



CLIMATE
NEXUS
REPORT

Climate + Supply Chain

The Business Case
for Action

September 2018

WE MEAN
BUSINESS



BSR®

Contents

01 About this Report

05 Executive Summary

06 Integrating Climate Risks into Supply Chain Management

08 CLIMATE CHANGE AND
SUPPLY CHAIN MANAGEMENT

09 CLIMATE RISKS

11 The Business Case

13 Business Actions

18 Conclusion

19 Endnotes

About this Report

Climate change affects each and every human around the globe, with profound implications for social justice and human rights. Health-related stresses, competition for natural resources, and the impacts on livelihoods, hunger, and migration warrant immediate global action. This report is part of a series of six climate nexus reports that cover human rights, inclusive economy, women's empowerment, supply

chain, just transition, and health. All papers in this series are aimed at business to drive resilience inside the company, across supply chains, and within vulnerable communities. The reports address issues that are material to business, vital in the current political environment, and key to building resilience.

This report is part of a series of six **climate nexus reports** that cover:



Supply
Chain



Health



Inclusive
Economy



Women



Human
Rights



Just
Transition

This paper explores the nexus of climate change and the supply chain. The purpose of this report is to:

01

Identify the potential impacts that climate change will have on company supply chains, particularly vis-à-vis the focus of supply chain management on cost, speed, quality, and uncertainty.

02

Outline how companies can enhance the resilience of their supply chains and operations, including supplier facilities; local communities; and the procurement of raw materials, components, and other goods and services.

This research draws upon a wide range of documentary sources, including scientific literature on climate impacts, supply chain management literature, and development literature covering the financial and economic aspects of climate change.

The report also benefited from conversations with BSR member companies, the secretariat of the Task Force for Climate-related Financial Disclosures (TCFD), and BSR partner organizations in the We Mean Business coalition.

While climate risks differ considerably by industry, this report is intended to be relevant across most sectors. The primary audience of this report is corporate supply chain, procurement, and purchasing professionals. It is also relevant for strategy, risk management, operations, and other corporate functions; financial firms (e.g., those considering investment or insurance risks); policymakers; and others.

This report was written by David Wei and Marshall Chase. Any errors are those of the authors. Please direct comments or questions to David Wei at dwei@bsr.org.



**WE MEAN
BUSINESS**

Acknowledgments

The authors wish to thank Tara Norton, Meghan Ryan, and Giulio Berruti of BSR for their peer review and insightful feedback. This paper draws from an earlier BSR work: Norton, Tara; Ryan, Meghan; and Wang, Fengyuan. 2015. "Business Action for Climate-Resilient Supply Chains: A Practical Framework from Identifying Priorities to Evaluating Impact." BSR Working Paper. BSR, San Francisco.

Disclaimer

BSR publishes occasional papers as a contribution to the understanding of the role of business in society and the trends related to corporate social responsibility and responsible business practices. BSR maintains a policy of not acting as a representative of its membership, nor does it endorse specific policies or standards. The views expressed in this publication are those of its authors and do not reflect those of BSR members.

Suggested Citation

Wei, David, and Chase, Marshall. 2018. "Climate and Supply Chain: The Business Case for Action." Report. BSR, San Francisco.

Climate Supply Chain

The Nexus

The characteristics of modern supply chains—their global geographical reach, specialized inputs that are increasingly produced in specific locations, and reduced inventories from just-in-time production—render them more vulnerable to disruption by climate risks.

CLIMATE RISKS MAY



Increase the cost, and variability of cost, of producing goods and services



Increase the uncertainty and magnitude of supply chain disruptions



Reduce the quality of goods and services provided



Disrupt the delivery of goods and services in a speedy and timely fashion

Climate action presents opportunities for companies to reduce existing supply chain costs.



Reporting from members of CDP's supply chain program show that **99 participating companies**

saved US\$14B

while reducing GHG emissions by

551
million tons
of CO₂-equivalent

The Business Case

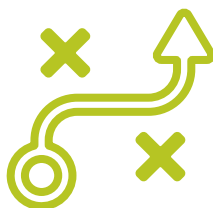
RISKS



Climate risks affect critical supply chain issues of cost, speed and responsiveness, quality, and the uncertainty of disruption.

There is a clear business case for companies to reduce these risks and strengthen supply chain performance by building the resilience of operations and communities along supply chains.

OPPORTUNITIES



Companies that can successfully navigate physical and regulatory risks, meet changing

customer expectations, protect workers, and effectively adapt to changing technology will be better placed to compete given the impacts and uncertainties created by climate change.

OPPORTUNITIES INCLUDE

- Resource efficiency
- The benefits of low-GHG energy sources
- The development of innovative products and services
- New markets in the low-GHG economy
- Resilience to climate impacts

During Thailand's severe flooding in 2011, more than 14,500 companies reliant on Thai suppliers suffered business disruptions worldwide.*

Electronics manufacturers and auto companies were particularly impacted.

- **Western Digital**, with one third of the global hard drive market, lost 45 percent of its shipments.
- **HP** lost US\$2 billion.
- **NEC** cut 10,000 jobs due to a global shortage of hard disk drives.**
- **Toyota, Honda, and Nissan** lost 240,000, 150,000, and 33,000 cars respectively.***
- Some companies had to postpone new car models.****

Total insured losses were estimated between

US\$15B and US\$20B

Recommendations

Companies can address climate-related risks in their supply chains, create value, and potentially develop a competitive advantage by identifying and acting where they have the greatest impact and influence.



IDENTIFY CLIMATE PRIORITIES

Structured assessment of the supply chain can help companies prioritize high-risk areas that offer the greatest opportunity for creating supply chain resilience—including areas of high GHG emissions and areas of high climate vulnerability.



TAKE ACTION AND DEVELOP TARGETS

TAKE ACTION: Climate action takes many forms, and companies can increase efficiency by adopting a structured approach to identify actions with the highest potential for impact. Types of supply chain climate actions companies can take are internal, with suppliers, and in broader collaboration.

DEVELOP TARGETS: Setting measurable, time-bound targets helps companies focus and drive their actions to address their supply chain climate risks. It also helps companies reduce these risks faster and more profitably than acting without concrete targets.



EVALUATE IMPACT

Monitoring, evaluating, and reporting helps a company understand how well different actions contribute to achieving targets and effectively addressing supply chain climate priorities. They can also determine whether there is any need for a company to amend its approach.

* <https://www.oxfamamerica.org/publications/prep-value-chain-climate-resilience/>
** <http://wbcsdpublications.org/project/building-resilience-in-global-supply-chains/>

*** <https://blogs.ei.columbia.edu/2014/11/17/floods-companies-and-supply-chain-risk/>
**** https://www.pwc.com/gx/en/governance-risk-compliance-consulting-services/resilience/publications/pdfs/issue3/business_not_as_usual.pdf

Executive Summary

At its core, supply chain management has four primary objectives: Reduce the overall cost of production, enhance the speed and responsiveness of delivery, enhance the quality of goods and services produced, and manage the uncertainty of major disruptions.

The characteristics of modern supply chains—their global geographical reach, specialized inputs that are increasingly produced in specific locations, and reduced inventories from just-in-time production—render them more vulnerable to disruption by climate risks. Climate change now affects all four of these objectives.

The recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) provide a clear categorization of climate risks, which would create more consistency across the reporting landscape. The task force uses two categories of risk:

- **Physical climate risks** from acute weather events and chronic climate patterns are disrupting the availability of raw material and energy supply, supplier operations, and local communities along the supply chain.
- The transition to a low-carbon economy also presents **policy and legal risks** that result from several trends: the pricing of greenhouse gas (GHGs) emissions, disruptions from new technologies like blockchain, market risks from growing customer demand for low-carbon and climate-resilient goods and services, and reputational risks to a company's brand equity and future business.



We recommend that companies address climate risks in their supply chains where they have the greatest impact and greatest influence by taking several steps:

01

Consider a broad range of climate risks and prioritize parts of the supply chain that are most at risk.

02

Implement supply chain actions, including with internal procurement teams, with suppliers, and through broader collaboration, and develop measurable targets for these actions.

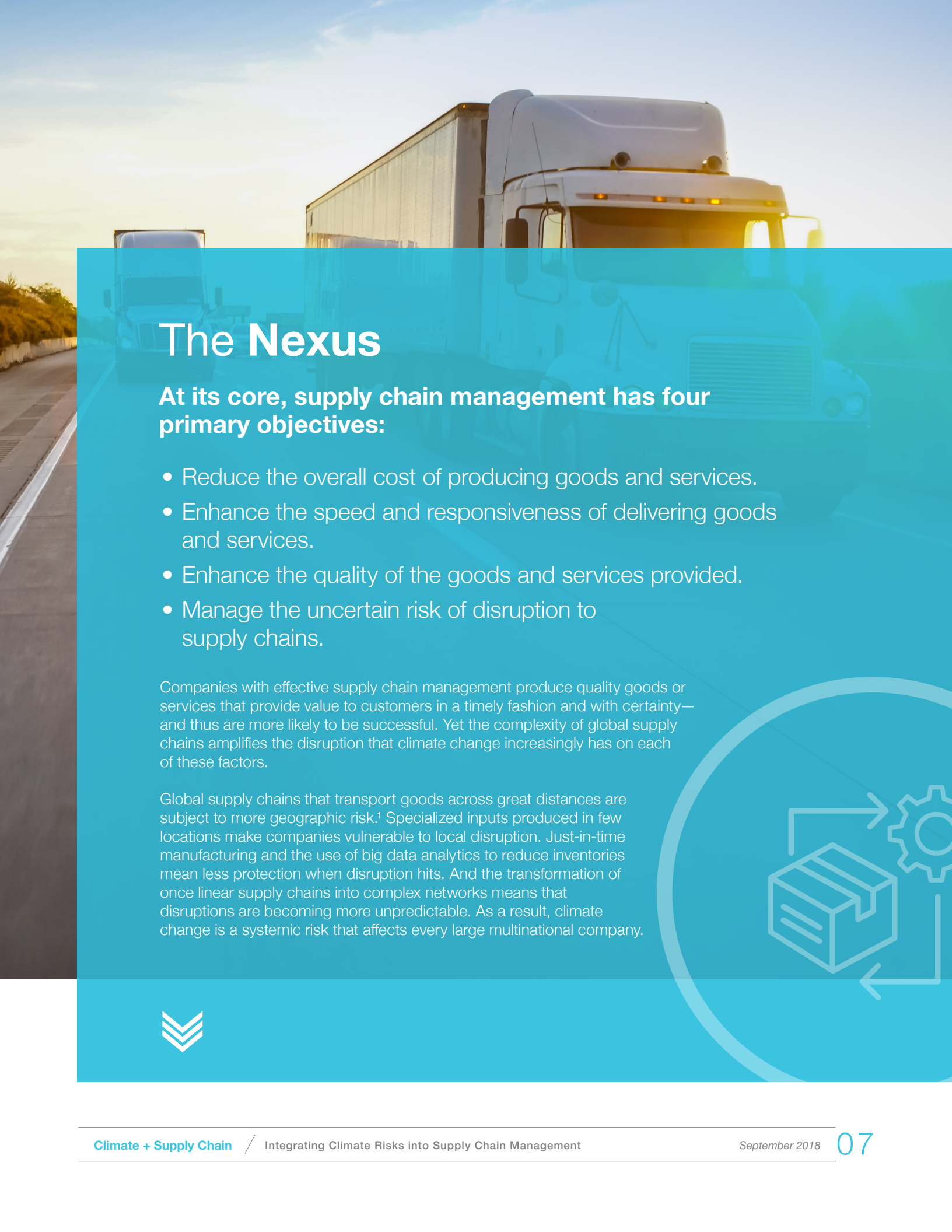
03

Evaluate the impact of supply chain actions and adjust actions and targets over time.

By integrating climate risks and building the climate resilience of the communities on which supply chains depend, companies increase the likelihood of fulfilling their supply chain objectives.

Integrating Climate Risks into Supply Chain Management

Supply chain management is a critical tool for business success in the world's increasingly complex, global, and interdependent economy. More and more, supply chains face disruption as a result of climate change—an effect that is amplified by the features of modern supply chains. Successful companies will assess and address the various risks that climate change poses to their supply chains.



The Nexus

At its core, supply chain management has four primary objectives:

- Reduce the overall cost of producing goods and services.
- Enhance the speed and responsiveness of delivering goods and services.
- Enhance the quality of the goods and services provided.
- Manage the uncertain risk of disruption to supply chains.

Companies with effective supply chain management produce quality goods or services that provide value to customers in a timely fashion and with certainty—and thus are more likely to be successful. Yet the complexity of global supply chains amplifies the disruption that climate change increasingly has on each of these factors.

Global supply chains that transport goods across great distances are subject to more geographic risk.¹ Specialized inputs produced in few locations make companies vulnerable to local disruption. Just-in-time manufacturing and the use of big data analytics to reduce inventories mean less protection when disruption hits. And the transformation of once linear supply chains into complex networks means that disruptions are becoming more unpredictable. As a result, climate change is a systemic risk that affects every large multinational company.



Climate Change and Supply Chain Management

In the World Economic Forum's 2018 *Global Risks Report*, extreme weather events, natural disasters, and failure of climate change mitigation and adaptation again topped the list of risks with the highest likelihood and impact,² underscoring that climate change presents material risks to business. This is recognized by the recommendations of the TCFD, which remind us that because climate-related risk is non-diversifiable and affects nearly all sectors, investors believe it requires special attention.³

Climate risks—which result from the ongoing warming of the Earth's atmosphere and society's attempt to limit that warming—affect each of the four main objectives of supply chain management. They may:

- Increase the cost, and variability of cost, of producing goods and services.
- Disrupt the delivery of goods and services in a speedy and timely fashion.
- Reduce the quality of goods and services provided.
- Increase the uncertainty and magnitude of supply chain disruptions.

This paper details how climate change affects supply chain management, how this impacts business success, and how supply chain management professionals can incorporate climate risks into their focus on cost, speed, quality, and uncertainty while providing opportunities to add low-carbon and climate-resilient qualities that customers seek from goods and services.

In 2017, three Category 4 hurricanes—Harvey, Irma, and Maria—slammed into the Caribbean and the United States. In the United States, Hurricane Maria's destruction of medical device manufacturing capacity in Puerto Rico led to a national shortage of medical IVs, forcing hospitals to use alternative products and suppliers. The sectors with the highest potential for revenue loss due to Hurricane Harvey were petroleum and coal products manufacturing (37 percent), chemical manufacturing (13 percent), and oil and gas extraction (12 percent).⁴

Climate Risks

Climate change presents a wide range of risks to businesses and the communities on which they depend. Some risks result from direct physical changes to the environment. Others are indirect and result from our collective response to climate change and our efforts to transition to a low-GHG economy.

The TCFD recommendations provide a useful framework to help companies disclose their climate risks, and accordingly to help supply chain professionals understand the types of climate risks they face. Today, the major sustainability reporting standards (CDP, SASB, and GRI) are aligning their approach with the TCFD recommendations, which is creating more consistency across the reporting landscape (and removing a pain point for sustainability practitioners).

Physical Risks

The TCFD recommendations speak to two types of physical climate risks: **acute** physical risks, which are event-driven, such as cyclones, hurricanes, and floods; and **chronic** physical risks, which are from longer-term shifts in climate patterns, such as sea-level rise, drought, and chronic heat waves.⁵ Both acute and chronic physical risks affect the cost, speed, or quality of supplier inputs to a company, as well as the uncertainty and resilience of supply.

Climate risks alter the availability of **raw material and energy supply** to a company and to its suppliers. Acute physical risks such as unexpected flooding or water shortages can force the temporary shutdown of a power plant, mine, or transportation route. Chronic physical risks, such as rising temperatures or changing rainfall patterns, can alter the yield of agricultural commodity inputs and degrade infrastructure and will require a shift away from past transportation routes.

Climate change may also directly affect the **operations** of a company's tier 1 suppliers over both the short and long term. For example, extreme weather events may suddenly shut down supplier facilities, or chronic heat waves may decrease a supplier's production efficiency and increase cost due to additional wear and tear on production lines.

In addition to physical operations and material inputs, climate risks disrupt local communities in many ways, which can affect a supplier's labor force. For example, climate change may aggravate disease vectors that worsen worker health and put additional stress on public health infrastructure. Higher temperatures decrease labor productivity by around 2 percent per degree centigrade.⁶ In the U.S., total hours of labor declined by half a percent per degree centigrade among workers exposed to outdoor temperatures, such as those in construction, agriculture, mining, and manufacturing.⁷

Transition Risks

The TCFD also identifies risks from the transition to a low-GHG economy.

Policy and legal risks result from a number of sources: policies to reduce GHG emissions, such as carbon markets, carbon taxes, or policies that indirectly impose a carbon price; policies that promote resilience to physical climate risks; and climate-related legal action brought before the courts. These increase supply chain costs related to GHG emissions, driving up the price of high-carbon energy inputs.

They also increase supply chain costs as companies work to ensure legal compliance. Similar to recent laws on conflict minerals reporting (e.g., Dodd-Frank section 1502), the California Transparency in Supply Chains Act, the UK Modern Slavery Act, and France's Due Diligence Law, future regulation may require increased transparency about GHG emissions and climate risk management in supply chains. For example, implementation of the TCFD recommendations through regulation would require that companies assess and disclose their climate risks in mainstream financial reporting. Finally, legal compliance requirements may reduce the pool of suppliers available to a company, increasing the concentration of risk.

These policy and legal risks will increase over time because the Paris Agreement requires that each country submit new emissions-reduction targets every five years. These targets represent a progression beyond previous commitments and reflect each country's highest possible ambition.⁸

Technology risks come from new production, transportation, information, and other technologies that dramatically affect entire value chains. The advent of container shipping and just-in-time manufacturing presented similar disruptions in the past, and blockchain technologies may do so in the future.

Market risks arise as climate change affects customer demand for various types of goods and services. For example, reduced snowfall in mountainous areas has resulted in fewer tourists and reduced sales for winter sports. Customers are also increasingly accounting for climate action when making purchases, as evidenced by the growing interest in low-carbon transportation,⁹ companies testing the market for "carbon neutral" electronics,¹⁰ and the risk that climate change may lead to the reevaluation of coastal real estate prices.¹¹

These risks cascade into supply chains as suppliers change their production in response to market signals. Market uncertainty may lead companies to seek greater supply chain flexibility. If a company uses outside financing to support supply chain activities, climate change may cause financial institutions, (including lenders, underwriters, and insurers) to increase the cost of capital for higher-GHG activities and locations more exposed to climate impacts.

Reputational risks arise because a company's engagement with its supply chain may affect its brand reputation and prospects for future business. Customers may become increasingly concerned about buying from companies that do business with heavy emitters or with companies that do not support community resilience in their supply chains. Climate advocates are also increasing awareness by publicly criticizing industries and companies that are slow to act on their supply chains.¹²

Conversely, sustainability leadership for large multinationals increasingly includes emissions-reduction targets across full value chains. These include General Mills' "farm to fork to landfill" target, Carlsberg's "beer in hand" target, Coca-Cola's "drink in your hand" target, Walmart's "Project Gigaton", and Hewlett Packard Enterprise's (HPE) 100 million ton target. For example, in order to join the Science Based Targets initiative—where companies agree to an emissions-reduction target representing their share of the global

goal of holding warming well below 2°C—companies whose value chains account for more than 40 percent of total emissions must include “ambitious and measurable” targets that cover the majority of value chain emissions.¹³ Leadership in the climate space increasingly involves leveraging emissions out of suppliers.

Successful supply chain management builds resilience against all of these risks by both reducing the vulnerability of supply chains and the communities along them to physical risks and by reducing GHG emissions along the supply chain to manage transition risks.

Opportunities

The TCFD recommendations also define business opportunities derived from efforts to mitigate and adapt to climate change, which are the flip side of climate risks. Opportunities include resource efficiency, the benefits of low-GHG energy sources, the development of innovative products and services, new markets in the low-GHG economy, and

resilience to climate impacts. Companies that can successfully navigate physical and regulatory risks, meet changing customer expectations, and effectively adapt to changing technology will be better placed to compete given the impacts and uncertainties created by climate change.

The Business Case

Climate risks affect critical supply chain issues of cost, speed and responsiveness, quality, and the uncertainty of disruption. There is a clear-cut business case for companies to reduce these risks and strengthen supply chain performance by building the resilience of operations and communities along supply chains.

Cost

Climate risks will drive significant cost changes in many supply chains, whether from physical impacts that increase the cost of infrastructure maintenance, agricultural inputs, and worker health, or from policy and legal changes that affect the cost of fuel, energy, and other high-carbon inputs. Actual costs will vary considerably by value chain, region, and other variables, but the impact of climate risks to cost cannot be ignored.

In 2010, drought in Russia delivered economic losses estimated at US\$15 billion, as wildfires destroyed crops.¹⁴ Resulting export restrictions had the knock-on effect of contributing to global price increases. Similarly, record-breaking temperatures in the U.S. over the summer of 2012 reduced corn supply and increased meat and dairy prices. Global food prices soared by 10 percent between June and July of that year.¹⁵ In the long term, climate impacts are projected to result in price rises of 37 percent for rice, 55 percent for maize, and 11 percent for wheat.¹⁶

Transport costs will rise as climate impacts damage infrastructure and regulation increases the price of high-carbon transport. According to the U.S. General Accounting Office, climate change may result in US\$7.4 billion in avoidable adaptation costs per year to U.S. roads.¹⁷ And since transportation uses over 50 percent of global primary oil production to meet nearly all of its energy demand, regulation imposing a carbon price will directly affect logistics costs throughout the supply chain.¹⁸

It is important to note that climate action also presents opportunities for companies to reduce existing supply chain costs. Reporting from members of CDP's supply chain program show that 99 participating companies saved US\$14 billion while reducing GHG emissions by 551 million tons of CO₂-equivalent.¹⁹

Speed and Responsiveness

Climate change will have a variety of impacts on the speed at which suppliers can deliver goods and services, and therefore on a company's ability to respond to market demand in a timely fashion.

During Thailand's severe flooding in 2011, more than 14,500 companies reliant on Thai suppliers suffered business disruptions worldwide.²⁰ Total insured losses were estimated between US\$15 billion and US\$20 billion. Electronics manufacturers and auto companies were particularly impacted. Western Digital, with one third of the global hard drive market, lost 45 percent of its shipments. HP lost US\$2 billion, while NEC cut 10,000 jobs due to a global shortage

of hard disk drives.²¹ Toyota, Honda, and Nissan lost 240,000, 150,000, and 33,000 cars respectively.²² Some companies had to postpone new car models.²³

Changes to transportation infrastructure will also affect speed of delivery. For example, the winter ice road season has already decreased from 200 days in the 1970s to 100 days in some areas of Alaska. The winter road network is projected to contract by an average 14 percent across the eight polar nations by 2050.²⁴ At the same time, the availability of arctic shipping will expand some trade route options.

Quality

Quality goods and services meet or exceed customer expectations. Quality is a key factor that affects the likelihood of repeat business from customers, the cost of warranty repairs or recalls, and a range of other issues. Climate change affects the existing quality of goods and services in some cases, and in other cases it is changing customer expectations.

For example, luxury fashion supply chains depend on high-quality fibers such as vicuña. A Kering-Maplecroft analysis found that the entire vicuña territory is a regional climate risk hot spot, and therefore maintaining a supply of high-quality fibers will require a coordinated effort.²⁵ In 2014, Cyclone Hudhud damaged

India's silk industry, and the cocoons that survived were of low quality. A more limited ability to control indoor environments in India means that silk production relies on strains of silkworms that are more resilient to warm temperatures and fluctuations in humidity, but produce lower-quality silk.²⁶

Food quality also will be affected. Growing wheat, rice, barley, or potato in high-CO₂ concentrations reduces the protein content by between 10 percent and 14 percent. Some crops may also show reduced mineral and micronutrient concentrations.²⁷ And higher temperatures in Ethiopia and elsewhere may result in lower-quality coffee beans.²⁸

Uncertainty of Disruption

The increasing magnitude and variability of climate impacts, combined with the increasing complexity of supply chain networks, exacerbate the uncertainty of disruption to supply chains. As a result, there is an overarching business benefit to addressing these issues together through the supply chain as a system, rather than addressing them piecemeal.

In a complex system, disruption can come from unexpected impacts. When Hurricanes Katrina (2005) and Ike (2008) hit Bayer's operation in Baytown, Texas, the company's plant was minimally affected, but employee homes and communities suffered significant damage, disrupting production.²⁹

Bayer responded by giving its communities disaster-response resources.

France's 2003 heat waves forced EDF to shut down six thermal power plants, and reduce production from roughly 60 nuclear reactors, due to regulatory limits on the maximum temperature of water discharges.³⁰ Total costs amounted to 300 million euros. By adopting a climate change adaptation plan, the company better withstood heat waves three years later. Similarly, following losses from Hurricane Katrina in 2005, Cisco reconfigured its supply chain for high-value products, resulting in virtually no revenue lost during Japan's 2011 tsunami.³¹

Business Actions

Companies can address climate-related risks in their supply chains, create value, and potentially develop a competitive advantage by identifying and acting where they have the greatest impact on the environment, and the greatest influence. The framework outlined for this process here was first introduced in BSR's 2015 report *Business Action for Climate-Resilient Supply Chains*.³²



Identify Climate Priorities

Determining where to focus in a supply chain can be a challenge. Structured assessment of the supply chain can help companies **prioritize hot spots that offer the greatest opportunity for creating supply chain resilience—including areas of high GHG emissions and areas of high climate vulnerability.** These priorities are identifiable parts of a supply chain where performance in managing climate risks will impact supply chain concerns about cost, speed, quality, and uncertainty.

We encourage a broad approach that considers all of the risks in the TCFD recommendations. This includes physical risks to suppliers' material and energy inputs, operations, labor, and communities, as well as policy and legal, technology, market, and reputational transition risks. Companies can also review risks to each of the areas of value—the capital assets—that their operations and supply chains rely on, as outlined on page 17.

For companies seeking a method to prioritize parts of their supply chain according to climate risks, BSR suggests assessing business-critical spend categories—as well as the geographies from which those categories are sourced—against two dimensions: quantity of emissions generated, which exposes the supply chain to transition risks, and level of vulnerability to physical climate risks. These two dimensions can be mapped to produce a visual representation of the priorities.

STEP 1: Companies can determine the scope for the exercise, focusing on categories of high spend, as well as any categories that are deemed high priority, such as business-critical suppliers or key raw materials that are not sourced directly.

STEP 2: Companies can develop two scores for each category—one for “emissions” and one for “vulnerability.”

- **The emissions dimension is scored based on the level or intensity of GHGs associated with a category.**
- **The vulnerability dimension is scored based on:**

- the extent to which the category is sourced from climate-vulnerable countries, ecosystems, or facility locations;
- the extent to which the category relies on climate-vulnerable natural resource inputs, such as water, to produce the product;
- the extent to which the category relies on extended supply chains and distribution routes in climate-vulnerable locations;
- the extent to which a significant proportion of suppliers within the category are not sufficiently aware of risks, or lack resources to mitigate risks; and
- the extent to which the category otherwise creates risks explained above, such as reputational or market risks.

Companies can look to a variety of public and company-specific data sources to understand and prioritize emissions and vulnerability and map product categories across the two dimensions to visualize the aspects of their supply chains that offer the greatest potential for building resilience.

Take Action and Develop Targets

Considering the urgency of climate change, companies should set targets and take action in tandem. In practice, the processes tend to happen iteratively.

TAKE ACTION

Climate action takes many forms, and companies can be more efficient by adopting a structured approach to identify those actions with the highest potential for impact. Companies can reference the TCFD framework discussed above, or the capital assets outlined on page 17, to help identify actions that address the key physical and transition risks that they, their suppliers, and other stakeholders face.

There are three types of supply chain climate actions that companies can take: internal, with suppliers, and in broader collaboration.

Internal action is about working with teams in procurement and related functions to improve requirements and processes to more successfully consider climate impacts in sourcing and procurement decisions. Supplier action is about setting requirements and encouraging suppliers to reduce their emissions, develop adaptive capacity, and participate in programs with these goals. Collaborative action is about joining, leading, or starting initiatives with other businesses and stakeholders. These initiatives can be commodity-focused, industry-focused, or community-focused.

Businesses may already be developing climate-resilient supply chains, even if the actions are not branded directly as relevant to climate. Our recommendation is to start by asking key internal departments, suppliers, and external stakeholders about their activities.

Internally, businesses likely have substantial information about specific supply chain risks. If there is a supply chain risk-management team in place, team members already monitor a number of risks related to climate change.

If there is no such team, we recommend talking to individuals in key departments about the identified climate priorities. Relevant departments to consult depend on the structure of the individual company and may include business continuity, engineering and design, enterprise risk management, finance, governance, import/export compliance, logistics, manufacturing, procurement, quality, security, sourcing, and supplier management.³³

There are multiple opportunities to consult with suppliers about how they address their own climate priorities: Add the topic to a supplier development meeting, discuss the topic at a supplier forum, send out a short questionnaire, or work questions into existing questionnaires and other data-gathering tools.

There already are many existing collaborative initiatives focused on material areas of impact for supply chains across sectors. Investigating existing programs and understanding where they are most active and successful can help companies focus on where they might want to invest time and effort. When considering which initiatives to embrace, consider how they are governed and their impact.

For more detail about actions that companies can take within their business, with suppliers, and with collaborative initiatives, please see BSR's 2015 report.³⁴

Once actions are identified, companies need to prioritize and ensure this prioritization relies on a robust rationale. This could include prioritization factors, such as a company's level of ambition, resources needed, the potential scale and likelihood of the impact on key metrics, or the measurability of results.

DEVELOP TARGETS

Setting measurable, time-bound targets helps companies focus and drive their actions to address their supply chain climate risks. It also helps companies reduce these risks faster and more profitably than acting without concrete targets.

Targets should focus on identified supply chain priorities, including both emissions reductions to address transition risks and strengthening areas that are vulnerable to physical climate risks.

TARGETS TO ADDRESS TRANSITION RISKS IN THE SUPPLY CHAIN

While quantitative emissions-reduction targets across the supply chain are ideal, many companies, as well as suppliers or segments of the supply chain, may not yet be ready to commit to quantitative goals. In this case, companies or their suppliers can set qualitative climate targets as a useful first step. Examples of qualitative targets that support supplier emissions reduction include:

- establishing energy-management systems;
- taking steps toward emissions reduction (e.g., identifying climate priorities);
- conducting a return-on-investment analysis of a range of potential emissions-reduction activities to identify quick wins;

- developing an emissions-action plan and implementing GHG-reduction projects; and
- including GHG-reduction criteria in supplier selection and product design (e.g., use of less GHG-intensive materials or supply chain processes).

Over time, a company can build on these steps by developing quantitative emissions-reduction targets that include the supply chain and are aligned with global efforts to hold surface warming to less than 2°C.

TARGETS TO ADDRESS PHYSICAL RISKS IN THE SUPPLY CHAIN

Goals to address physical climate risks are more qualitative in nature, such as commitments to build capacity, partner with relevant stakeholders, and develop projects in local areas. As this is an emerging area of climate practice, companies have a substantial opportunity to build the resilience of supplier operations and the communities on which they depend.

For example, food, beverage, and agriculture companies might set targets that focus on sustainable agriculture training for farmers, or investments in R&D to breed drought-resistant

crops for their suppliers. Companies can also set targets for the development of social and environmental initiatives that promote resilience in supplier communities. Given that holistically addressing physical climate risks is a relatively new idea for many companies, most are in a position to demonstrate leadership and innovation and link resilience goals directly to corporate priorities.

Monitoring, evaluating, and reporting helps a company understand how well different actions contribute to achieving targets and effectively addressing supply chain climate priorities and whether there is any need for a company to amend its approach.

In particular, metrics can help a company understand the outcomes and impacts of its climate actions and adjust targets over time. While a wide array of possible metrics exist,³⁵ there is growing momentum around consistent, comparable climate metrics and disclosures, particularly for GHG emissions. Specific metrics may vary by industry, but they can build on existing carbon accounting and reporting standards. We believe standardized supply chain emissions metrics are best when linked to science-based targets for emissions reductions. Metrics for adaptive capacity

could include, for example, the amount of supplier financial investment in infrastructure that helps minimize the impact of climate change or the percent of spend with suppliers in vulnerable locations. Metrics could also include the number of suppliers with climate-preparedness plans.

To help identify priorities, establish areas for action and targets, and evaluate results, companies can review the areas of value, or capital assets, that intersect their supply chains. BSR has identified six capital assets.³⁶

Six Capital Assets to Build Climate Resilience



Human Capital

refers to the skills and knowledge of available human resources, particularly in the workforce.



Political Capital

refers to access to decision making to shape policy environments that enable resilience.



Financial Capital

refers to the volume of available financial resources and access to financial goods and services.



Physical Capital

refers to infrastructure and equipment, including those related to manufacturing facilities, transport, logistics and communications.



Social Capital

refers to the strong relationships, collaborations, and bonds of mutual support and cooperation that are essential for addressing a systemic global challenge such as climate change.



Natural Capital

refers to the full range of services provided by biodiversity and ecosystems, including land and water.

When reviewing these capital assets, a company can identify the particular assets that face the greatest climate risks, take action to strengthen those assets, and measure the results of their action over time. This approach can be used along with the TCFD risk categories to highlight specific areas facing the greatest risks.



Conclusion

Supply chains have become complex global networks, often with specialized inputs produced in specific locations with reduced inventories. It is within this context that supply chains face growing climate risks, both from the physical impacts caused by climate change and from the transition to a low-carbon economy. These risks directly affect the cost, quality, timeliness, and certainty of supply chain production. By identifying and prioritizing affected parts of the supply chain, taking action, and evaluating impact, companies can build resilience to these risks, increasing the likelihood of business success.

Endnotes

- 1 <http://wbcsdpublications.org/project/building-resilience-in-global-supply-chains>
- 2 http://www3.weforum.org/docs/WEF_GRR18_Report.pdf
- 3 <https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf>
- 4 <http://www.air-worldwide.com/Blog/3-Types-of-Risk-That-Will-Impact-Supply-Chains-in-2018>
- 5 <https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf>
- 6 https://scholar.harvard.edu/files/jisung-park/files/j_park_-_world_bank_poverty_and_climate_change_conference_2015_pres_-_v14.pdf
- 7 <http://www.princeton.edu/faculty-research/research/item/estimating-economic-damage-climate-change-united-states>
- 8 http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf
- 9 <https://www.theheinekencompany.com/sustainability/case-studies/green-corridor>
- 10 <https://inhabitat.com/motorola-renew-w233-cellphone>
- 11 <https://realestate.usnews.com/real-estate/articles/how-climate-change-could-impact-your-home-value>
- 12 <https://www.ecotextile.com/2018050423464/labels-legislation-news/ngo-takes-swipe-at-levis-in-climate-change-row.html>
- 13 <https://sciencebasedtargets.org>
- 14 https://www.pwc.com/gx/en/governance-risk-compliance consulting-services/resilience/publications/pdfs/issue3/business_not_as_usual.pdf
- 15 https://www.pwc.com/gx/en/governance-risk-compliance consulting-services/resilience/publications/pdfs/issue3/business_not_as_usual.pdf
- 16 <https://www.bsr.org/reports/BSR-Cambridge-Climate-Change-Implications-for-Agriculture.pdf>
- 17 <http://www.gao.gov/assets/690/687466.pdf>
- 18 <https://www.bsr.org/reports/BSR-Cambridge-Climate-Change-Implications-for-Transport.pdf>
- 19 <https://www.cdp.net/en/research/global-reports/global-supply-chain-report-2018>
- 20 <https://www.oxfamamerica.org/publications/prep-value-chain-climate-resilience>
- 21 <http://wbcsdpublications.org/project/building-resilience-in-global-supply-chains>
- 22 <https://blogs.ei.columbia.edu/2014/11/17/floods-companies-and-supply-chain-risk>
- 23 https://www.pwc.com/gx/en/governance-risk-compliance consulting-services/resilience/publications/pdfs/issue3/business_not_as_usual.pdf
- 24 <https://www.bsr.org/reports/BSR-Cambridge-Climate-Change-Implications-for-Transport.pdf>
- 25 <https://www.bsr.org/en/our-insights/report-view/climate-change-implications-and-strategies-for-the-luxury-fashion-sector>
- 26 <https://www.bsr.org/en/our-insights/report-view/climate-change-implications-and-strategies-for-the-luxury-fashion-sector>
- 27 <https://www.bsr.org/reports/BSR-Cambridge-Climate-Change-Implications-for-Agriculture.pdf>
- 28 <https://www.nature.com/articles/nplants201781.epdf>
- 29 <https://www.c2es.org/document/weathering-the-storm-building-business-resilience-to-climate-change-2>
- 30 <https://www.oxfamamerica.org/publications/prep-value-chain-climate-resilience>
- 31 <http://wbcsdpublications.org/project/building-resilience-in-global-supply-chains>
- 32 <https://www.bsr.org/our-insights/report-view/climate-resilient-supply-chains>
- 33 <http://www.scrlic.com>
- 34 <https://www.bsr.org/our-insights/report-view/climate-resilient-supply-chains>
- 35 https://www.researchgate.net/publication/275165339_An_analysis_of_metrics_used_to_measure_performance_in_green_and_sustainable_supply_chains
- 36 <https://www.bsr.org/en/our-insights/report-view/resilient-business-resilient-world-private-sector-climate-adaptation>

