Corporate Water Resilience in an Uncertain Future

March 2020

Project Team

Ross Hamilton
Tien Shiao
Jason Morrison
United Nations Global Compact CEO Water Mandate
www.ceowatermandate.org
Pacific Institute
www.pacinst.org

Christina Copeland
CDP
www.cdp.net

Jean-Pierre Maugendre
Suez
www.suez.com

Tom Williams
World Business Council on Sustainable Development
www.wbcsd.org

Support
The work was supported by the following CEO Water Mandate endorsing companies including: Abercrombie & Fitch, Anheuser-Busch InBev, Asia Pulp and Paper, Bayer AG, BHP, Braskem, Calgro M3, Cargill, Incorporated, Colgate-Palmolive Company, Danone S.A., Diageo plc, The Dow Chemical Company, Ecolab Inc., Engie, Firmenich SA, Gap Inc., GlaxoSmithKline plc, Heineken, Hilton Hotels and Resorts, Levi Strauss & Co., Mars, Incorporated, Merck and Co., Inc., Microsoft Corporation, Nestlé S.A., Netafim, Nike Inc., PepsiCo, Inc., PVH Corp., Radisson Hotels, , Suez S.A., The Coca-Cola Company, Teck Resources Limited, Unilever, Woolworths Holding Limited.

We'd also like to acknowledge the support of the CEO Water Mandate Action Platform by the Swiss Agency for Development and Cooperation (SDC).

The guide was edited by Brendan Mclaughlin and designed by Dana Beigel. Peter Schulte, Pacific Institute; Rebecca Olson, Pacific Institute; and Mai-Lan Ha, United Nations Global Compact; provided direction for the final stages of publication.
Cover Photo: ©BreSmith/Unsplash

Recommended Citation
United Nations Global Compact CEO Water Mandate, Pacific Institute, CDP, Suez, World Business Council for Sustainable Development. 2020. Corporate Water Resilience in an Uncertain Future. www.ceowatermandate.org/resilience-report.

Corporate Water Resilience in an Uncertain Future
ISBN: 978-1-940148-00-7

Acknowledgements
The following experts provided advice on substance and structure throughout the development of the publication.

Contributors
Cate Lamb, CDP
Camille Richard, Suez
Abigail Warner, United Nations Global Compact CEO Water Mandate, Pacific Institute
Alua Suleimenova, United Nations Global Compact CEO Water Mandate, Pacific Institute

Peer Reviewers
John Matthews, The Alliance for Global Water Adaptation (AGWA)
Librian Angraeni, Asia Pulp and Paper
Lanny Jauhari, Asia Pulp and Paper
Jehanne Fabre, Danone
Heather Cooley, Pacific Institute
Colin Strong, World Resources Institute

Table of Contents

Introduction 4

Water-related climate risks 5

Companies that fail to act will struggle to endure, let alone thrive 6

Barriers to private sector action 8

Existing private sector approaches for identifying, assessing and managing physical climate risks 10

Building resilience: leading corporate case examples 13

- Direct operations 13
- Healthy catchments 13
- Supply chains 14
- Local communities 15

Conclusions 16

Figures and Tables

Figure 1. The physical impacts of climate change go beyond a company's direct operations 4

Figure 2. Examples of physical impacts of climate change experienced by companies 6

Table 1. Common barriers to company actions on climate change and illustrative measures to overcome them 9

Table 2. Illustrative prompt questions for companies to assess their readiness to build resilience 10

Box 1. General and sector-specific guidance for companies on physical climate risk management 11

Introduction

Climate change poses one of the most serious threats to societies, economies and environments across the globe. The business community is already experiencing adverse physical effects of climate change, from increased operational costs and disrupted production to social unrest in communities in which companies operate.[1] These climate impacts are most prominently expressed through changes in the water cycle.[2,3] "*If climate change is the shark, water is its teeth*" is an analogy quoted with increasing frequency in business conference circuits. According to data reported to CDP, changes in precipitation and extreme drought were the most common physical risks of climate change.-

> **"Water is the first casualty of climate change."**
>
> —Howard Bamsey
> Chair of GWP and former Executive Director, Green Climate Fund

A growing number of companies recognize the imperative to manage the risks of climate change. To build resilience to a changing climate and thrive into the future, companies will need to adequately consider, mitigate and adapt to the water-related risks of climate change to their core operations, surrounding communities, supply chain and broader networks.

The purpose of this discussion paper is to:

- Highlight the link between physical risks of climate change and impacts on business.
- Present the case for more urgent action from business to manage water-related risks of climate change.
- Demystify common barriers and present illustrative solutions to private sector action on climate change.
- Present leading examples of companies better integrating their efforts on climate change and water and collaborating with strategic partners to have positive impact.

This paper summarizes existing literature assessing the physical risks of climate change to the private sector and examples of how the private sector can address these risks and build their water resilience. The reader should expect to understand why more action is urgently needed by businesses, the existing barriers to action, and proposed solutions to address those barriers. The partner organizations have worked with companies to understand the physical risks of climate change and how to address those risks. In documenting what's been done to date we aim to raise awareness and enable more companies to build their water resilience.

1 Goldstein, A., Turner, W.R.; Gladstone, J. and D.G. Hole, "The private sector's climate change risk and adaptation blind spots," 2019, Nature, Vol 9, 18-25.

2 Boltz, F. Poff, N.L.; Folke, C.; Kete, N.; Brown, C.M.; Freeman, S.; Matthews, J.H.; Martinez, A. and J. Rockstrom, "Water is a master variable: Solving for resilience in the modern era," 2019, Water Security, Vol 8, 1-7.

3 Sadoff, C.W. and M. Muller, "Better water resources management: greater resilience today. More effective adaptation tomorrow," 2009, GWP TEC Perspective Paper, Global Water Partnerships, Stockholm.

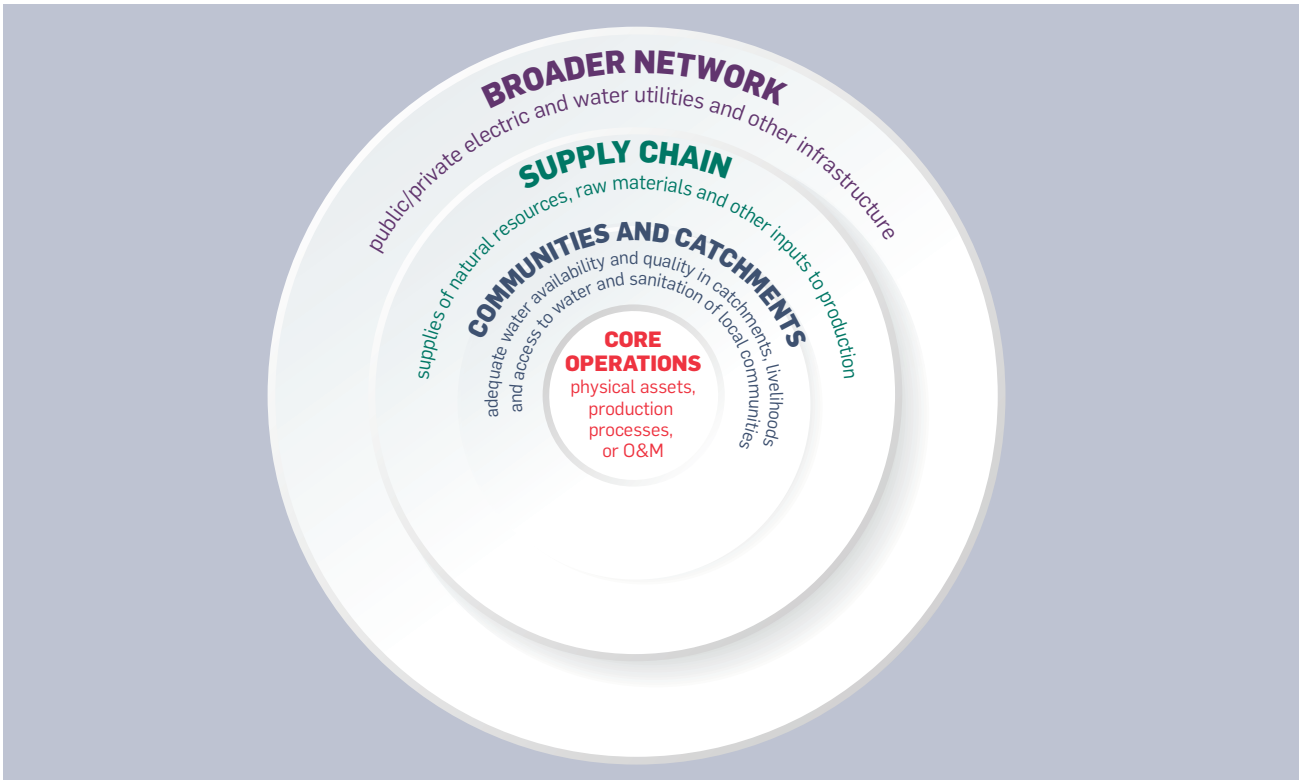
Water-related climate risks

Climate change is already affecting the direct operations, surrounding communities, supply chains and broader network of companies around the world, as well as the broader networks on which they depend (Figure 1). The potential impacts of water-related climate risks to companies (Figure 2)[4] include:

- Storms damaging facilities and transportation/energy infrastructure and equipment.
- Flooding from intense rainfall interrupting production and necessitating interventions to increase water treatment capacity. In 2011, flooding in Thailand cost Ford Motor Company 34,000 units in lost production.[5]
- Droughts reducing the availability and/or increasing the cost of natural resources and related inputs. For example, reduced water availability can result in power outages and disruption.
- Increased competition for natural resources driving conflict with local communities, production interruptions, and potential asset stranding.

In 2018, 215 of the world's largest companies reported exposure to US$970 billion in climate risks (transition and physical risks).[6]

FIGURE 1. **The physical impacts of climate change go beyond a company's direct operations[7]**



4 Goldstein et al., "The private sector's climate change risk," 18-25.

5 Ford's CDP Report: 2018-2019. https://corporate.ford.com/microsites/sustainability-report-2018-19/assets/files/ford-response-to-carbon-disclosure-project.pdf

6 Climate transition risks are defined as financial risks which could result from the process of adjustment towards a lower-carbon economy (https://beyond-ratings.com/publications/climate-transition-an-unpriced-risk-2/). Climate physical risks are defined as physical damage that companies may sustain from climate change induced environmental changes such as extreme weather events (https://www.schroders.com/fr/insights/economics/how-will-physical-risks-of-climate-change-affect-companies/).

7 Adapted from Sussman, F.G. and J.R. Freed, Adapting to climate change: A Business Approach, Center for Climate and Energy Solutions, 2008.

Climate change is a threat multiplier, often exacerbating existing water-related risks. In many regions, climate change is increasing water stress, posing a major challenge for water-intensive sectors like apparel, food and beverage and agriculture.[8] Companies with long-lived fixed assets, such as those in the mining and power sectors, are especially vulnerable to the water-related impacts of climate change.[9]

FIGURE 2. **Examples of physical impacts of climate change experienced by companies**

Companies can inadvertently increase climate-related risks for vulnerable communities through competition for water during droughts, or emergency spillage of waters during floods and extreme rainfall events. Some communities are disproportionately vulnerable to climate change impacts due to their direct reliance on water and natural resources for their food and livelihoods, poor access to clean water and sanitation, and exposure to extreme weather events. Additionally, there is an outsized impact on women, children, migrants, the urban poor and indigenous people.

Companies that fail to act will struggle to endure, let alone thrive

There is a need for significant action by all parts of society, including the private sector, to curtail greenhouse gas emissions. At the same time, there is the recognition that climate impacts are inevitable, meaning adaptation actions are also required. For companies to adapt and build resilience in a changing climate, they will need to adequately manage the impacts of a changing climate, including the availability of good quality water resources.

8 UNESCO, The United Nations world water development report 2019: Leaving No One Behind. https://en.unesco.org/themes/water-security/wwap/wwdr/2019.

9 ICMM, Adapting to a changing climate – building resilience in the mining and metals industry. https://www.icmm.com/website/publications/pdfs/climate-change/191121_publication_climate_adaptation.pdf.

CLIMATE ADAPTATION: specific actions undertaken to respond to or prepare for particular climate impacts. Adaptation can lead to climate resilience.

CLIMATE RESILIENCE: the ability to recover from and/or resist a deviation, shock, or stressor by bouncing back with transformation.

WATER RESILIENCE: the ability of freshwater systems to persist, adapt and transform to sustain coherent function under change.[10]

Climate change adaptation seeks to lower companies' risks, and also presents opportunities. There are three broad types of opportunities related to physical climate change impacts: managing existing physical climate risks; responding to emerging physical climate risks; and adapting to market shifts driven by physical impacts and catering to any resulting new market needs.[11] To illustrate this, 225 of the 500 biggest companies reported climate-related opportunities totalling over US$2.1 trillion dollars.[12]

Publication of the Financial Stability Board Taskforce's guidance on climate-related financial disclosure in 2017 has had a positive impact on the private sectors' approach to climate risk assessment and disclosure.[13] Nonetheless, several "blind spots" around corporate climate adaptation exist, including:

- Risks relating to the transition to a lower carbon economy (referred to as transition risks) receive greater scrutiny than the physical risks of climate change.[14] In recognition of the need to advance disclosure practice, the European Bank for Reconstruction and Development released further guidance for companies to improve their approach to assessing and disclosing information related to the physical risks of climate change.[12]
- Of the physical risks of climate change disclosed in the 2018 CDP data, around 70% were considered direct, just over 20% were expected to occur in the company's supply chains, and less than 10% could affect their customers, suggesting that companies may be less familiar with the ways in which their supply chains may be affected.[15]
- Adaptation actions adopted by companies to manage physical climate risks are predominantly soft in nature, with a focus on planning and de-risking processes. Hard adaptation approaches (i.e., capital investments in technology or engineered infrastructure) are the next most common, with ecosystem-based approaches (the sustainable management, conservation and restoration of ecosystems) rarely used.[16]

10 Adapted from Boltz et al., "Water is a master variable," 1-7.

11 European Bank for Reconstruction and Development, Advancing TCFD guidance on physical climate risks and opportunities, 2018. www.physicalclimaterisk.com.

12 CDP, Major risk or rosy opportunity. Are companies ready for climate change, 2019. https://www.cdp.net/en/research/global-reports/global-climate-change-report-2018/climate-report-risks-and-opportunities.

13 TCFD, TCFD: Status Report, June 2019.

14 Goldstein et al., "The private sector's climate change risk," 18-25.

15 CDP, Major risk or rosy opportunity.

16 Goldstein et al., "The private sector's climate change risk," 18-25.

Adaptation to water-related climate risks will require dramatic improvements in the efficiency of water use, the elimination of pollution in order to ensure the water remaining in the catchment is safe to use, investments in healthy catchments and water infrastructure, support for adaptive water governance, and the strengthening of the adaptive capacity of local communities. Potential business benefits of strengthening the capacity of local communities include avoidance of company-community conflict over access to water and other natural resources, and ensuring the health and safety of their workforce.[17]

Barriers to private sector action

The risky alternative to the proactive management of climate-related risks is for companies to learn by experiencing the full brunt of climate-related impacts. Yet like other groups across/within society, many companies have been slow to respond. Past planning and management efforts were typically based on the assumption of climate stationarity: assuming the past predicts the future.[18,19] However, it is now clear that this is no longer a valid assumption.

Uncertainty about the timing and severity of possible climate impacts are common reasons for inaction. However, companies are accustomed to making decisions within a large spectrum of uncertainty on a suite of factors, and a number of approaches have been developed to help companies deal with climate-related uncertainties (see Table 1 and Box 1).

Common barriers to company action, as well as illustrative examples of how companies and representative organizations have acted to circumvent them, are outlined in Table 1. The barriers have been framed around the three "revolution areas" put forward by the Global Commission for Adaptation to drive appropriate decision-making and the release of required public and private financial flows.[20]

17 Red Cross Red Crescent Climate Centre, Companies and Climate Resilience: Mobilizing the power of the private sector to address climate risks, 2019.

18 Smith, D.M. et al., Adaptation's thirst: Accelerating the convergence of water and climate action, Background paper prepared for the 2019 report of the Global Commission on Adaptation, 2019.

19 McKinsey Global Institute, Climate risk and response – physical hazards and socioeconomic impacts, 2020.

20 Global Commission on Adaptation, Adapt now: A global call for leadership on climate resilience, 2019. https://cdn.gca.org/assets/2019-09/GlobalCommission_Report_FINAL.pdf

TABLE 1. **Common barriers to company actions on climate change and illustrative measures to overcome them** [21,22,23,24]

Barrier area	Description	Examples of approaches to address barriers
Understanding	• Failure to recognize that future climate trends will differ from past trends • Uninformed about potential business risks to value chain over various timescales • Lack of awareness of solution options	Braskem, a Brazilian petrochemical company, completed a climate risk assessment of its supply chain and identified water stress as a significant risk. In response, Braskem developed an adaptation plan through 2040 that entails engaging with high water risk suppliers to adopt new approaches for addressing water and climate risks through training workshops, implementation improvements and annual reporting of water and climate management. Braskem also implemented water reuse in high water risk areas to ensure a more robust and reliable supplier management process.[25,26]
Planning	• Difficulty obtaining accurate and relevant climate information and data • Difficulty dealing with high levels of uncertainty in climate projections in planning and decision-making • Short-term focus of planning	To facilitate member companies' access to relevant climate data, the International Council on Mining and Metals (ICMM) developed and launched the Mining Climate Assessment tool (MiCA), which allows users to download the latest climate projection for any site. Climate data includes changes in temperature, rainfall and wind speed, as well as variation in water stress from the World Resources Institute's Aqueduct. ICMM's member companies use MiCA to inform mine planning and operational modifications.[27,28]
Finance	• Uncertainty about how to price and value climate-related risk • Perceived costs of adjusting business plans • Unconvincing potential yields from adaptation investments	Data from hundreds of the world's largest companies shows that the majority expect much lower costs to manage climate risk than to manage the potential implications of the risk.[29] To tackle the impacts of climate change through commitments to reduce their carbon footprints and improve water efficiency, Diageo announced a £180 million commitment to sustainable energy and water infrastructure in one of their key regions, Africa. Diageo is supporting investments in solar energy, renewable biomass power and water efficiency for breweries in seven African countries.[30]

21 Loechel, B. and Hodgkinson, J. H., Climate impacts and adaptation in Australian mining communities: industry and local government views and activities: 2013 follow-up survey, 2014, EP14694, CSIRO.

22 Climate Disclosure Standards Board and Sustainability Accounting Standards Board, TCFD Good Practice Handbook, 2019.

23 USAID, Addressing Climate Vulnerability for Power System Resilience and Energy Security: A Focus on Hydropower. RALI Series: Promoting Solutions for Low Emission Development. ICF International, Washington DC., 2017.

24 Peace, J. and Maher, K., Weathering the Next Storm: A Closer Look at Business Resilience 13, 26, Arlington: C2ES, 2015, https://www.c2es.org/publications/weathering-next-storm-closer-look-business-resilience.

25 Braskem, Annual Report, 2018. https://www.braskem.com.br/annualreport2018.

26 Braskem, Stockholm Water Week event, 2019. https://www.worldwaterweek.org/event/8614-braskem---from-climate-change-risks-to-water-security.

27 International Council on Metals and Mining, Enhancing mining's contribution to society, 2016. https://www.icmm.com/website/publications/pdfs/annual-review/2016_icmm_annual-review.

28 The Taskforce on Climate-related Financial Disclosures, 2019 Status Report. https://www.fsb.org/2019/06/task-force-on-climate-related-financial-disclosures-2019-status-report/.

29 CDP, Major risk or rosy opportunity.

30 Diageo, Investing £180 million in a climate-resilient future for Africa, 2019. https://www.diageo.com/en/in-society/case-studies/investing-180-million-in-a-climate-resilient-future-for-africa/.

A number of examples of companies overcoming these barriers exist. Using the Global Commission for Adaptation "revolution areas" framework, Table 2 outlines prompt questions for companies to assess their readiness for a better, more resilient future.

TABLE 2. **Illustrative prompt questions for companies to assess their readiness to build resilience**

Revolution area	Illustrative prompt questions
Understanding	Has your company undertaken a vulnerability assessment for site/value chain/broader network, including over different time scales? Does your company currently track the cost of any weather/water-related impact on sites/ the business? How does your company currently price climate/water-related risks? How vulnerable is your host community to climate change?
Planning	How do you currently deal with uncertainty in planning and investment decision-making? What future climate scenarios is your company prepared for, and how will your business need to adjust as a result? What is your current level of disclosure on physical climate risks? Are you integrating water-related issues into long-term business objectives, and your strategy for achieving those long-term objectives?
Finance	What options and costs have you explored for addressing climate risk exposure? Are you integrating water-related issues into financial planning?

Existing private sector approaches for identifying, assessing and managing physical climate risks

Despite a growing number of companies assessing and managing the potential physical impacts of climate change on their business operations, action is not at the scale, degree, or urgency warranted. This situation has been compounded by the lack of structured approaches to support business on their climate resilience journey, although this is also changing (Box 1).

BOX 1. **General and sector-specific guidance for companies on physical climate risk management**

GENERAL GUIDANCE:

- The Task Force on Climate-Related Financial Disclosure has championed the use of scenario analysis to determine the cost of both transition and physical risks and opportunities to which companies are exposed.[1] Further guidance for companies on undertaking scenario analysis is planned.
- The European Bank for Reconstruction and Development and the Global Centre of Excellence on Climate Adaptation have developed guidance for companies on reporting physical climate risks and opportunities.[2]
- The World Business Council on Sustainable Development developed a guide outlining actions that companies can take to strengthen their supply chains in the face of threats from climate change.[3]
- BSR developed a private-sector risk and resilience framework that enables the private sector to understand the three elements of climate risk—the physical hazards of climate change—and how exposed and vulnerable their operations, supply chains and the communities in which they operate might be to these climate impacts.[4]
- AECOM developed the six-step Climate Resilience Framework including scoping risk, screening risk, applying climate science, detailed risk assessment, resilience options, and implementation of resilience options.[5]

SECTOR-SPECIFIC GUIDANCE:

- Leading mining companies have collaborated to develop a seven-step process for identifying priority physical climate risks and measures to address them.[6]
- The International Hydropower Association launched the **Hydropower Sector Climate Resilience Guide** in 2019.[7] The guide offers a methodology for identifying, assessing and managing climate risks to enhance the resilience of hydropower projects. The guide adopts a bottom-up approach by leveraging understanding of the operational constraints, so that hydropower project design and management can be stress-tested against uncertain conditions.

1 The Task Force on Climate-related Financial Disclosures, The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities, 2019. https://www.tcfdhub.org/scenario-analysis/.

2 European Bank for Reconstruction and Development and the Global Centre of Excellence on Climate Adaptation, Advancing TCFD Guidance on Physical Climate Risks and Opportunities, 2019. https://www.physicalclimaterisk.com/media/EBRD-GCECA_draft_final_report_full.pdf.

3 World Business Council on Sustainable Development, Building Resilience in Global Supply Chains, 2015. https://www.wbcsd.org/contentwbc/download/442/4590.

4 BSR, Resilient Business, Resilient World: A Research Framework for Private-Sector Leadership on Climate Adaptation, 2018. https://www.bsr.org/reports/BSR_Resilient_Business_Resilient_World_A_Research_Framework_for_Private_Sector_Leadership_on_Climate_Adaptation.pdf.

5 AECOM, Becoming Climate Resilient: An executive business case for climate resilience, 2015. https://www.aecom.com/wp-content/uploads/2016/08/Becoming_Climate_Resilient_NOV2015.pdf.

6 BSR, Adapting to Climate Change: A Guide for the Mining Industry. https://www.bsr.org/reports/BSR_Climate_Adaptation_Issue_Brief_Mining.pdf.

7 International Hydropower Association, Hydropower Sector Climate Resilience Guide, 2019. https://www.hydropower.org/download/file/nojs/21346.

Across the various private-sector climate resilience frameworks and approaches (Box 1), there are a number of common expectations and requirements, including:

- The need to evaluate climate risk in the context of vulnerability. Failure to assess the vulnerability of people and assets amplifies the climate and disaster risk threatening a business.
- The importance of using the best available climate data and information, covering (at a minimum) the lifespan of the asset, in order to adequately evaluate the associated risk and opportunity.
- The importance of ensuring the scope of climate-related vulnerability assessment goes beyond the direct operational and facility boundary and considers the supply chain, local community and enabling infrastructure, such as ports and railways.
- Acknowledgment that the baseline weather and climate conditions previously used for business planning and decision-making purposes almost certainly have changed and will do so further.
- The critical importance of obtaining multi-functional input (i.e. beyond simply environmental function) to ensure an assessment takes a broad perspective. Relevant business departments are likely to include finance, planning, procurement, human resources, community, asset management, engineering, infrastructure and health and safety.
- The value of integrating resilience into existing company's processes, such as those for planning, risk management, investment and capital evaluation, rather than being a "bolt on" exercise or process.
- Consideration of partnerships as a means for implementing climate resilience strategies.

Building resilience: leading corporate case examples

A growing number of companies have started to assess and respond to water-related climate risks by developing mitigation and adaptation strategies at a number of organizational levels. Below are case examples of adaptive strategies within direct operations, local catchments, surrounding communities and supply chains to build resilience, the areas where climate change impacts are felt by companies (see Figure 1).

DIRECT OPERATIONS

Once climate-related hazards are understood, companies often focus on actions such as enhancing water-use efficiency, ensuring appropriate water pollution controls are in place, and undertaking flood mapping exercises to protect key on-site infrastructure.

- **L'Oreal**, a beauty company, has a global climate change risk map representing all activities and business areas. The list of risks is prioritized based on the level of impact and control by L'Oreal. Physical risks from climate change disrupt L'Oreal's operations due to increased severity and frequency of weather events. To mitigate their physical risk, L'Oreal has a business continuity plan (BCP) for crisis management and recovery to minimize the impact on their revenues. The site's supply chain manager or environmental health and safety manager implements, updates and tests the BCP. The supply chain technical directors ensure that the BCP is deployed and the corporate supply chain managers centralize the information. In parallel, L'Oreal has a natural hazard insurance program which assesses the vulnerability of their production sites to extreme weather events to inform the prioritization of prevention actions. Operating losses over one month from interruption of a factory from extreme weather events are largely covered. Insurance is implemented if damage to a production plant occurs despite the prevention actions.[31]

- **Olam**, a global agribusiness company, recognized water as a business risk to its operations in California, especially after the 2012-2017 drought. To address this risk, Olam developed a selective breeding program to produce onions with higher solid content and lower water content in order to optimize irrigation. In collaboration with growers, Olam has saved 9.7 billion litres of water, 280 tons of nitrogen, 20,000 tons of greenhouse gases and 4.6 million kwh of power since 2009.[32]

HEALTHY CATCHMENTS

Many companies have come to understand that even the most water-efficient operations with well-managed effluent discharge are not insulated from water-related climate risks if the water resources in the catchment they depend on are under threat. Accordingly, the protection and restoration of wetlands, upland forests and other crucial ecosystems are critical to ensuring reliable water supplies and reducing flood risks in a changing climate.[33] Furthermore, these nature-based solutions can result in multiple benefits, such as improved water quality, carbon sequestration and enhanced biodiversity.

31 L'Oreal's Climate Change CDP response, 2019.

32 We Mean Business, Survival of the driest – Olam's innovative onion breeding program, 2017. https://www.wemeanbusinesscoalition.org/wp-content/uploads/2017/08/Case-Study-OLAM.pdf.

33 Global Commission on Adaptation, 2019. Adapt now: A global call for leadership on climate resilience, 2019. https://cdn.gca.org/

- **Volkswagen**, a car manufacturer, has a production plant in the Puebla Tlaxcala Valley, a region of Mexico where water supply was insufficient to meet the growing city of Puebla and local industry. The company partnered with experts from the Comisión Nacional de Áreas Naturales Protegidas and Free University of Mexico City. Since groundwater recharge was dependent on restoring ecosystems on the volcanic slopes of Popocatépetl and Iztaccíhuatl, Volkswagen replanted 300,000 Hartweg's Pines, dug 21,000 pits, and developed 100 earthen banks to retain rainwater and infiltrate water into deeper soil layers. Approximately 1.3 million cubic meters of groundwater per year were recharged back into the aquifer. Additional biomass sequestered CO_2 and improved conditions for native fauna. The additional groundwater supply will support Volkswagen's long-term operations and benefit local communities.[34]

- **LafargeHolcim,** a building materials company, faced increased flooding near their operations due to climate change and deforestation. Through careful review of hydrologic and hydrogeological studies of river systems, LafargeHolcim gained experience managing river flow and converting their quarries into water retention basins to mitigate flood risk. In addition, one quarry in Bellegarde, France, in partnership with the local municipality, regulators and other stakeholders (NGOs, residents and farmers), was converted into a stormwater reservoir with constructed wetlands, flood control gates, piping and channels. When the water level rises, the system releases water from the river to the rehabilitated quarries, reducing flood risk to LafargeHolcim and the local community. The created wetland habitats increased biodiversity and developed recreational areas for the local community.[35]

SUPPLY CHAINS

A growing number of companies are realizing that their supply chains are more vulnerable than in the past due, for example, to just-in-time processes and physical distances between locations. Interdependencies, such as extreme events at one remote location, can bring the supply chain to a halt. Companies with a large supply chain can build resilience through disaster risk management plans.

- **Nestlé's** subsidiary companies, Nescafé and Nespresso, depend on Colombian suppliers for raw materials, many of which are smallholder farmers. Nestlé partnered with other organizations to formulate an Intelligent Water Management (IWM) plan–the Manos al Agua framework—to make the Colombia coffee sector more resilient to the impacts of climate change through improved environmental performance at the farm and watershed levels. The IWM focused on four areas: clean technology transfer (water conservation/treatment post-coffee washing process), healthy ecosystems (agroforestry and bioengineering to minimize soil erosion and conserve important water areas), knowledge generation (a water and climate monitoring system and preventing crop damage due to extreme weather), and cooperation and participation (collective action). So far, 10 water reuse systems have been constructed, 160 sites selected for reforestation and agroforestry, and 27 local community

assets/2019-09/GlobalCommission_Report_FINAL.pdf

34 Volkswagen, Replenishing groundwater through reforestation in Mexico, 2011. https://www.cbd.int/doc/books/2011/B-03740.pdf.

35 WBCSD, Natural Infrastructure Case Study: Water Management and Flood Prevention in France, 2015. https://www.naturalinfrastructureforbusiness.org/wp-content/uploads/2015/11/LafargeHolcim_NI4BizCaseStudy_WaterManagementFloodPrevention.pdf.

participation groups set up to train farmers implementing actions in 25 river basins to build climate resilience.[36]

- **Illovo**, a subsidiary company of Associated British Foods, is mostly made up of independent sugar cane farmers in Africa. The threat of water scarcity led Illovo to fund the Sustainable Sugarcane Farm Management System (SUSFARMS) with three fundamental environmental principles: conserving natural assets, maintaining critical ecosystems' services, and using agricultural resources sustainably. SUSFARMS reduced impacts to biodiversity and ecosystem health with expected savings of US$6.8 million annually.[37]

LOCAL COMMUNITIES

The private sector has an important role to play in strengthening the adaptative capacity of their surrounding communities to climate change. The innovations, products, services, political influence, capacity to shape behavior, and investments the private sector could contribute are essential for enhancing the resilience of vulnerable communities across the world.[38] More specifically, the private sector can support community responses to water-related climate risks by:

- Involving communities in climate risk and resilience discussions.
- Considering how the company may be a source of increased risk for local and wider communities' water access under different climate scenarios.
- Ensuring maladaptation does not result from climate resilient measures for projects (i.e. where carbon mitigation and/or adaptation causes deleterious flow-on water impacts that may be detrimental to the environment and local communities).
- Supporting enhanced awareness of climate change and its water-related impacts within local communities.
- Supporting the development of local community adaptation plans that factor in water resources which will enable them to access funding.
- Supporting the development of climate-resilient livelihoods and associated skills.

36 Manos as Agua-Intelligent Water Management, A Nestle Case Study. https://ceowatermandate.org/wp-content/uploads/2017/11/BAFWAC_-_Nestle_11.4.pdf.

37 Corporate Citizenship, The Impact of Illovo in Africa, 2017. https://www.illovosugarafrica.com/UserContent/Documents/Illovo-Impact-Report-Group-Dec17.pdf.

38 Red Cross Red Crescent Climate Centre, Companies and Climate Resilience: Mobilizing the power of the private sector to address climate risks, 2019. https://reliefweb.int/report/world/companies-and-climate-resilience-mobilizing-power-private-sector-address-climate-risks.

The humanitarian community is a logical partner for the private sector considering their experience and track record in supporting communities throughout the world to build their climate resilience over many years.

- In 2014, the mining company **Rio Tinto Minera Peru** commenced a community adaptation project at its La Granja copper site in Peru, where the surrounding communities are facing climate-related impacts.[39] The primary objective of the adaptation project was to support identification of both current and future risks to the livelihoods of local communities and to build capacity for adapting to those risks. Using the CRiSTAL tool[40] and CARE International's Climate Vulnerability and Capacity Analysis (CVCA) framework[41], an inclusive and participatory approach was taken to ensure effective community consultation and ownership of the project's results. The project improved knowledge and understanding of the local climate-related hazards, their impact on community livelihoods, and the coping strategies of the La Granja community. Rio Tinto Minera Peru also came away with actionable recommendations for supporting community resilience.

Conclusions

Companies across various industries and geographies are already experiencing the adverse water-related impacts of climate change, resulting in disruptions to operations, increased costs, depreciation of assets, and strained relationships with local stakeholders. The significance and urgency of the impacts, however, is not reflected in the climate adaptation planning and management practices undertaken by the private sector overall, despite advancements in recent years.

To build resilience, the private sector would benefit from consideration of physical climate impacts beyond its operational boundaries—to their core operations, surrounding communities, supply chains and broader networks—to better integrate water and climate efforts already underway, invest in solutions to address physical climate impacts, support community resilience, and partner with others on developing and implementing those solutions. Therefore, climate change adaptation not only seeks to lower risks to companies associated with a changing climate, but also has possible opportunities.

There are cases of private sector leadership across different industry sectors, yet much more needs to be done. Solutions are clear, action needs to be accelerated, and partnerships will continue to be important.

39 International Council on Metals and Mining (ICMM), Rio Tinto Minera Peru: La Granja Project, 2016. https://www.icmm.com/website/case-studies/2016_la-granja-case-study.pdf.

40 Community-based Risk Screening Tool – Adaptation and Livelihoods (CRiSTAL). https://www.iisd.org/cristaltool/

41 Care International, Climate Vulnerability and Capacity Analysis Handbook. https://careclimatechange.org/cvca/

The CEO Water Mandate's six core elements:

Direct Operations

Mandate endorsers measure and reduce their water use and wastewater discharge and develop strategies for eliminating their impacts on communities and ecosystems.

Supply Chain and Watershed Management

Mandate endorsers seek avenues through which to encourage improved water management among their suppliers and public water managers alike.

Collective Action

Mandate endorsers look to participate in collective efforts with civil society, intergovernmental organizations, affected communities, and other businesses to advance water sustainability.

Public Policy

Mandate endorsers seek ways to facilitate the development and implementation of sustainable, equitable, and coherent water policy and regulatory frameworks.

Community Engagement

Mandate endorsers seek ways to improve community water efficiency, protect watersheds, and increase access to water services as a way of promoting sustainable water management and reducing risks.

Transparency

Mandate endorsers are committed to transparency and disclosure in order to hold themselves accountable and meet the expectations of their stakeholders.