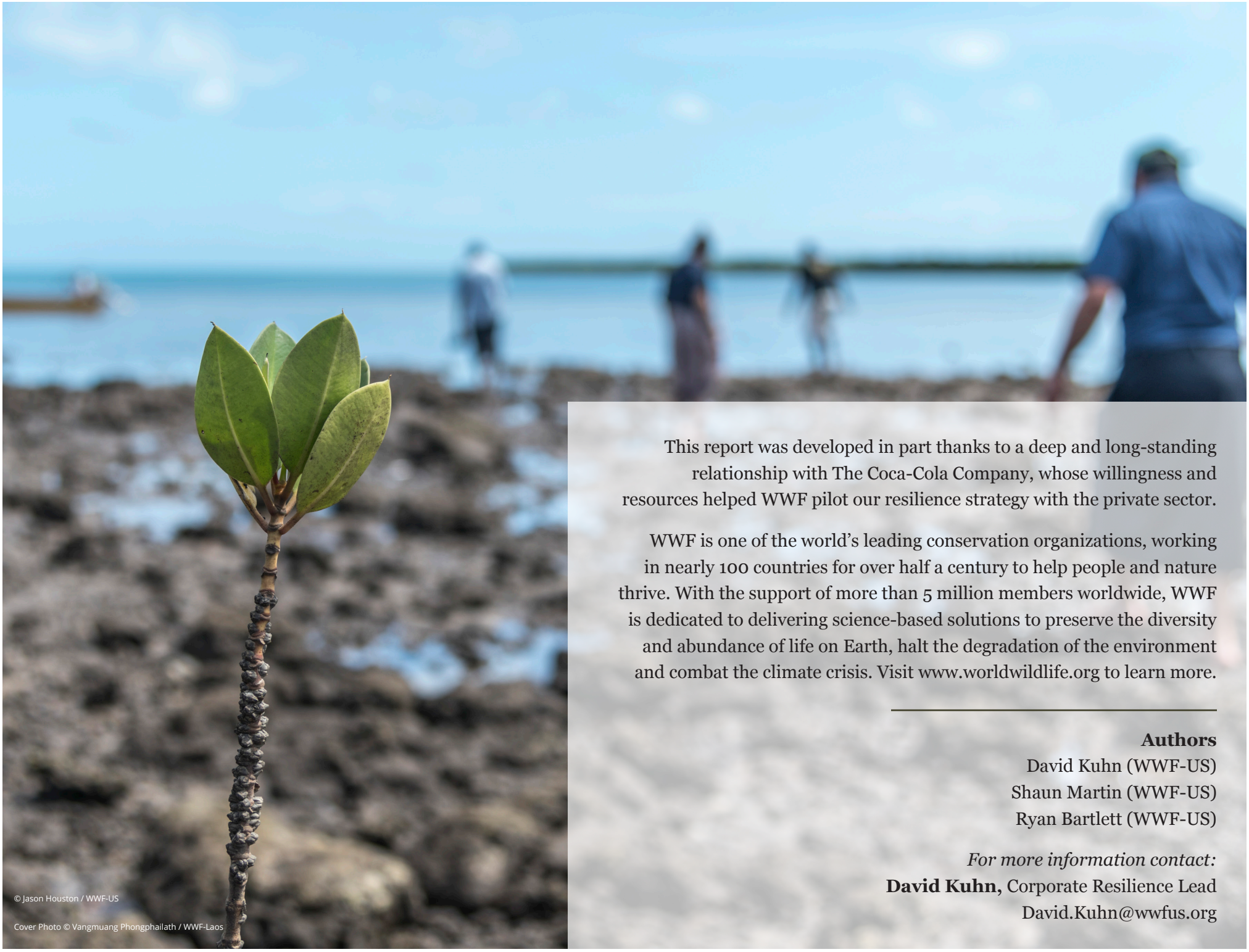
RISING TO RESILIENCE

A Practical Guide for Business & Nature



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WWF is one of the world's leading conservation organizations, working in nearly 100 countries for over half a century to help people and nature thrive. With the support of more than 5 million members worldwide, WWF is dedicated to delivering science-based solutions to preserve the diversity and abundance of life on Earth, halt the degradation of the environment and combat the climate crisis. Visit www.worldwildlife.org to learn more.

Authors

David Kuhn (WWF-US)

Shaun Martin (WWF-US)

Ryan Bartlett (WWF-US)

For more information contact:

David Kuhn, Corporate Resilience Lead

David.Kuhn@wwfus.org

INTRODUCTION

Climate change is amplifying and creating new risks for companies.

As storms, droughts and heat waves become more frequent and severe, natural systems that provide the essential inputs to sustain production and ensure business continuity face ever-increasing threats. Companies must now ensure they are not only sustainable, but also "resilient" -- that is able to withstand, recover from, and adapt to changes in weather and climate. Companies can manage climate risks by building resilience in their supply chains, the communities where they operate, and the natural systems they rely upon. The purpose of this guidebook is to help companies understand where they are at risk from climate change and to begin to develop and refine strategies that build resilience to rapid, ongoing change by utilizing nature.

Company awareness of the risks climate change poses to value chains, communities, infrastructure, nature and ultimately their business has grown significantly in recent years, owed, in large part, to the fact that climate impacts have become more quantifiable, dramatic, and costly[1]. A 2019 State of Green Business report also notes that consumer demand for action on climate change is becoming a factor driving a sharp increase in the awareness of climate risks among companies[2]. Companies are seeing the impacts of climate change on their profitability, sustainability, and reputation.

In response to increasing climate impacts and demand for action, companies are reporting on physical and transitional risks associated with climate change, and around 80% of those engage in reducing their emissions. While nearly every large company has significant plans to cut emissions, very few have plans to manage the current and future climate change risks to their businesses beyond further investment in business-as-usual sustainability programs.[3] Yet there is an increasing number of incidences of companies failing to respond to or mitigate social and environmental risks, from environmental disasters to social conflicts over resource allocation and use.[4] Companies are often paralyzed by the complexities and new uncertainties that climate change brings to traditional risk management. More is required to address the root causes of system failures and the amplification of risk that climate change will have on companies and the systems on which they rely.

As companies increasingly turn their attention to addressing climate risks, there is an urgent need for clear and actionable risk management guidance that is good for companies, society and the planet. While companies can report climate-related risk and risk mitigation to platforms like the Task Force on Climate-related Financial Disclosures (TCFD), there is no clear guidance on what to report or how to mitigate risk that aligns resilience and sustainability options. This lack of alignment is itself a serious risk to companies, people and nature. It is important for companies to think not only about the impacts of climate change on their supply chains, but also the vulnerability of the communities and natural systems on which we all depend for services and solutions. If companies misinterpret risk and misalign action to contend with a narrow set of risks or goals, they may compromise the broader health of the communities and ecosystems they rely on for profit, productivity, and social license to operate. The answers are not always simple and require commitment and time, but developing solutions grounded in the resilience principles detailed in this guidance can lead to durable benefits.

WHAT DOES CLIMATE CHANGE MEAN FOR COMPANIES?

Companies have been disclosing information on their environmental, social and governance risks since the late 1990s. However, two factors have led to companies simply reporting issues rather than addressing the underlying problems.

1 **The problems themselves are often complex and often outside the direct control of companies.**

2 **Companies tend to focus on a set of narrowly defined risks in isolation from one another.**

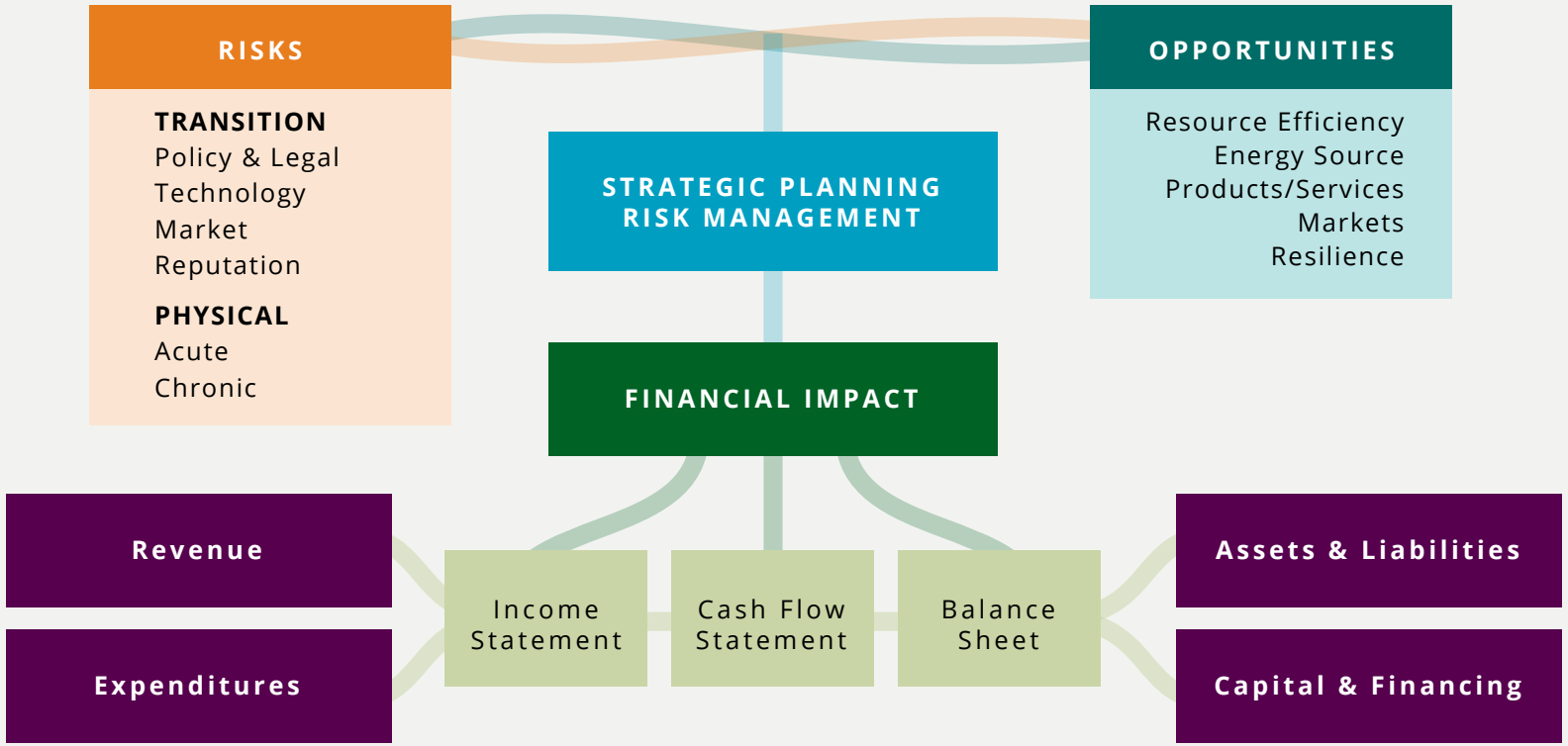
Investment in sustainability as a business practice, defined as the implementation of a business strategy that focuses on the ethical, social, environmental, cultural, and economic dimensions of doing business, can help a company understand the complexity of the problem.[5] Corporate boards of some of the largest companies in the world are beginning to use sustainability as a measure of corporate health.[6] However, sustainability is no longer a sufficient measure of health because climate change acts as a risk multiplier by increasing or exacerbating extremes and stresses, but also by the inherent uncertainty in its nature. The past is not the future and companies are now being forced to reassess how they look at risk as well as how they define sustainability. A sustainability strategy does not inherently make a company more resilient.

Impacts of climate change on business

According to one valuation, the value at risk as a result of climate change, to the total global stock of manageable assets ranges from $4.2 trillion to $43 trillion between now and the end of the century. The 2015 study highlights that "much of the impact on future assets will come through weaker growth and lower asset returns across the board." Companies may not be able to avoid climate-related risks by shifting value chains as climate change is a systemic issue.[7] Climate change affects everything. Companies are being forced to invest in longer-term strategies and solutions at scale. Organizations that invest in activities and strategies that may not be viable in the longer term due to climate risks are thus less resilient; and their investors will likely experience lower returns.

Climate change impacts can be categorized as shocks and stresses, or "acute" and "chronic", and can be felt throughout the value chain. Acute risks such as severe storms, floods, and drought have immediate and apparent impacts on corporate operations, supply chains, customers, and communities. Chronic risks, like sea level rise and desertification, are longer-term and will not disappear. TCFD has outlined the financial impacts of climate change for business (Figure 1), but there are broader implications from climate change for companies beyond how it manifests in a traditional enterprise risk management (ERM) report.

Figure 1

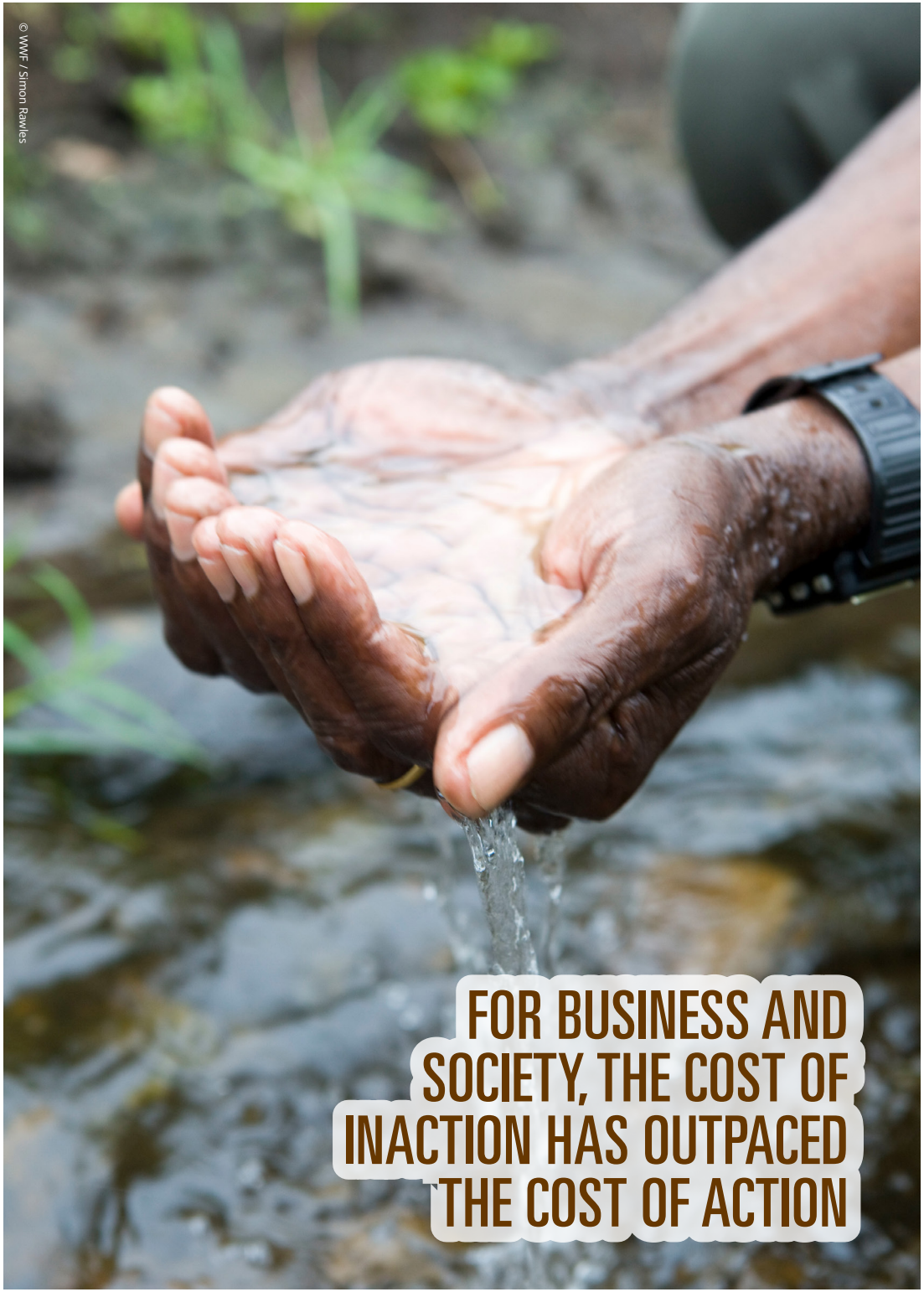


Source

Climate change not only directly impacts a company's operations and supply chains, but affects a company's health in other ways. Climate change impacts economies, communities and workforces through the spread of tropical diseases like malaria and dengue, which are moving poleward into new areas, and the appearance of novel pathogens not just for people but for livestock and wildlife. Plants become less nutritious, as more carbon dioxide in the atmosphere can decrease dietary iron, zinc, protein, and other macro- and micronutrients in certain crops. Lack of available clean water also has serious implications for human health and sanitation.

Social license to operate is an essential part of a healthy business and it too can be affected by climate change. Profits alone do not create social license. "Without social legitimacy, companies might find it difficult to access physical inputs and financial capital as well as obtain permits and other resources to function." A company is not only impacted by climate risk within its fence line, but also by how communities where they operate are impacted by climate change and how they respond to those impacts. A lack of awareness of the risks climate change poses to the broader landscape and communities can result in hitting the "panic" button when faced with an emergency or overwhelming stressor, and compromising investments in social legitimacy and environmental sustainability for immediate sourcing or rebuilding needs. Furthermore, if companies do not consider how communities are being impacted by climate change, they cannot plan to meet societal expectations that give them social license.

Beyond risk to value chains and communities, consumers as well as governments are demanding more action. According to the 2019 State of Green Business report, recent years have shown a sharp increase in the number of companies reporting customer-driven risks relating to climate change, led by young people. For business and society, the cost of inaction has outpaced the cost of action. [8]



ECOSYSTEMS & PEOPLE DO NOT OPERATE INDEPENDENTLY; THEY ARE PARTS OF AN INTERDEPENDENT SYSTEM, EACH INFLUENCING THE HEALTH AND VIABILITY OF THE OTHER

The Value of Ecosystems:
How should companies value nature to build resilience?

Ecosystems themselves provide economic benefits and services to society and business. Ecosystem services, such as pollination of crops, water filtration, flood mitigation, waste decomposition, carbon sequestration and climate regulation are worth around $125 trillion dollars annually. A recent paper by WWF, Natural Capital Project, and Global Trade Analysis Project modeled the value loss of six ecosystem services at US$9.87 trillion in real GDP by 2050, partly as a result of degradation.[9] The degradation of ecosystems is hindering their ability to provide services and resources, to keep our society and economy healthy. It is for this reason that so many companies have developed sustainability strategies.

Nature is also humanity's first line of defense against the impacts of climate change. But climate change itself poses an immediate and existential threat to ecosystems. This has direct impacts on our economy and potential to be prepared for changes. The consequences of climate change and synergistic impacts on the natural world are particularly apparent in the agricultural sector. Climate change could depress growth in global agriculture yields up to 30% by 2050.[10] And without resilient agriculture, crop failures and food insecurity will likely lead to increased environmental degradation as companies shift production to new locations and communities exploit natural resources to accommodate lost livelihoods and incomes. We are at risk of finding ourselves in a negative feedback loop, where climate change destroys our means of production and well-being, and in response we further compromise the very ecosystems that are providing the same.

Climate change affects the entire globe, but its impacts are local and landscape dynamics are complex. Ecosystems and people do not operate independently; they are parts of an interdependent system, each influencing the health and viability of the other. Companies and their supply chains are also integral parts of this system. To remain viable in the face of growing risks and uncertainty, businesses will need to invest in broad, system-wide solutions. Resilience is ultimately a property of systems and an individual company's resilience means little if the natural and social systems upon which it depends are disrupted or fail. One of the best ways for business to become more resilient is to leverage nature.

Resilience & Companies

WWF broadly defines climate resilience as: the ability of a social-ecological system to absorb and recover from climate-related shocks and disturbances and maintain functionality and services by adapting to chronic climate stressors, and transform when necessary. For business, resilience means the ability to achieve and maintain long-term goals in the face of shocks and stresses. It is inherently about fostering understanding, responsiveness, learning, flexibility, and continuous improvement.

Resilience means dealing with unidentified risks and considering adapting and transforming. But companies can become resilient at the expense of people and nature, which would only compound risk and impacts. In order to survive and thrive, companies need to take steps to guard ecosystems and ecosystem services against degrading human activities as well as climate change. Companies can avoid maladaptation and compromising long-term health and wellness of communities and the environment by framing their risk from climate change in a socio-ecological context.

Building resilience is a process that requires attention to complexity and consideration of system dynamics. Companies need to understand how they're organized to deal with complexity and uncertainty. They need new strategies to address environmental, social, and supply chain turbulence, and to safeguard investments in sustainability from climate impacts while maximizing return on investment in sustainability.

While climate change amplifies existing risks, and creates new risks and greater uncertainty, lack of a plan, contingencies, and inflexibility exacerbates or creates its own risks as well. Platforms such as the Task Force on Climate-related Financial Disclosures (TCFD) have provided companies with the opportunity to inform investors and insurers of climate risk with a consistent climate-related financial risk disclosure, opening the door to deeper understanding of climate risks and financial implications. Companies are developing plans to address their climate risk and taking action. But how companies take taking action matters.

Investment in business as usual sustainability and reducing impact does not fully help a company face a changing world. Companies now need to embrace change and uncertainty. Being proactive and prepared can, if framed through a social-ecological lens, have financial benefits for companies as well as create socio-ecological benefits and buffers. Companies are beginning to see the opportunities in climate change, from new products to expanding markets to marketing, and opportunities to do things better. Investments in nature are a way to do things better and meet multiple goals. They have proven to be a cost-effective and smart way to act. **And safeguarding those natural solutions to the threats of climate change makes good business sense.**

FOR BUSINESS, RESILIENCE MEANS THE ABILITY TO ACHIEVE AND MAINTAIN LONG-TERM GOALS

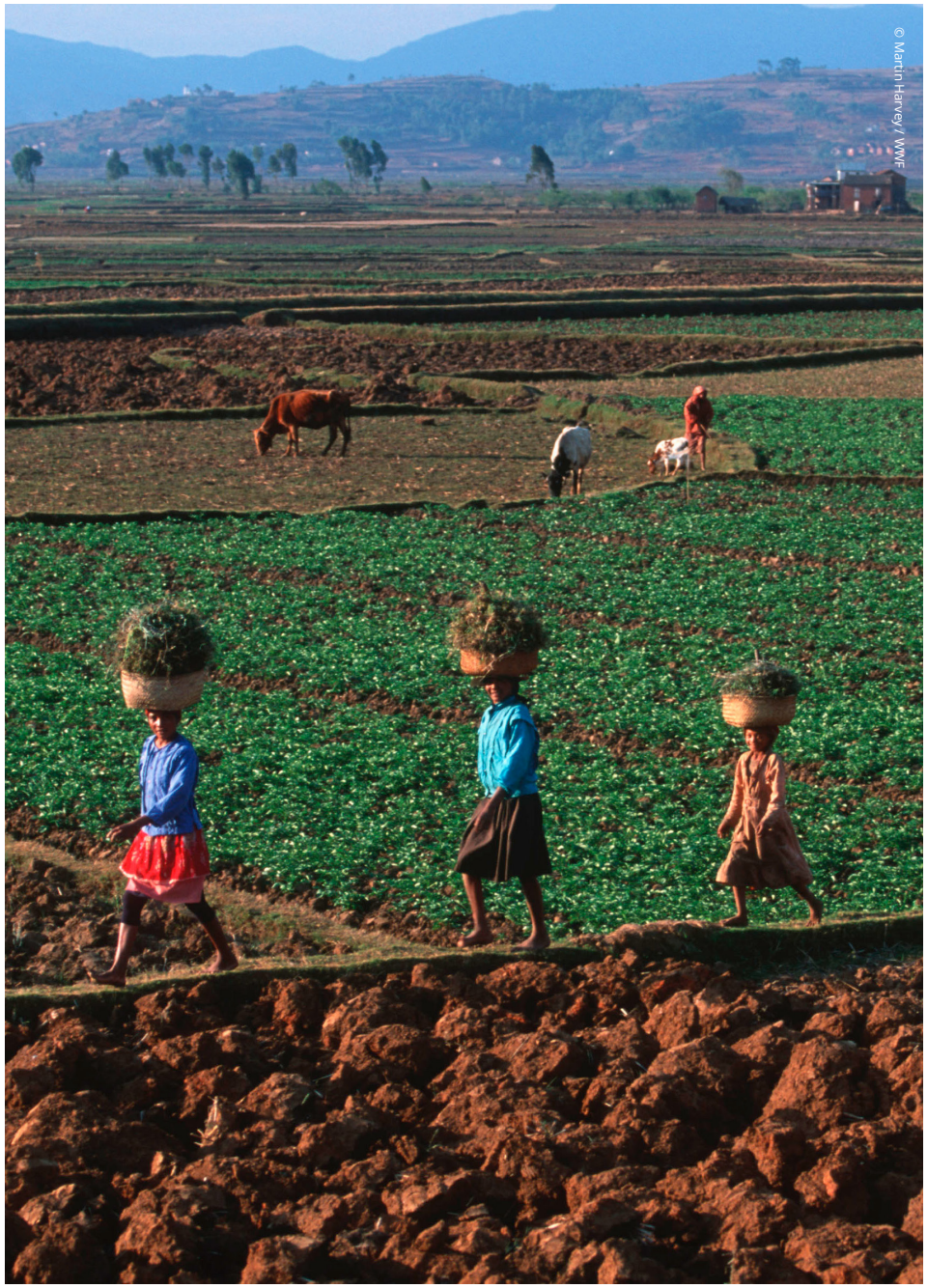
RESILIENCE & SUSTAINABILITY

Sustainability is the practice of reducing environmental impacts to ensure balance between natural resource use and replenishment, ultimately improving the quality of life and the bottom line. It often assumes a functioning and stable system. Rejecting the use of pesticides in agriculture because of their harmful effect on pollinators necessary for crop production can be considered a sustainability strategy. However, in doing so organic farmers may increase their vulnerability to outbreaks of new pests that are becoming more frequent with climate change. To protect crops from this emerging threat one needs a resilience strategy.

Resilience is the practice of anticipating risks and designing strategies to mitigate those risks to ensure that systems maintain functionality (or profitability) in the face of destabilizing disruptions and chronic stresses. To build resilience to pest outbreaks organic farmers may begin planting pest-resistant strains of crops. They could also switch new entirely new crops or move production to new areas where the new pests are not yet present. Or they can begin using pesticides.

Each of these options presents a dilemma. How can farmers (and companies) continue to pursue sustainability as they build resilience to emerging shocks and stresses? Pest resistance may come in the form of GMOs. New crops may require more water resources (and may not be as profitable). Moving to new areas could mean clearing natural forests and grasslands. And of course, using pesticides could be abandoning the sustainability strategy altogether.

However, sustainability and resilience can work together. Sustainable practices can contribute to resilience, if they're designed with socio-ecological resilience in mind. To address a broad number of risks and uncertainty, a company needs to plan to be resilient and sustainable. Companies committed to pursuing sustainability goals will face the same sorts of tradeoffs as they seek to build the resilience of their companies in the face of a rapidly changing climate, and will need to plan to minimize tradeoffs to achieve their goals.



WWF's Principles of Resilience

Avoid Harming Nature

Efforts to build corporate resilience should pursue actions that help mitigate risk without undermining valuable ecosystem services that provide important services to businesses and communities. In short, companies should not sacrifice their environmental **sustainability goals** to build resilience to climate-related risks.

EXAMPLE

Removing a mangrove forest to build a seawall to protect coastal assets will result in the loss natural protection from storm surge and sea level rise, loss of carbon storage potential, and habitat for fish nurseries that may be important to local communities.

Use Nature to Help People

Corporate resilience strategies should consider the important contributions that nature provides to people, communities, and economies in reducing vulnerabilities to the impacts of climate-related shocks and stresses. Interventions that build upon nature's contributions to societal challenges like climate change are called **Nature-based Solutions.**

EXAMPLE

Natural wetlands can reduce flood risks through water retention during periods of high rainfall.

Build Resilience for Nature

Resilience strategies should not overlook the significant risks that climate change poses to nature, nor assume that sustainability efforts alone can build resilience to unprecedented climate shocks & stresses. Nature itself needs to adapt to climate change. In fact, companies may need to strengthen their sustainability goals to reduce pressure on nature as well as support **"climate-smart" conservation** interventions to ensure continued delivery of important services to people and businesses.

EXAMPLE

Forests can help stop soil erosion, recharge groundwater and store carbon. But these services are lost when forests burn under increasing drought and heat. We must manage forests differently, sometimes even allowing new species of trees within forests, to help ensure their long-term viability.

A GOVERNMENT MIGHT DAM A RIVER TO STORE WATER FOR ITS CITIZENS IN TIMES OF DROUGHT ONLY TO DEPRIVE ITS NEIGHBORS DOWNSTREAM OF THE WATER RESOURCES THEY NEED

These principles, which value nature and its contributions to the social-ecological system in which companies operate, can help guide companies as they develop resilience strategies to mitigate risks to their profitability, reputation, social license to operate and to their sustainability goals. As companies think about resilience, there are a few things they should consider.

First, is that there are multiple definitions of resilience and all are equally valid. Ecologists, engineers, sociologists, and public health officials each have their own understanding of the concept and apply it to different problems. Resilience is multi-dimensional, depending on one's vantage point and perspective. Furthermore, building resilience for one group may come at the expense of making others less resilient. A government might dam a river to store water for its citizens in times of drought only to deprive its neighbors downstream of the water resources they need.

Companies can be resilient in multiple ways. There are two broad categories of resilience "general" and "specified." General resilience basically means "healthy." When someone is healthy, they can withstand and recover from a whole host of non-specific illnesses and injuries. You can build general resilience by eating well, exercising regularly, and avoiding unhealthy habits like smoking. When you get a cold, you should bounce back faster than someone who does not take care of themselves. But being in good overall health does not mean you are immune to specific diseases like Ebola, for example. For specific threats you need to build "specified resilience." Each year we are encouraged to get immunized for new strains of flu. For threats like Ebola, society needs to take special measures to prevent its spread.

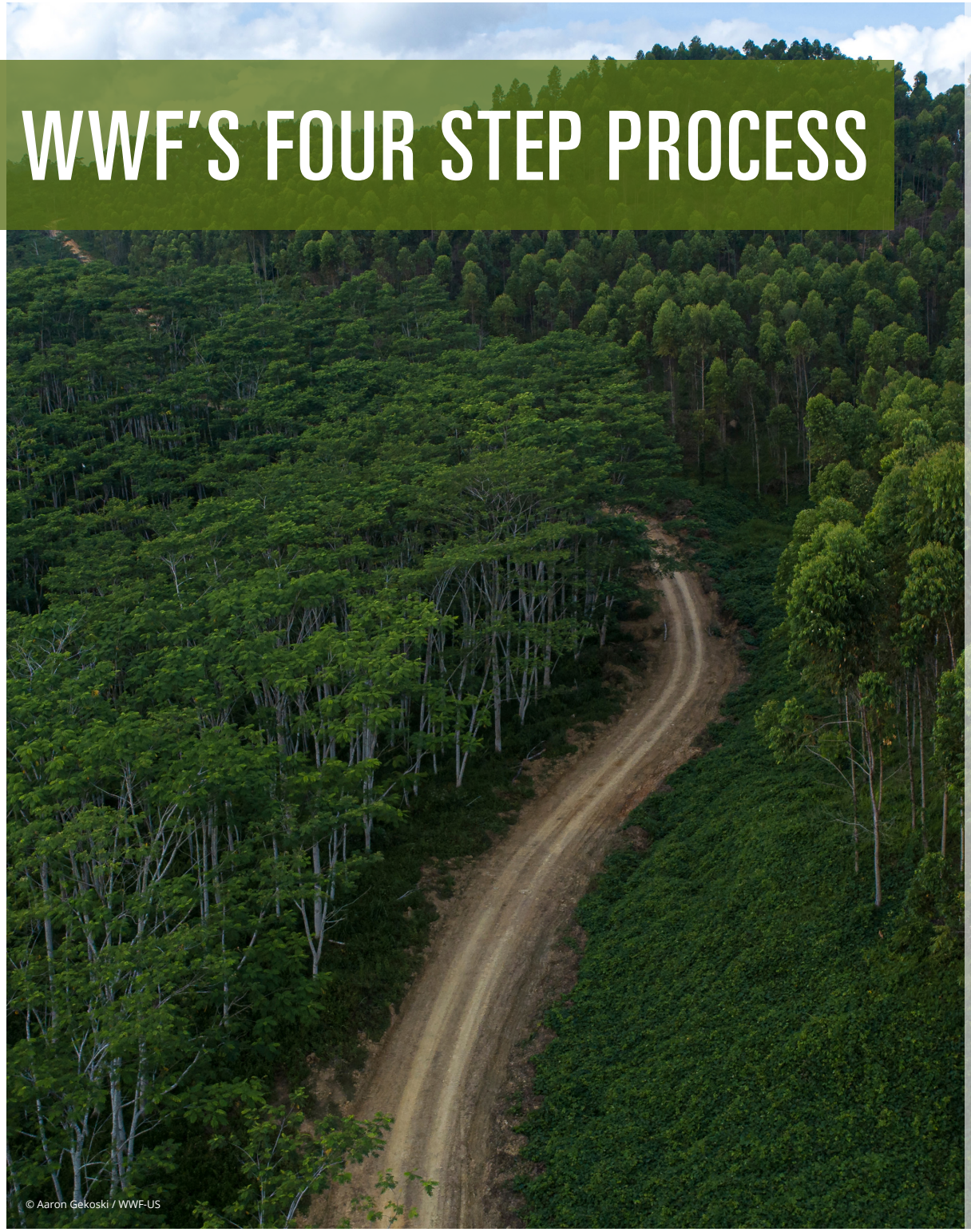
HOW SHOULD COMPANIES BUILD RESILIENCE?

As the previous section suggests, there are many ways to think about and build resilience depending on a company's goals and the context in which it operates. Companies should build both general and specific resilience. They should invest in actions that build general resilience as well as specific resilience to identified threats to specific areas through targeted actions. Investments in resilience means a company is addressing general threats as well as specific threats brought about by climate change. And companies should use sustainability as a tool for building resilience. This line of thinking also offers opportunities. A company's plan to address risk should involve actions that make business sense: investing in sustainability can lead to growth in a company's top and bottom line.

Resilience is a process, not an end goal. You cannot achieve resilience, only strive toward it. You cannot be resilient to everything all the time. Although quantifying risk and measuring resilience are challenging, companies can implement checklists and processes and incentivize solutions that build system resilience and help meet sustainability goals. To improve risk management and resilience building, companies can do things like use climate, environmental, and social information in risk screening; and gather information from landscapes and stakeholders in landscapes where the company operates. Companies can also develop and implement environmentally-conscious disaster risk management policies and practices. Extending time horizons in planning can help ensure the right kind of responsiveness and flexibility of businesses in landscapes. Encouraging and incentivizing the appropriate use of "nature-based solutions," such as wetlands and forests, can help reduce the impacts of floods and recharge aquifers. And companies should rethink how natural resource management must account for the impact of climatic change on nature and recognize that nature itself is affected, by using climate information in planning nature-based solutions and incorporating scenario planning.

WWF has developed a four step process to help companies identify key climate-related risks and develop solutions that help build resilience while valuing and supporting nature.

WWF'S FOUR STEP PROCESS



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STEP 01

Assess Risk: Assembling Available Knowledge & Resources, Planning for Change, & Developing a Long-Term Capacity for Informed, Flexible Management

STEP 02

Develop a strategy to manage for change, not just persistence

STEP 03

Implement local solutions that are nature-friendly, responsive, and flexible

STEP 04

Monitor, evaluate, and adaptively manage

1 ASSESS RISK: Assembling Available Knowledge & Resources, Planning for Change, & Developing a Long-Term Capacity for Informed, Flexible Management

The first step to better managing the growing climate risks that a business faces is understanding those risks. The Task Force on Climate-related Financial Disclosures (TCFD) has opened the door to better understanding of climate risks and financial implications. But guidance is needed to assess the climate risks that are fundamental to business, particularly around strategic resilience that aligns with a company's sustainability goals. This begins with **developing a process** that identifies the right scope and framing when assembling a risk assessment, knowledge and resources.

Reassess Risk Analysis

While the TCFD asks an organization to "assess its climate-related risks and opportunities within the context of its businesses, operations, and physical locations in order to determine potential financial implications," it's clear that things outside of a business's walls will have impacts on the business. The TFCD methodology outlines potential physical risks to business from climate change in Figure 3.

Organizations need new strategies to deal with supply chain turbulence. Traditional enterprise risk management (ERM) is too often simplistic, as each risk is identified and addressed independently, while complex and longer-termed interactions are rarely considered. What is more, the focus is often on discrete events rather than gradual buildup of stresses. This approach doesn't prepare a company for when an unexpected event occurs or for an uncertain future. Value chains and landscapes and the impacts of climate change on them are complex and dynamic in nature and require constant attention to sense vulnerabilities and to respond to unexpected shocks. Strengthening resilience requires new and updated analytical tools as well as a cultural shift.

Figure 3

WATER	Water Usage	Physical	Total freshwater withdrawn (cubic meters)
	Water Intensity	Physical	Amount used per output scaling factor (e.g., revenues, sales, units produced (cubic meters)
	Water Source	Physical	Amount withdrawn from areas of high baseline water stress (cubic meters) Amount treated and recycled (cubic meters)
LAND USE	Land Cover	Physical	Percent of land by cover type (e.g., grassland, forest, cultivated, pasture, urban) Annual change in cover type
	Land Use Practices	Transition	Percent of land used for agricultural tillage, grazing practices, sustainability practices or conservation practices
LOCATION	Coastal Zone	Physical	Locations within a coastal zone
	Flood Zone	Physical	Locations within a flood zone
RISK ADAPTION & MITIGATION	R&D		Amount invested in developing low-carbon products, services and/or technology
	CapEx		Amount invested in deployment of low-carbon technology, energy efficiencies etc. Amount invested in resilience capabilities

Define your scope in a way that is focused and intentional and explicitly considers natural resources

The right risk framing and scope in risk analysis is essential. The scope of risk analysis refers to what specifically is to be assessed. Risk analysis should be a practice to inform decision-making; and defining your scope in a broad context is meaningless if the ultimate goal is to develop and decide on solutions. Therefore, analysis of a company's vulnerability, exposure and adaptive capacity should be applied to something defined and specific. **The first question companies should answer is, "What do I want to build the resilience of?"** The company itself? A facility? It's workforce and the communities where they live? The answer to this question should be focused and intentional, while explicitly considering the landscape and landscape dynamics where solutions will be implemented.

The framing of risk analysis refers to what risks are considered and what information is used to assess risk. **The second question a company needs to ask is, "What threats and impacts of climate change do I want to build resilience to?"** This should be broad without being overly general. If the framing is too general, action can be scattered and unfocused, and lead to action that does not take specific measures to protect your company as well as natural capital. The answer should not be, "We want to build resilience to climate change", but rather broadly identified impacts on the previously defined subject of your scope. When framing your risk analysis, a company should consider shocks and stresses, past, current and future, and then prioritize addressing the most impactful.

Again, the framing of a risk analysis should underscore the company's reliance on communities and nature. Climate risk is a factor of three things: exposure, vulnerability, and adaptive capacity. Companies need to understand these factors as they relate to the landscapes where they are grounded. What are the most influential impacts on the community that provides your workforce, or the ecosystem that nurtures and protects your water source? Natural capital and ecosystem services must be at the core of risk scope and framing, if a company is to understand fundamental threats to landscapes, and therefore the health of their supply chains.

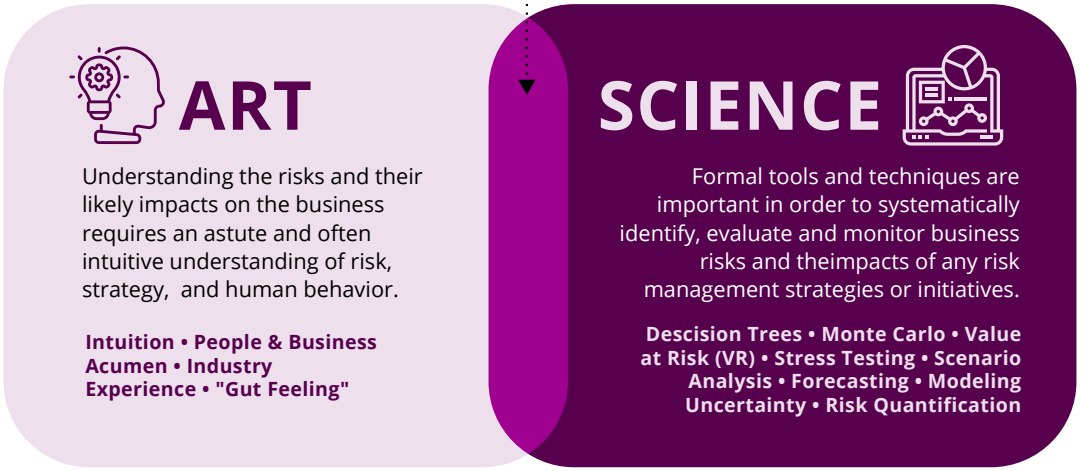
Assemble baseline information from local, national, and international sources

Using the right information in risk analysis is key. Once a company has identified the scope and framing of a risk analysis, they must choose the right information to use to assess risks. There are two dominant risk management frameworks used globally: the COSO Enterprise Risk Management Framework (2002) (Committee of the Sponsoring Organizations of the Treadway Commission) and the International Organization for Standardization (ISO) 31000 Risk Management Standard. However, over-reliance on the tools and techniques that are strictly quantitative and "science-based" or, conversely, qualitative and "intuition-driven" can result in some important risks being misinterpreted or unaccounted for. And if the information on climate risks to people and landscapes (see ecosystems) is not considered, only part of the risk picture will be in focus.

Therefore, it is important to consider interrelated risks, and risks on a landscape-scale, use long-term climate information in risk analysis and expand time horizons, and use multiple sources and types of information in risk analysis.

The essential information needed for a valuable climate risk assessment can be grouped into three basic buckets: environment, communities, and climate. Companies can use information already at their disposal or collect new information, but information gathering should intentionally develop an understanding of context. Information gathering is an exercise in understanding, which can help a company be proactive in their risk management. Baseline information on historical climate patterns, current climate changes, and future projections could be collected from a variety of primary and secondary sources, including peer-reviewed journal articles (where feasible), reports from local and national NGOs, hydro-met services and agencies, and international sources.

ART & SCIENCE: *General consensus says that both must be leveraged in enterprise risk management*



From: WBCSD's "Sustainability and enterprise risk management: The first step towards integration"

OLD ERM	NEW ERM
Discrete information on individual risks	Expand risk assessments to identify the extent to which climate shocks and stresses may adversely impact communities and ecosystems, and the impacts that future changes in the risks of such events could have
Internally managed	Consult outside authorities
Short-term	Extend risk analysis and planning time horizons
Internally gathered information	Assemble baseline information from local, national, and international sources as well as qualitative as well as quantitative data
The data is being disclosed is not being used for internal decision-making	Integrate risks into strategic and operational planning

Focus on key vulnerabilities to people & places

One vital source of information for risk analysis comes from the ground. It is essential to include "bottom-up" or community, on-the-ground information and perspectives into risk analysis and management. Decision-scaling is a tool that can be used to allow the use of many climate projections to produce best estimates of future climate risks. Decision-scaling links bottom-up vulnerability assessments and hazard identification with multiple sources of climate information, such as top-down climate projections and modeled data to estimate relative probabilities of hazards, yielding risk estimates.[11]

Regardless of the approach or level of detail, most risk assessments should include:[12]

1. Evaluation of exposure, sensitivity, and adaptive capacity of the ecosystem and communities.
2. Analyses of observed (historical) and projected (future) climate, land use, demography, and other important climate and non-climate factors.
3. Evaluation of changes that have already occurred in the communities, ecosystem, or ecological process of interest.
4. An objective scoring method to evaluate the relative vulnerabilities.
5. Estimation of uncertainties of projected changes in both climate and non-climate drivers of change. Uncertainty can be estimated using expert knowledge or statistical variation.
6. An analysis of spatial information available for the potentially vulnerable areas.
7. Narratives that describe key information sources, relevant ecological and geographical contexts, and justifications for rankings.

Companies can use the risk assessment to hone their framing. Given a better picture of climate risks, a company is better equipped to take intentional action that addresses specific threats. Once risks are assessed and the intention is focused, a company then should develop strategies that address key vulnerabilities in their value chain.

KEY TAKEAWAYS

- Define your scope in a way that is focused and intentional and explicitly considers natural resources
- Frame your assessment considering system scale dynamics
- Assemble baseline information from local, national and international sources
- Focus on key vulnerabilities to people and places

2 DEVELOP A STRATEGY TO MANAGE FOR CHANGE, NOT JUST PERSISTENCE

Using the risk information garnered in the risk analysis process, the next step in building resilience is developing or reassessing goals and strategy. Resilience and sustainability should be at the heart of commercial operations and investment decisions. With the right information, companies are equipped to develop forward-looking, climate-informed goals that engrain the resilience process and utilize a sustainability strategy to achieve their goals. While resilience and sustainability should be the foundation of any company's broader plan, it is important to track how such a foundation is being built and develop how it can be achieved.

Given the scale and magnitude of climate change impacts, sustainability goals that focus only on maintaining the persistence of existing systems may no longer be the best option. To utilize resilience as a risk management option, open and honest dialogue about potential climate futures is necessary when reviewing existing goals. Sustainability goals themselves often cannot be achieved without using climate information and "stress testing" or scenario-planning actions to meet them. Scenario-planning can provide insight into the effectiveness of policies and strategies.

Develop robust strategies and targeted interventions aimed at supporting communities and landscapes

Companies should look to existing management plans—e.g. water, supply chain, disaster preparedness and response, and evaluate them for their contribution to addressing climate risk. A very simple tool that allows for an easy screening of existing proposed actions is the A-B-C process. Actions, activities, or strategies are grouped into three basic categories:

A Actions that already address climate change risk or help build climate resilience to some degree *(like a disaster response plan, for example, for existing risks that are already worsening or will in the future due to climate change)*

B Actions whose success or failure depends on climate change, but are not currently designed to address it

C Actions that have no relation to climate change whatsoever

It will often be the case that existing activities in already agreed upon plans and strategies are not sufficient to address the priority impacts, vulnerabilities, and risks identified in the risk assessment. Additional activities directly related to already proposed activities may be necessary, so it is useful to think of them in the context of the existing plans.

Once this filtering process has been completed, internal discussions across relevant teams or key staff should follow a prioritization process for A or B actions and entirely new activities not included in any strategy that are most essential to either ramp up or develop anew. An obvious initial list of potential resilience priorities for a business would be existing top priorities for sustainable sourcing, water use, risk management, and any current plans for disaster risk reduction and response. For entirely new actions or activities, a full project evaluation assessing the potential performance of the investment against multiple criteria may be necessary.

Use scenario planning to consider alternative climate futures when identifying options

Scenarios are stories that describe potential futures. Scenario planning should be conducted throughout the risk analysis and decision-making process to determine the best path for action. It is not a onetime activity that yields final answers but a process to evaluate and inform decision-making on multiple stages and scales.

Decision scaling and scenario planning are tools and processes that use regular stakeholder consultation alongside modeling analysis to determine 'robust'—meaning they work under multiple futures—and optimal actions under a range of different climate and economic development scenarios. These tools help identify 'win-wins', or solutions that work for multiple stakeholders as well as strategies that will not be effective in any future. Not surprisingly, these tools allow for a range of levels of complexity, from more simple approaches evaluating fewer scenarios via mostly qualitative information to academic modeling exercises based on both qualitative and quantitative approaches where economic performance is evaluated for specific proposed actions under multiple climate scenarios to determine the most 'optimal', 'robust' interventions that meet stakeholder priorities, are cost-efficient, and perform well under different climate extremes. They are the logical next step in the risk strategy process from the risk assessment.

Just as the vulnerability and risk assessment process should evaluate system scale factors, it is equally as important to tailor activities to multiple scales, from individual households and communities, to larger surrounding sub-watershed or basin, to engagement in platforms and roundtables. Community, household, or business level actions are important to have demonstrable impact in mitigating specific risks, while interventions will be necessary at larger scales to build resilience to risks to entire systems. Examples run the spectrum, from localized rainwater harvesting or wells to increase supplies for local communities to large scale reforestation and restoration programs in upper watersheds to reduce sedimentation and increase groundwater infiltration. This is once again, where existing larger sustainability strategies or management plans—ie integrated watershed management plans—can provide a particularly useful backbone for local to landscape scale action.

SCENARIOS ARE STORIES THAT DESCRIBE POTENTIAL FUTURES

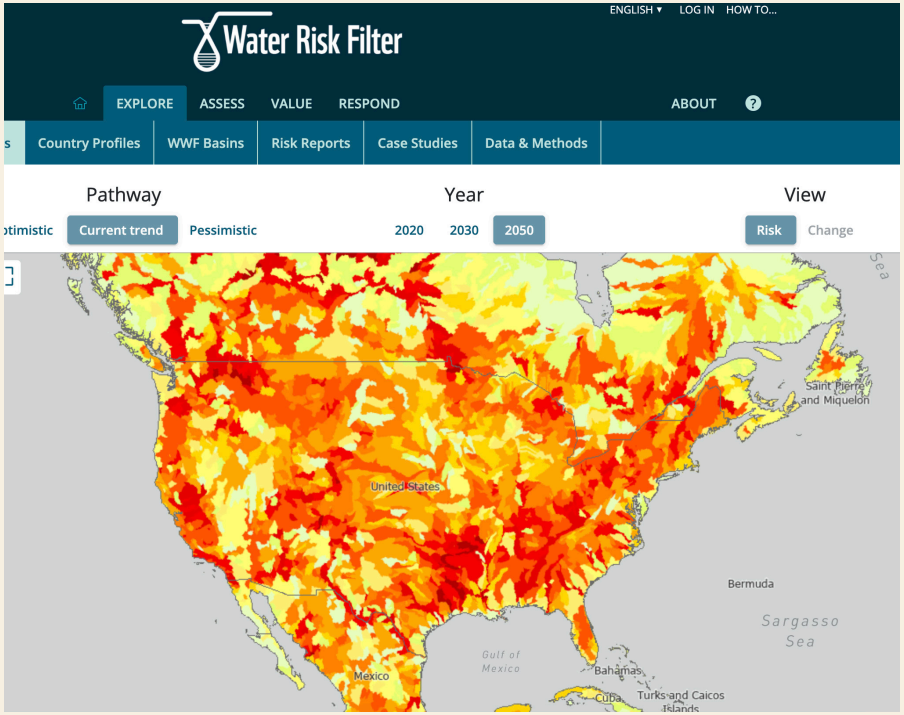
Select strategies by aligning options with desired outcomes of socio-ecological resilience

At a minimum, resilience strategies should respond directly to the vulnerabilities, impacts, and risks. However, to truly assess the effectiveness of a proposed action requires some evaluation of its performance under alternative future climate scenarios, i.e. by determining its robustness. Without this step, there is no way to plan for the often very high uncertainty of how climate change will affect systems. While there is more certainty about changes in temperature and related heat extremes since they are and have been increasing linearly since the industrial revolution (thus the term global warming), it is much more scientifically difficult to project out future rainfall patterns, especially without 30 year observed data histories based on spatial networks of weather stations that are often lacking in many regions. To tackle this uncertainty, a wide variety of organizations are increasingly using scenario planning tools that have been employed since the 1960s by the private sector to be more flexible and adaptive to changing conditions, tailored to specific uncertainties of changing rainfall patterns and other future climate risks.

There are a variety of tools and approaches to facilitate a scenario planning process, depending widely on the level of complexity, from complex economic optimization modeling and decision scaling to more basic discussion of priorities under alternative future climates. A simple approach is to organize a stakeholder consultation workshop representing key actors in the basin—for example through an existing watershed management planning process—and discuss resilience priorities and their likelihood of success under alternate climate futures.

The WWF Water Risk Filter

Already a leading online tool for companies and investors to assess and respond to water risks, the WWF Water Risk Filter is 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 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. **Learn more here.**



Restructure roles and processes to address climate resilience and sustainability

While having the right risk analysis methodology is vital, it is equally important to have the right process and structure in place to respond to risk. This is another important part of the assessment phase to determine how you are able to respond and how you are planning. Internally, a company should undertake an audit of capacity to be prepared for climate events and can recover from them quickly, and in a way considers other longer-term goals and stakeholders.

If we are espousing understanding, responsiveness, flexibility, and continuous improvement, what does corporate structure look like in order to achieve this? Building capacity for climate resilience within a company requires the right structure and incentives. Sustainability teams and chief sustainability officers are increasingly reporting directly to their CEO, giving them a direct line to influencers are decision-makers who can create broad structural and cultural changes within a company.

Regardless of where a sustainability team sits within a company, sustainability goals should be clearly communicated throughout the company and the entire resilience process should be ingrained across teams.

Use scenario planning to consider alternative climate futures when identifying options

The ultimate success of any resilience action plan will depend just as much on internal ownership and buy-in to the process as external stakeholder engagement. Climate change affects so many aspects of business operations, including and beyond existing sustainability efforts, increasing awareness and literacy in the larger workforce is a worthwhile investment of time and resources. There are a number of easy ways to begin this process, for example through hiring outside consultants to run a series of staff trainings, but engaging directly through a process of discussing existing work plans and strategies will have the greatest impact. Otherwise, it will continue to be seen as largely a “future problem”, rather than the immediate all-hands-on-deck challenge that it is.

KEY TAKEAWAYS

- Develop robust strategies and targeted interventions aimed at supporting communities and landscapes
- Use scenario planning to consider alternative climate futures when identifying options
- Select strategies by aligning options with desired outcomes of socio-ecological resilience
- Restructure roles and processes to address climate resilience and sustainability
- Increase climate literacy within the professional workforce

3 IMPLEMENT LOCAL SOLUTIONS THAT ARE NATURE-FRIENDLY, RESPONSIVE, AND FLEXIBLE

Implementing solutions requires a multi-faceted approach that prioritizes investment in Resilient Sustainability. There are essentially three basic types of interventions for building resilience to climate change: engineered approaches like infrastructure to control flooding or provide water; nature-based approaches that use ecosystems natural benefits for people that help reduce impacts from hazards like flooding, landslides, fires, or drought; or investments in human capacity like training programs to improve people's ability to understand and manage risks. All three are critical components of any resilience plan, but nature-based solutions (NBS) are currently an underutilized solution that can provide multiple benefits for people and nature.

The primary challenge in employing **nature-based solutions is ensuring that they are most effective, and provide the most benefits, at larger scales;** a local constructed wetland to capture pollution runoff and excess stormwater will still provide local benefits, but will not be as effective, especially for increasingly intense storms, as managing an entire watershed through protection and restoration of upstream forests or downstream wetlands.

Use scenario-planning to evaluate effectiveness and resilience of nature-based solutions

When prioritizing and potentially investing in NBS, it is especially important to consider how they are also directly vulnerable to climate change. Many NBS projects have failed because they failed to evaluate their effectiveness under climate change; for example, mangroves that were planted without considering rising sea levels, or reforestation with trees that immediately die due to extreme drought or flooding. Furthermore, the return on investment of a nature-based solution, or the resilience benefits they provide, is greater if those solutions are also stress-tested and designed based on climate projections of prioritized impacts.[13]

Identify a range of options at both site and system scales

Just as the vulnerability and risk assessment process should evaluate system scale factors, it is equally as important for companies to consider multiple scales, from individual households and communities, to larger surrounding sub-watershed or basin. Community, household, or business level actions are important to have demonstrable impact in reducing their specific risks, while interventions will be necessary at larger scales to build resilience to risks and impacts that affect entire systems. Examples run the spectrum, including localized rainwater harvesting or wells to increase freshwater supplies for local communities, as well as large scale reforestation and restoration programs in upper watersheds to reduce sedimentation and increase groundwater infiltration. This is once again, where existing larger sustainability strategies or management plans—ie integrated watershed management plans—can provide a particularly useful backbone for local to landscape scale action.

Evaluate intervention options that meet resilience criteria

All operations are influenced by factors outside their borders. This is especially true with respect to climate impacts, which affect ecosystems at local and global scales. As a result, resilience options will also need to be effective across a broad range of scales. All proposed actions and interventions should be evaluated against their general contribution to resilience for people, infrastructure, and nature. Regardless of the scale of the proposed activity, to ensure actions will contribute to resilience, they must be assessed against specific identified vulnerabilities, impacts, and future risks.

At a minimum, resilience actions should respond directly to the vulnerabilities, impacts, and risks identified in previous steps. However, to truly assess the effectiveness of a proposed action requires some evaluation of its performance under alternative future climate scenarios; i.e. by determining its robustness. Without this step, there is no way to plan for the often very high uncertainty of climate change.

Build partnerships for resilience at scale

Building partnerships is critical to help companies address their risks in deep and meaningful ways, and provide the scale needed to solve social and environmental problems. While there are some actions largely internal to a business that will not require a regular process of stakeholder engagement, for example plant operations and maintenance, there are some risks and interventions that can only be addressed in consultation and partnership with others. Furthermore, while companies must commit resources to solutions, partnerships are a way to optimize the use of and diversify resources that provides potential for greater impact and sustainability.

KEY TAKEAWAYS

- Use scenario-planning to evaluate effectiveness and resilience of nature-based solutions
- Identify a range of options at both site and system scales
- Evaluate project options that meet resilience criteria
- Build partnerships for resilience at scale
- Invest in nature-based solutions

4 MONITOR, EVALUATE, AND ADAPTIVELY MANAGE

How do you know you are on the right track? There are a number of ways a company can track their progress in building resilience by evaluating implementation of the above steps which can provide companies a means of understanding their resilience gains. A company can audit how they are identifying, assessing, and managing climate-related risks and how they are integrated into the organization's overall risk management.

Measure your internal resilience process by assessing maturity

Companies can benchmark success by how they do things like use climate, environmental, and social information in risk screening; gather information from landscapes and stakeholders on the ground; implement environmentally conscious disaster risk management policies and practices; and extend time horizons in planning. And reflected in those things, we should see the WWF's 3 principles of resilience: don't harm nature, use nature to help people, and help nature adapt. Because without these principles, and without focusing on landscapes, people and nature, a company's response to climate change impacts could have unintended negative consequences for people and nature.

Resilience is about maintaining progress in the face of shocks and stresses. The best way to know if your company is "resilient" is to look at performance in the face of a wide array of shocks and stresses. The second way a company can measure resilience is to measure their progress on meeting their goals. Companies should continue to measure progress on goals, while tracking shocks and stresses and measuring how well they're doing. Same goals, different outcomes.

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Measure intervention resilience in a landscape

The third way a company can measure resilience is through a simple benchmark in line with WWF's resilience principles to measure if and how a company is doing all it can to avoid harming nature, investing in nature-based solutions, and how those solutions are holding up in the face of shocks and stresses. This is best applied at the intervention or landscape scale. While standards for certain commodities or natural resource management can be used as a measuring stick, particularly in regard to the first principle of doing no harm to nature, they are often insufficient if not coupled with actions based on climate information. Therefore it is important for a company to expand their risk interventions to address specific resilience in landscapes.

Be adaptive by testing, measuring, and enhancing work

Constant reevaluation is essential when measuring resilience due to the substantial uncertainties of future risks. Building resilience requires continually reviewing new information and knowledge, re-assessing past assumptions, and stimulating learning. More collaborative processes can also help. Building partnerships is critical to addressing risks in deep and meaningful ways, and providing the scale needed to solve social and environmental problems.

Create ongoing opportunities for knowledge exchange

Creating open dialogue and knowledge exchange also strengthens a company's social license to operate. Social license to operate is an essential part of a healthy business. And profits alone do not create social license. Without social legitimacy, companies might find it difficult to access physical inputs and financial capital as well as obtain permits and other resources to function. A company is not only impacted by climate risk within its fenceline but by how communities are affected by climate change and how they respond to those effects on their lives and livelihoods. It is important for companies to create a space for dialogue and collaboration with stakeholders in a landscape. There are a range of advantages to a broad and well-functioning participation. An informed and well-functioning group has the potential to build trust and a shared understanding – both fundamental ingredients for collective action.

KEY TAKEAWAYS

- Measure your internal resilience process by assessing maturity
- Measure project resilience in a landscape
- Be adaptive by leveraging the resilience framework to test, measure and enhance work over time
- Create ongoing opportunities for knowledge exchange

CONCLUSION

Resilience is a practice in listening, learning, and adapting. This guidance itself is intended to be updated and expanded upon as we learn more about our changing world and relationships. Companies must play a central role in finding ways to help create a functioning economy and society in the face of unprecedented challenges and change without compromising the natural systems we all rely on for our health and wellbeing. We know that nature is an integral part of the solution and can help us build resilience to climate change, but we must help nature too. The central philosophy that companies must now employ is that resilient nature, resilient landscapes, and resilient communities build resilient business.

RESILIENT NATURE, RESILIENT LANDSCAPES, AND RESILIENT COMMUNITIES BUILD RESILIENT BUSINESS.

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