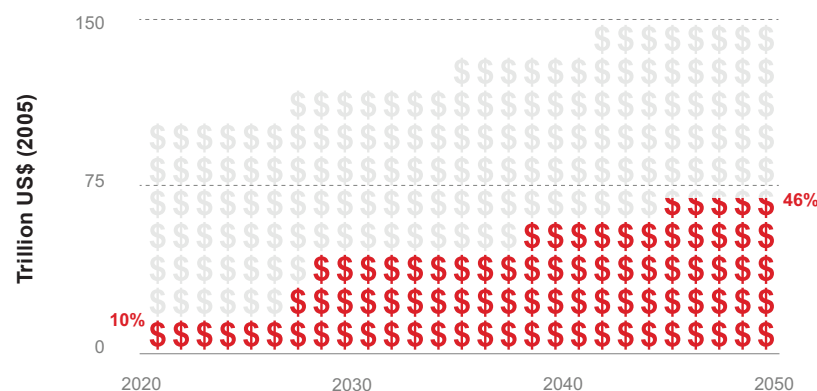


Figure 1.
Global GDP (PPP)
exposed to high water
risk by 2050

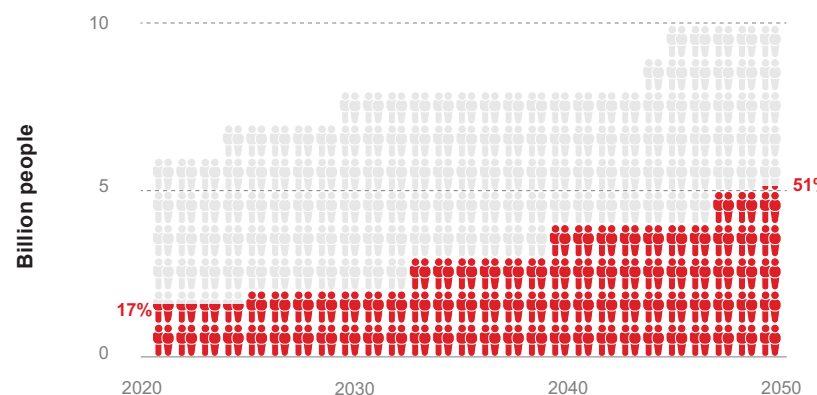


Figure 2.
Global population
exposed to high water
risk by 2050

2. Scenario analysis and TCFD recommendations

Scenarios are not intended to be forecasts or predictions, rather they represent plausible future states of the world. In a world of uncertainty, scenario analysis is a useful approach for a forward-looking assessment of risks and opportunities, so that businesses can evaluate their resilience under different possible futures.

Given the high uncertainty in the face of climate change, **TCFD** recommends companies and financial institutions apply scenario analysis for assessing climate-related risks and opportunities to determine potential business implications. More specifically, TCFD recommends using different climate-related scenarios, including at least a scenario compatible with 2°C global warming, as it provides a common reference point that is generally aligned with the objectives of the Paris Agreements. In addition to a 2°C scenario, it is also recommended to explore a more ambitious 1.5°C scenario, and a scenario which is compatible with the Nationally Determined Contributions (NDCs) implementation.

As climate and water risks – as well as opportunities – are closely **interlinked**, it is critical for scenario analysis to incorporate water in a comprehensive manner. However, the current climate scenario analyses are relatively new and water risks are still largely unexplored or limited to

water stress projections. In particular, the TCFD recommendations regarding physical risks from climate change refer explicitly to water-related physical risks, which can take the form of acute risks from extreme weather events (e.g. flood event) and chronic risks (e.g. scarcity, quality, ecosystem services) from longer-term shifts in climate patterns. However, the TCFD recommendations do not refer explicitly to regulatory and reputational water risks, which can cause significant potential impacts if overlooked.

“ CLIMATE-RELATED RISKS AND OPPORTUNITIES ARE UNDENIABLY INTERTWINED WITH THOSE ASSOCIATED WITH WATER. ANY ASSESSMENTS OF FUTURE WATER-RELATED EVENTS SHOULD THEREFORE CONSIDER THE CLIMATE, BUT THIS IS ONLY ONE PIECE OF THE PUZZLE. OTHER SOCIO-ECONOMIC DRIVERS IMPACT THE SUPPLY AND DEMAND OF WATER, SUCH AS REGULATORY, MARKET AND DEMOGRAPHIC CHANGES. THE NEW WWF WATER RISK FILTER TOOL SUPPORTS THE INTEGRATION OF WATER INTO TCFD-ALIGNED SCENARIO ANALYSIS AND WILL STRENGTHEN THE DISCLOSURE AND ASSESSMENT OF COMPANIES’ RESILIENCE TO FUTURE SCENARIOS. ”

FRANCESCA RECANATI
ENVIRONMENTAL SPECIALIST
(TECHNICAL MANAGER)
CLIMATE DISCLOSURE STANDARDS BOARD

WHAT IS TCFD?

Recognizing the potential implications of climate change for the global financial system, the Task Force on Climate-related Financial Disclosures (TCFD) was established in 2015 by the Financial Stability Board. The TCFD developed and released in 2017 a set of recommendations for corporate reporting on climate-related financial risk and opportunities, with the objective to better inform financial markets and investors. One of its key recommendations is for corporates and financial institutions to conduct scenario analyses.

Effective TCFD disclosures aim to:

- 1) help inform internal corporate decision-making on how to assess and manage climate-related risks and opportunities, thereby strengthening corporate strategies and policies; and
- 2) ensure that climate-related information disclosed by companies is consistent, comparable, relevant and useful for investors' decision-making needs and processes.

The TCFD recommendations were later adopted by the EU Non-Financial Reporting Directive, which provides guidelines on climate and environmental information that European companies must include in their annual reports.



3. Overview of the WWF Water Risk Filter Scenarios

Since its launch in 2012, the Water Risk Filter has used the most up-to-date datasets to enable companies and investors to assess current water risk exposure. In 2018, the tool extended its scope to include new elements related to response and valuation – and the new scenarios work builds on this legacy.

The Water Risk Filter scenarios apply the same approach as the tool’s current basin risk assessment framework but integrate 2030 and 2050 quantitative projections of physical risks such as scarcity, flooding, water quality, and ecosystem services status, as well as future regulatory and reputational risks.

“ RECOGNIZING THE IMPORTANCE OF ASSESSING AND PREPARING FOR POTENTIAL FUTURE WATER RISKS IN A CHANGING CLIMATE, CARLSBERG WAS THE FIRST COMPANY TO TEST AND USE THE NEW WWF WATER RISK FILTER SCENARIOS TO UNDERSTAND HOW WATER RISKS ACROSS OUR BREWERIES MAY EVOLVE IN 2030 AND 2050 UNDER DIFFERENT SCENARIOS. ”

SIMON BOAS HOFFMEYER
SENIOR DIRECTOR SUSTAINABILITY
CARLSBERG GROUP

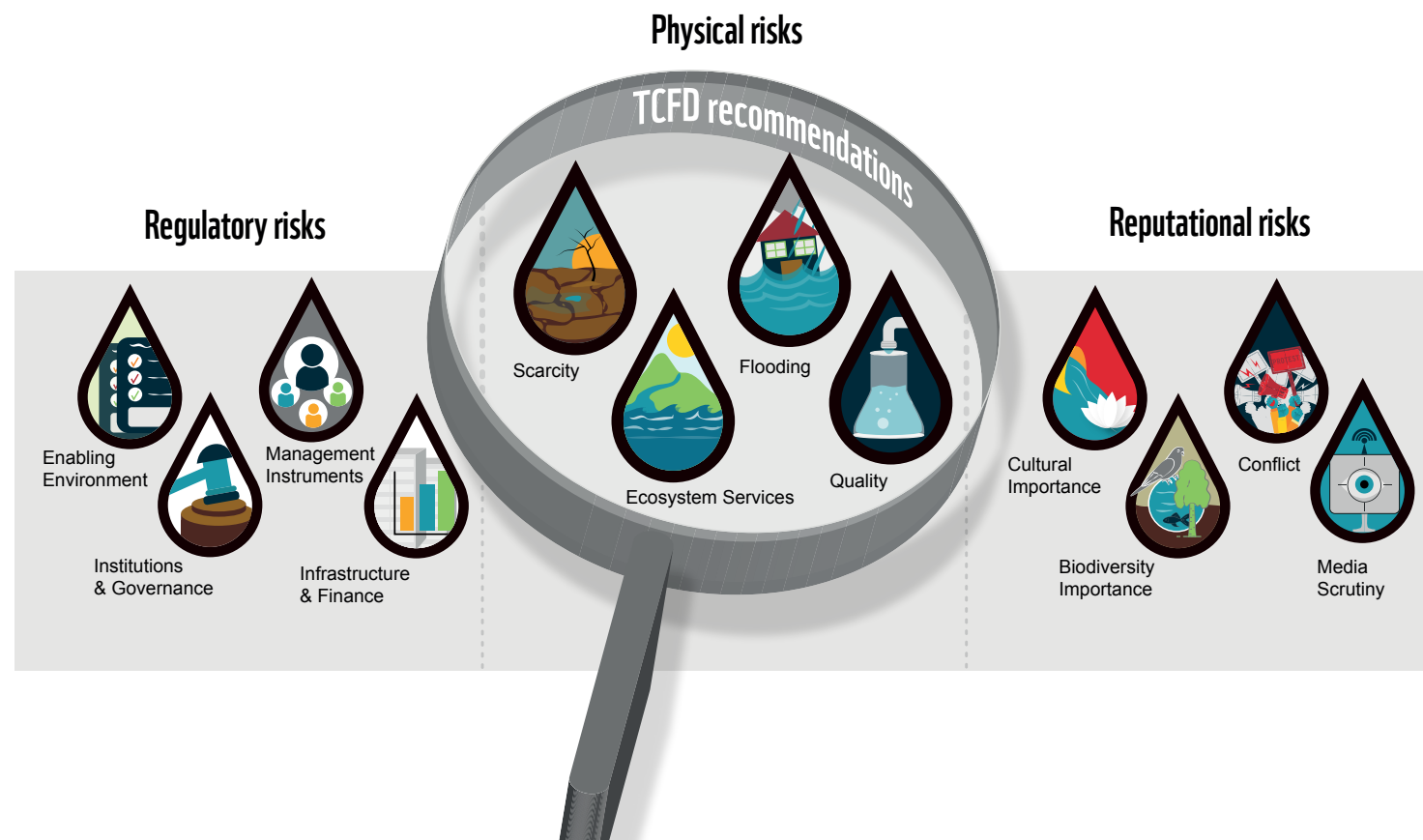


Figure 3. Physical, regulatory and reputational risks covered by the WWF Water Risk Filter

In line with the TCFD recommendations, the Water Risk Filter scenarios are based on the combination of the most relevant climate scenarios (**IPCC Representative Concentration Pathways – RCP**) and socio-economic scenarios (**IIASA Shared Socioeconomic Pathways – SSP**). More specifically, these scenarios are based on climate

impact ensemble projections that account for climate (e.g., temperature, precipitation) and socio-economic variables (e.g., population, GDP), and represent the consequences and effects of climate and socio-economic changes on water resources. Accordingly, the pathways for the Water Risk Filter scenarios follow the respective narratives described below.

Optimistic scenarios	Current trend scenarios	Pessimistic scenarios
<p>The optimistic scenarios represent a world with sustainable socio-economic development (SSP1) and ambitious reduction of GHG emissions (RCP2.6 /RCP4.5), leading to an increase of global mean surface temperature of approximately 1.5°C by the end of the 21st century.*</p>	<p>The current trend scenarios represent a world similar to current socio-economic development trends (SSP2) and intermediate GHG emission levels (RCP4.5 /RCP6.0), leading to an increase of global mean surface temperature of approximately 2°C by the end of the 21st century.*</p>	<p>The pessimistic scenarios represent a world with unequal and unstable socio-economic development (SSP3) and high GHG emission levels (RCP6.0 /RCP8.5), leading to an increase of global mean surface temperature of approximately 3.5°C by the end of the 21st century.*</p>

The Water Risk Filter Scenarios are a result of collaboration between WWF and multiple research groups with expertise in each of the specific aspects of water risk such as **IIASA Water Program**, **Water Scarcity Atlas**, the **University of Tokyo**, **IFPRI (CGIAR)**,

NIES Japan, and the **European Commission’s JRC**. For more information on the underlying datasets and framework of the scenarios, read the tool’s methodology documentation, which is available **online**.

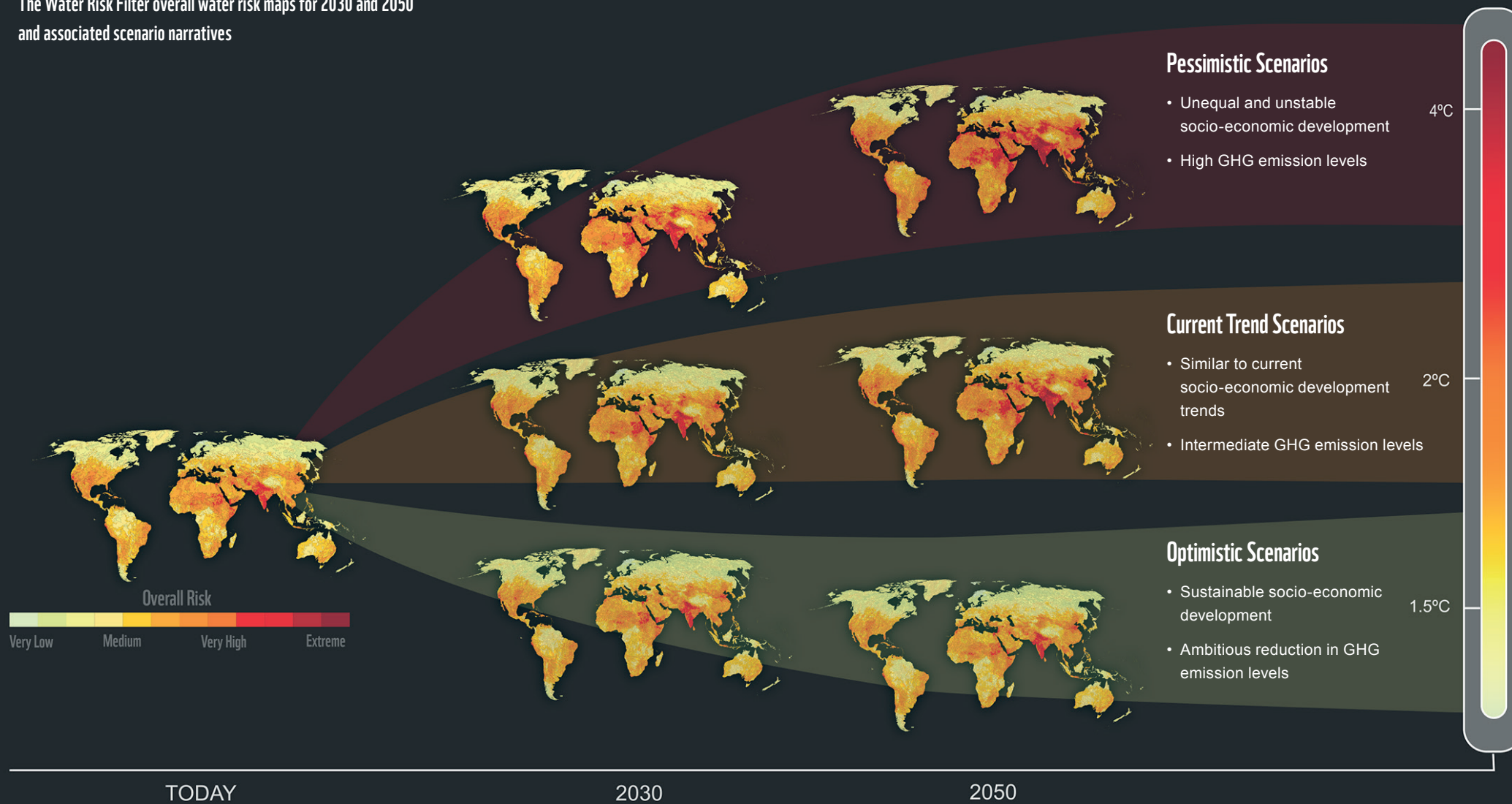
“ **UNDERSTANDING CURRENT WATER RISKS USING THE WATER RISK FILTER TOOL IS A CRITICAL FIRST STEP FOR THE SUCCESSFUL IMPLEMENTATION OF THE ALLIANCE FOR WATER STEWARDSHIP (AWS) STANDARD. WITH CLIMATE CHANGE EXACERBATING WATER RISKS, THE NEW WATER RISK FILTER SCENARIOS WILL ENABLE COMPANIES TO BETTER UNDERSTAND FUTURE CLIMATE-WATER RISKS AND DEVELOP WATER STEWARDSHIP STRATEGIES THAT ARE FUTURE-FIT.** ”

ADRIAN SYM
CEO
ALLIANCE FOR WATER STEWARDSHIP

* Changes calculated with respect to the 1986-2005 reference period, and based on the Coupled Model Intercomparison Project Phase 5 (CMIP5) ensembles.

Scenarios of overall water risk

The Water Risk Filter overall water risk maps for 2030 and 2050 and associated scenario narratives



Overview of the narratives of the WWF Water Risk Filter Scenarios

	Optimistic scenarios	Current trend scenarios	Pessimistic scenarios
Climate aspects*	<p>Low emissions – RCP2.6 / RCP4.5</p> <ul style="list-style-type: none"> • Aggressive mitigation measures so that GHG emissions are halved by 2050 • Increase of global mean surface temperature is not likely to exceed 2°C by the end of the 21st century 	<p>Intermediate emissions – RCP4.5 / RCP6.0</p> <ul style="list-style-type: none"> • Strong mitigation measures so that GHG emissions peak around mid-century, then start declining • Increase of global mean surface temperature is more likely than not to exceed 2°C by the end of the 21st century 	<p>High emissions – RCP6.0 / RCP8.5</p> <ul style="list-style-type: none"> • Business-as-usual so that GHG emissions continue to rise throughout the 21st century • Increase of global mean surface temperature is as likely as not to exceed 4°C by the end of the 21st century
Socio-economic aspects, extended towards water availability and use**	<p>Sustainability – SSP1</p> <ul style="list-style-type: none"> • Emphasis on human and nature well-being • Effective and persistent cooperation and collaboration across the local, national, regional international scales and between public organizations, private sector and civil society within and across all scales of governance • Rapid technological change • Improved resource efficiency • Sustainability concerns; more stringent environmental regulation implemented • Research and technology development reduce the challenges of access to safe water and improved sanitation 	<p>Middle of the road – SSP2</p> <ul style="list-style-type: none"> • Current social and economic trends continue • Relatively weak coordination and cooperation among national and international institutions, the private sector, and civil society for achieving sustainable development goals • Technological progress but no major breakthroughs • Modest decline in resource use intensity • Moderate awareness of the environmental consequences of choices when using natural resources. Environmental systems experience degradation • Access to safe water and improved sanitation in low-income countries makes unsteady progress 	<p>Regional rivalry – SSP3</p> <ul style="list-style-type: none"> • Emphasis on national issues due to regional conflicts and nationalism • Societies are becoming more skeptical about globalization. Global governance, institutions and leadership are relatively weak • Low investment in technology development • Increase in resource use intensity • Environmental policies have very little importance. Serious degradation of environmental systems in some regions • Growing population and limited access to safe water and improved sanitation challenge human and natural systems

* IPCC 2014 ** O'Neill et al. 2017, Wada et al. 2016

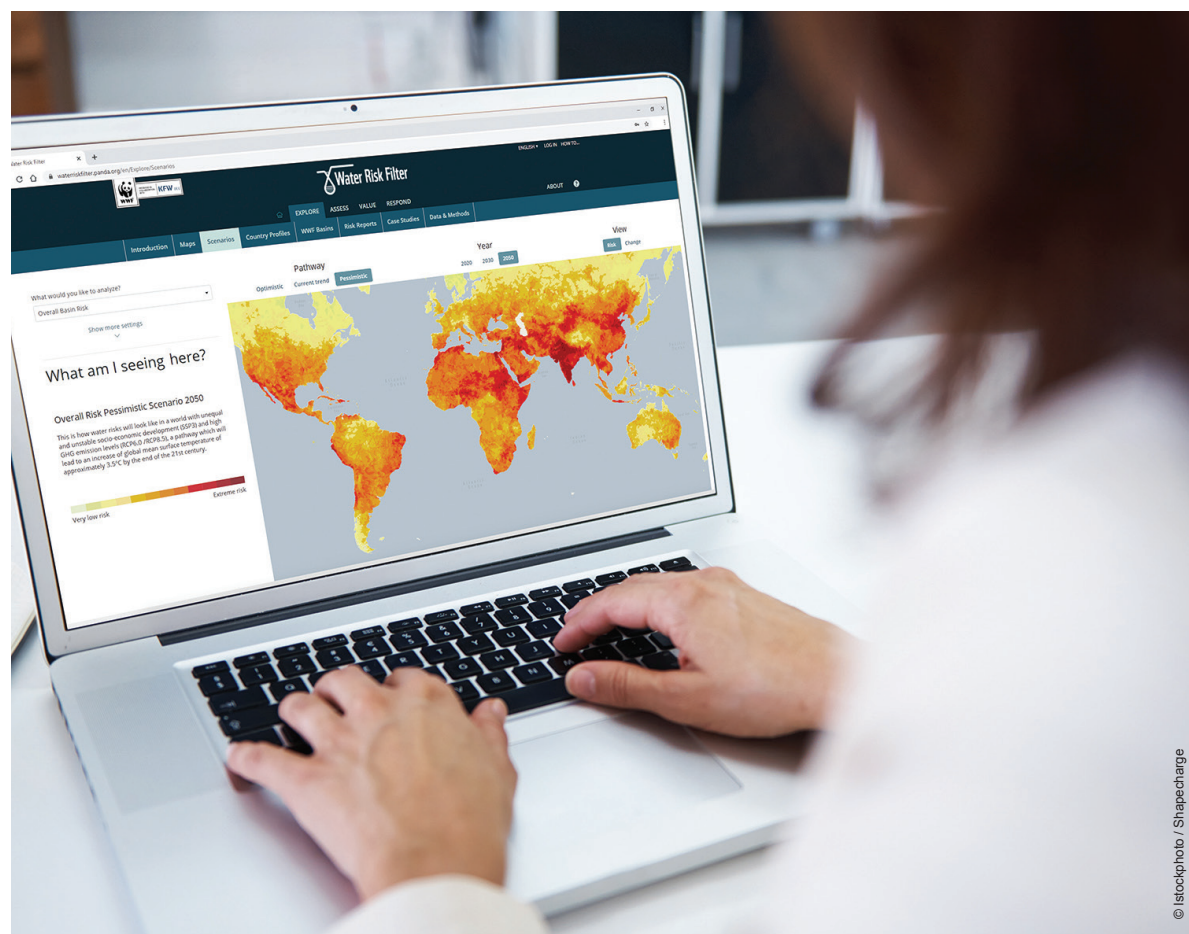
4. From risk assessment to resilience planning

The Water Risk Filter is a practical tool that guides corporates and investors along their water stewardship journey from performing a water risk assessment to identifying recommended actions to address current water risks. With the integration of new climate and socio-economic pathway-based scenarios of water risk, the tool now enables forward-looking risk assessment that can help evaluate and inform long-term resilience planning and strategy.

The four-step process on page 11 outlines how users can harness the Water Risk Filter scenarios and other unique tool functionalities to guide them from understanding risks to planning for resilience, as well as reporting aligned to TCFD and EU NFRD.

“ AS THE LARGEST GERMAN FOOD RETAILER, EDEKA IS USING THE NEW WWF WATER RISK FILTER SCENARIOS TO BETTER UNDERSTAND FUTURE WATER RISKS TO KEY AGRICULTURAL COMMODITIES, WHICH WILL HELP INFORM OUR LONG-TERM PLANS AND STRATEGY FOR CLIMATE AND WATER RESILIENCE. ”

ROLF LANGE
HEAD OF CORPORATE COMMUNICATIONS
EDEKA HEADQUARTERS



Steps from risk assessment to resilience planning

1 Assess and respond to current water risks

It is recognized best practice that undertaking a robust **water risk assessment** is a critical first step in order to identify current water risks and hotspots across operations, value chains, and investments.

Establishing a baseline of current risk exposure and responses is essential.

2 Perform scenario analysis to assess future water risks

Water risk will change over the medium to long-term due to various climate and socio-economic factors: the question is how?

The Water Filter Risk scenarios can help to understand how different types of water risks (physical, regulatory and reputational) may evolve over time, as well as identify the key drivers of change and future water risks, which companies and investors could potentially be exposed to.

3 Evaluate resilience under different scenarios to inform long-term planning and strategy

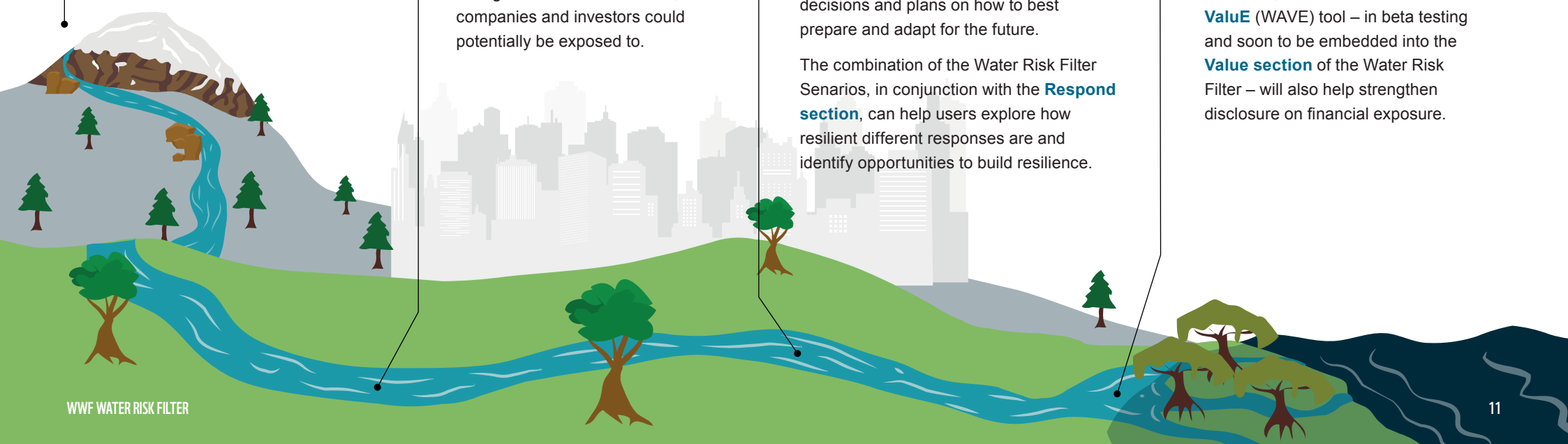
Climate and water **resilience** is the ability to prepare and plan for, absorb, recover from, and successfully adapt to adverse events, trends, or disturbances from the impact of climate change. In a world of uncertainty, the outputs from scenario analysis can be used to evaluate and test how resilient a company's proposed water stewardship responses are to different plausible scenarios, which in turn can help inform and shape strategic decisions and plans on how to best prepare and adapt for the future.

The combination of the Water Risk Filter Scenarios, in conjunction with the **Respond section**, can help users explore how resilient different responses are and identify opportunities to build resilience.

4 Disclose on water risk, opportunities, and resilience

The results from the Water Risk Filter can help improve corporate disclosure – as recommended by **TCFD** and **EU NFRD** – by providing reliable, consistent and comparable information on current and future water risks as well as identifying water stewardship response opportunities for resilience in the face of change.

Moreover, the new **Water And ValuE** (WAVE) tool – in beta testing and soon to be embedded into the **Value section** of the Water Risk Filter – will also help strengthen disclosure on financial exposure.



5. Key recommendations on the use of scenarios

- **Understand the assumptions behind scenarios**

A **scenario** is a hypothetical construct that describes a potential path of development that will lead to a particular outcome in the future. Therefore, it is critical to understand the key assumptions and uncertainties under different scenarios to be able to interpret the outputs of the analysis and potential implications.

- **Context matters – understand the drivers of risk change**

Climate change will manifest in many ways, depending on the location and nature of the business. In short, context is critical. For example, physical water risks are comprised of different risk categories: scarcity, flooding, water quality, and ecosystem services status. A good understanding of the risk levels in each of these risk categories will lead to more contextually appropriate adaptation measures.

- **Identify the challenges for adaptation**

While freshwater is a major conduit through which climate impacts are felt, it can also play a **central role in climate adaptation and resilience**. However, the greater the change in risk (i.e., the difference between today and future risk), the greater the challenge for adaptation. Therefore, it is critical to identify the sites and assets projected to face the greatest increase in risk and focus resilience efforts in those places, especially for material parts of the value chain.

- **Risk exposure is only half of the story – evaluate resilience to inform planning and strategy**

Based on the outputs of scenario analysis, it is crucial to evaluate whether the company's current strategy is adequately resilient or will need stronger resilience planning, considering the future risk levels. Scenario analysis should be appropriately incorporated into the company's risk management and strategic planning, so that risks are dynamically identified, assessed and managed.

- **Hope for the best, prepare for the worst**

As the future climate is uncertain, it is important for companies and investors to improve resilience to a

range of possible futures, including a pessimistic pathway scenario in which water risks are likely to increase most significantly.

- **Scenario analysis is not a stand-alone exercise**

The results of the Water Risk Filter scenario analysis should be integrated with other components of a company's scenario-based assessment, including the transition risks and opportunities related to the shift to a lower carbon economy as well non-water-related physical risks, which might affect the company.

- **Build resilience with Nature-based Solutions and collective action**

Like climate, water resilience cannot be fully achieved at the site scale - it requires basin-level efforts and will require much greater attention on **Nature-based Solutions** and accordingly will require a strong focus on building relationships and partnerships in basins. Resilience strategies should consider the critical benefits that nature can provide (e.g., protection from flooding, groundwater recharge) and take steps to ensure stakeholders are invested in successful outcomes.

6. Conclusion

As highlighted in WWF and AB InBev **Climate Change & Water Report 2019**, “water is the sector where most climate impacts are felt and where climate resilience must be developed”. Water offers a strong starting place for companies to develop a climate resilience plan.

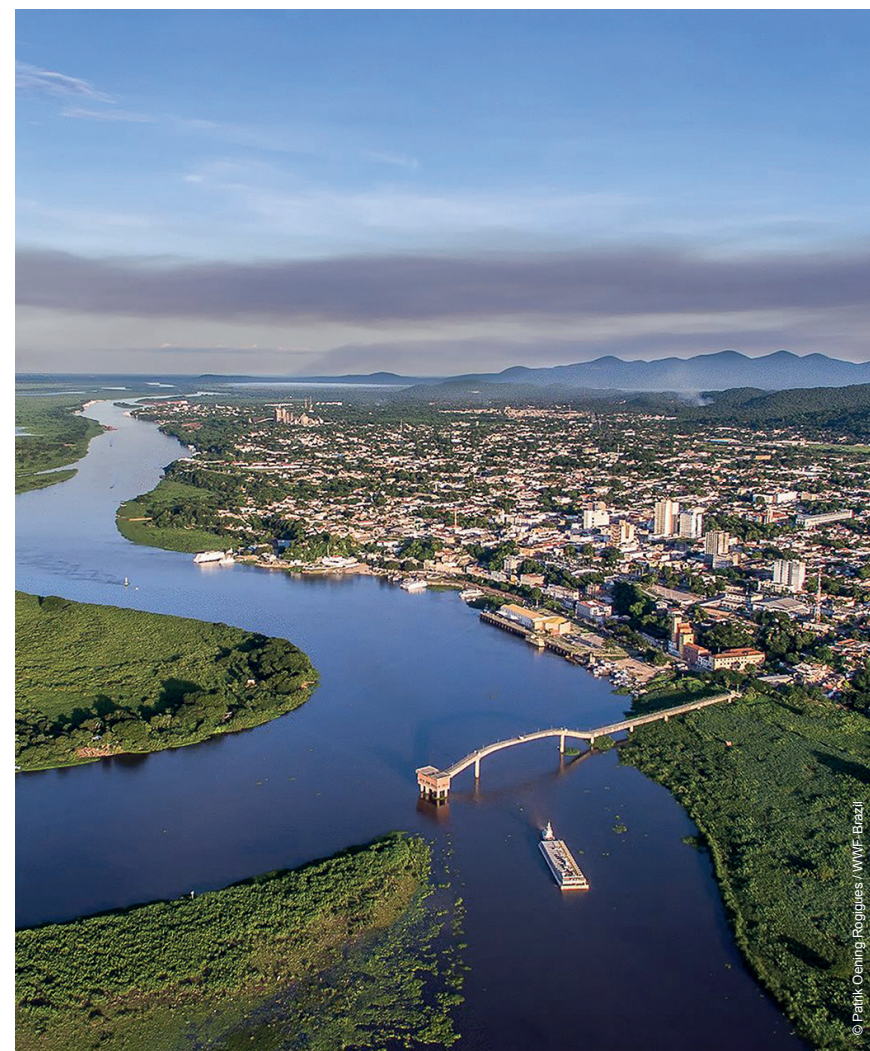
Climate change is a water risk multiplier, amplifying existing risks and opportunities. Given high uncertainty in the face of climate change, scenario analysis is a very useful approach for understanding future water risks and opportunities, so that businesses can evaluate their resilience to a range of possible future states.

In line with the TCFD and EU NFRD recommendations, the WWF Water Risk Filter now provides 2030 and 2050 scenarios of water risks, based on climate and socio-economic changes, to enable companies and investors to understand, prepare for and report on future water risks and opportunities.

To tackle the complexity of water risks, the Water Risk Filter scenarios comprehensively cover all types of water risks, ranging from TCFD-focused acute physical risks (e.g. flooding) and chronic physical risks (e.g. scarcity, water quality, and ecosystem services status) to the less commonly explored regulatory and reputational water risks, which can cause significant potential impacts if overlooked. Ultimately, the outputs of scenario analysis should be used to test and evaluate whether proposed response plans are future-fit, thus helping to inform long-term resilience planning and strategies for a water-secure and climate resilient future.

“ AS A FIRST STEP IN OUR NEW COLLABORATION WITH WWF, WE ARE ANALYZING CURRENT WATER RISKS ACROSS OUR GLOBAL OPERATIONS USING THE WATER RISK FILTER TOOL. WE LOOK FORWARD TO USING THE TOOL’S NEW SCENARIOS TO EVALUATE FUTURE WATER RISKS, WHICH WILL INFORM OUR RESILIENCE PLANNING IN THE FACE OF CLIMATE CHANGE. ”

FREDRIK HELLMAN
CLIMATE RESILIENCE LEAD
ASTRAZENECA



7. Recommended Additional Resources

Brian C. O'Neill et al. (2015) **The roads ahead: Narratives for shared socioeconomic pathways describing world futures in the 21st century**

CDSB (2019) TCFD: **Good Practice Handbook**

European Commission (2019) **Guidelines on reporting climate-related information**

GIZ (2020) **Stop Floating, Start Swimming: Water and climate change – interlinkages and prospects for future action**

Global Commission on Adaptation (2019) **Adapt now: A global call for leadership on climate resilience**

IPCC (2014) **Synthesis Report of the IPCC Fifth Assessment Report (AR5)**

Oxford University **The Nature-based Solutions Initiative**

Potsdam Institute for Climate Impact Research **The Senses Toolkit**

Task Force on Climate-Related Financial Disclosures (2017) **Recommendations of the Task Force on Climate-Related Financial Disclosures**

Task Force on Climate-Related Financial Disclosures (2017) **The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities**


UNEP Finance Initiative (2019) **A comprehensive investor guide to scenario-based methods for climate risk assessment, in response to TCFD**

Van Vuuren et al. (2012) **Scenarios in Global Environmental Assessments: Key characteristics and lessons for future use**

WWF & AB InBev (2019) **Climate Change and Water: Why valuing rivers is critical to adaptation**

WWF (2019) **Linking Water Risk and Financial Value**

WWF (2020) **Working with Nature to reduce climate risk**



“IMPACTS OF CLIMATE CHANGE WILL MOST IMMEDIATELY AND ACUTELY BE EXPRESSED THROUGH WATER”

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