



# Business Action for Climate-Resilient Supply Chains

*A Practical Framework from Identifying Priorities to Evaluating Impact*

May 2015



## About this Report

This report presents BSR's point of view on how to develop climate-resilient supply chains. It is part of BSR's overall "Business in a Climate-Constrained World" strategy to mobilize BSR's business network, global reach, industry insights, and issue expertise in support of sustained business action on climate change.

For businesses, the supply chain is one of the most critical areas of opportunity to develop climate resilience, both through emissions reduction and developing adaptive capacity. Although this is the case, publically available data suggests that not enough companies are actively embracing the opportunity in their supply chains.

The purpose of this report is to provide companies with a practical framework to understand how to develop climate-resilient supply chains. The report provides clear steps, tools, and examples of current practices by leading companies. The report focuses on three main industry sectors: consumer products, information and communications technology, and food, beverage and agriculture. The framework and tools presented in the report will be useful to companies in other sectors as well.

We anticipate that readers of this report will be encouraged (as we were) to learn that embracing climate resilience in the supply chain is often about honing and amplifying actions that companies and their suppliers are already taking. It is also about joining and driving collaborative initiatives. While companies are urged to think holistically about how to achieve climate resilience across all categories of spend, companies can make the most impact by focusing on the areas in their supply chains that have the highest emissions and are most vulnerable to climate change. We also found that there is more work to do in setting meaningful targets that address both emissions reductions and developing adaptive capacity, and evaluating and reporting on progress.

We hope that chief procurement officers, supply chain directors, category managers, sourcing directors, and others involved in sourcing and supply chain sustainability will gain value from our findings. Our hope for this report is that it will provide a clear understanding of how to move forward, motivate companies to take action, and, ideally, lead to climate-resilient supply chains.

This report was researched and written over a five-month period, from January to May 2015, and is based on a literature review of relevant publications, interviews with BSR member companies and stakeholders, and analysis of relevant BSR climate and supply chain work.

### **ACKNOWLEDGEMENTS**

The authors wish to thank the following people for agreeing to be interviewed for this report: Neil Barrett, Sodexo; Dov Brachfeld, H&M; Liz Cross and Gabrielle Giner, BT; Marie-Claire Daveu, Kering; Dexter Galvin, CDP; Kelly Goodejohn, Starbucks; Steve Lippman, Microsoft; Louise Nicholls, Marks & Spencer; Steve Peterson, General Mills; Jamie Rusby, IKEA; Beth Sauerhaft, PepsiCo; Anshu Sharma, SEEDS; and Peter Zhou, Huawei.

The authors would also like to thank the following people for their peer review and insightful feedback: Edward Cameron, Eric Olson, and Ryan Schuchard.

We would also like to thank Eric Losh for designing the original graphics in the report.

Finally, we extend a very special thanks to Emilie Pratico, who provided tireless guidance and support throughout the process.

#### **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.

Working papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback and to influence ongoing debate on emerging issues. Most working papers eventually are published in another form, and their content may be revised.

#### **ABOUT BSR**

BSR is a global nonprofit organization that works with its network of more than 250 member companies to build a just and sustainable world. From its offices in Asia, Europe, and North America, BSR develops sustainable business strategies and solutions through consulting, research, and cross-sector collaboration. Visit [www.bsr.org](http://www.bsr.org) for more information about BSR's more than 20 years of leadership in sustainability.

#### **SUGGESTED CITATION**

Norton, T.; Ryan, M.; and Wang F. 2015. "Business Action for Climate-Resilient Supply Chains: A Practical Framework from Identifying Priorities to Evaluating Impact." BSR Working Paper. BSR, San Francisco.

## Table of Contents

<b>5</b>	<b>Executive Summary</b>
<b>7</b>	<b>Definitions</b>
<b>9</b>	<b>Introduction and Report Context</b>
<b>14</b>	<b>Understanding Climate Risks to Your Industry</b>
<b>17</b>	<b>Framework for Climate-Resilient Supply Chains</b>
	1. Identify Priorities
	2. Take Action and Develop Targets
	3. Evaluate Impact
<b>39</b>	<b>Conclusion</b>
<b>40</b>	<b>References</b>

## List of Tables and Figures

**TABLE 1:** Definitions

**FIGURE 1:** BSR Resilience Wedges

**TABLE 2:** Supply Chain Climate Risks

**FIGURE 2:** Framework for Climate-Resilient Supply Chains

**FIGURE 3:** Supply Chain Climate Priorities Map

**TABLE 3:** Interpreting the Supply Chain Resilience Map

**TABLE 4:** Public Sources

**TABLE 5:** Company Sources

**TABLE 6:** Food, Beverage, and Agriculture Resilience Wedges

**TABLE 7:** Consumer Products Resilience Wedges

**TABLE 8:** Information and Communications Technology Resilience Wedges

**TABLE 9:** Supply Chain Collaborative Initiatives

**TABLE 10:** Climate-Resilient Supply Chain Targets and Commitments

**TABLE 11:** Supply Chain Resilience Metrics

## Executive Summary

The year 2015 is a critical year for the business community to act on climate change. The science is proven, and the world is poised for critical action at the United Nations Conference on Climate Change in Paris in December.

Climate change is a material risk to supply chains across industries, and according to the CDP, more than 50 percent of an average corporation's carbon emissions typically come from the supply chain.<sup>1</sup>

The concept of climate resilience incorporates both reducing emissions of greenhouse gases (GHGs), and developing adaptive capacity to respond to climate change. In turn, supply chain resilience incorporates both reducing emissions and developing adaptive capacity in relevant areas of the supply chain.

Climate risks to supply chains are already upon us, and most of the companies interviewed for this report cited that their businesses are measuring and accounting for these risks. There are five main areas of supply chain climate risks to be considered by companies across all industries: 1) the physical risk to suppliers' assets and operations; 2) the risk of reduced availability or increased costs of inputs; 3) the risk of changing regulations in sourcing or distribution markets; 4) the risk of climate-related disruptions in communities that impact supplier workforce availability and productivity; and 5) stakeholder, or reputational, risk.

In addition to these general risks, there are sector-specific risks. For the purposes of this report, we considered three sectors.

**Food, beverage, and agriculture:** Supply chains in this sector rely on natural cycles for their stability and productivity, and therefore are sensitive to shifts in ecological systems. Practitioners, including our interviewees from the food, beverage, and agriculture industry, report that climate change already has had direct impacts on their supply chains.

**Information and communications technology (ICT):** Supply chains in this sector are exposed to a number of climate risks related to inputs, geographic location of suppliers, changing regulations, and workforce instability. Resource-intensive processes and availability of materials such as rare earths may be threatened by scarcity and rising costs of key inputs, such as energy and water. Higher temperatures will exacerbate energy demands, potentially leading to outages that could threaten ICT suppliers' ability to operate.

**Consumer products:** Suppliers in this sector—those that provide apparel, furniture, personal care, beauty, and luxury goods—also are exposed to a number of climate-related risks. Consumer products suppliers often are situated in areas vulnerable to the physical impacts of climate change, and disruptions in supply as well as labor and community instability are key risks. In addition, consumer products supply chains face the potential for shortage of raw materials and necessary natural resources.

To develop a climate-resilient supply chain, a company does not need to develop a stand-alone “climate-resilient supply chain strategy.” Resilient supply chains are effective supply chains, and climate targets and actions should be

---

<sup>1</sup> CDP, 2011, ii.

mainstreamed into existing supply chain and related business strategies and programs.

Companies that already are taking action to develop climate-resilient supply chains have approached the challenge in a pragmatic way. The framework we outline below is a three-step process, echoing the journey undertaken by those BSR member companies interviewed for this report. The framework is designed to maximize a company's ability to move quickly to address their risks and opportunities.

### **Step 1: Identify Supply Chain Priorities**

Supply chain climate priorities are the areas of a particular supply chain that offer the greatest opportunity for creating supply chain resilience, and include both areas of high GHG emissions and areas of high climate vulnerability.

Companies are identifying climate priorities in different ways. BSR recommends assessing key categories of spend and relevant geographies to map the aspects of their supply chains that offer the most potential for building resilience. Part of this process is assessing the mix of potential interventions—mitigation, adaptation, or a combination of both—that can best address the range of climate risks in their supply chains.

### **Step 2: Take Action and Develop Targets**

Considering the urgency of climate change, companies are setting targets and taking action in tandem.

Companies can take action by looking internally, integrating climate considerations into the overall procurement, sourcing, and supplier management processes. They can engage and require suppliers to take action by encouraging or requiring suppliers to get involved with climate resilience programs or asking them disclose their own climate performance. And finally, companies have an opportunity to join and lead global collaborative initiatives relevant to their climate priorities.

Developing targets provides direction for companies. Companies should consider developing short-term targets to address climate priorities, and, alongside this effort, investigate science-based methodologies to develop more robust emissions reductions targets.

### **Step 3: Evaluate Impact**

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

Companies can put in place robust metrics, and consider developing bolder reporting practices.

We hope this report will provide a clear understanding of how to move forward on developing climate-resilient supply chains and motivate companies to take action.

## Definitions

Throughout this report, we frequently will refer to these climate and supply chain terms:

**TABLE 1: Definitions**

<p><b>Climate Resilience</b></p>	<p>The IPCC report defines resilience as “the capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or and structure, while also maintaining the capacity for adaptation, learning, and transformation.”<sup>2</sup></p>
<p><b>Climate Resilience Wedges</b></p>	<p>Based on the idea of climate “stabilization wedges” pioneered by Princeton professors Robert Socolow and Stephen Pacala in a seminal paper published in 2004, resilience wedges are opportunities to both reduce emissions and enhance adaptive capacity.<sup>3</sup> This approach is underpinned by the concept that each industry has an emissions reduction “wedge” that represents the total emissions that industry must reduce in order to support climate stabilization. While some wedges cut across industries – such as shifting to lower-GHG fuels or supporting renewable energy sources – others are unique to specific industries.</p>
<p><b>Supply Chain Resilience</b></p>	<p>The capacity of business and their supply chains to minimize their contribution to climate change and to cope with and adapt to climate-related hazardous events, trends or disturbances, which could include disrupted supply chains, reduced availability of natural resources, infrastructure impacts, disrupted transport and logistical routes, and other unpredictable impacts.<sup>4</sup></p>
<p><b>Climate Mitigation</b></p>	<p>Efforts to reduce or prevent emission of greenhouse gases.<sup>5</sup> The IPCC defines mitigation as “interventions to reduce the sources or enhance the sinks of greenhouse gases.”<sup>6</sup></p>
<p><b>Climate Adaptation</b></p>	<p>The ability of a system to adjust to climate change, take advantage of opportunities or to cope with the consequences. The IPCC defines adaptation as the “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.”<sup>7</sup> First, generation adaptation is often referred to consequences of exposure to climate (e.g. flood defenses or seawalls). “Second-generation adaptation” tackles the underlying drivers of climate vulnerability – the factors that make populations sensitive to climate change impacts (e.g. investments in biodiversity and ecosystem services, women’s empowerment)</p>

<sup>2</sup> IPCC, 2014, p. 5.

<sup>3</sup> Pacala and Socolow, 2004.

<sup>4</sup> Cameron, 2015.

<sup>5</sup> UNEP.

<sup>6</sup> IPCC, 2014.

<sup>7</sup> IPCC, 2014.

<b>Supply Chain Risk</b>	<p>“The likelihood and [adverse] consequence of events at any point in the end-to-end supply chain, from sources of raw materials to end use of customers.”<sup>8</sup></p>
<b>Supply Chain Risk Management</b>	<p>The assessment and control of risk events at all points in an end-to-end supply chain, from sources of raw materials to end use by customers and consumers. SCRM involves the systematic assessment and treatment of potential risk events across operations with the objective to exploit opportunities and/ or to reduce negative impacts on the performance of the organization and its supply chain.<sup>9</sup></p>

---

<sup>8</sup> Supply Chain Risk Leadership Council, 2011, p.4.

<sup>9</sup> ASIS International. 2004, p. xi.

# Introduction and Report Context

## Why this Report, and Why Now?

Climate change is an urgent issue for all businesses. In her [plenary address](#) at the BSR Conference 2013, Mary Robinson, former President of Ireland used the words of Martin Luther King, Jr. to describe the reality of the climate challenge, as something we must face in “the fierce urgency of now.” Continued research from the IPCC demonstrates that “climate change threatens irreversible and dangerous impacts,” all of which would dramatically impact global supply chains.<sup>10</sup>

There is greater certainty that human activity has been the dominant cause of the warming of the climate since the mid-20th century, and the scientific community has called for action to reduce 20-40 percent GHG emissions by 2020, and 85 percent by 2050 (over a 1990 baseline) to keep the planet below a 2°C temperature rise in order to prevent the most severe impacts of climate change.<sup>11</sup> This message from the scientific community has been translated into action by nearly 200 governments that have committed to reducing emissions, and by companies around the world who are both demanding action in the form of an international climate agreement and taking action to reduce emissions within their own operations and supply chains.

**For large, multi-national businesses, the supply chain is one of the most critical areas of opportunity to develop climate resilience, both through reducing emissions and developing adaptive capacity.** According to the CDP, more than 50 percent of an average corporation’s carbon emissions typically are from the supply chain.<sup>12</sup> In some industries, a greater proportion of emissions are generated in the supply chain. For example, for food, beverage, and agriculture companies, as much as 90 percent of total emissions are in the supply chain.<sup>13</sup>

## BSR’S ROLE IN DRIVING CLIMATE ACTION

In response to this fierce urgency and the possibility to implement solutions, BSR is catalyzing and accelerating action in the business community toward climate resilience. BSR’s “Business in a Climate-Constrained World” strategy is a three-year initiative launched in 2014. The strategy is designed to mobilize our business network, global presence, and industry and issue expertise to address global climate change. Our strategy comprises three main tenets: **Translation** of climate risk; **collaboration** across business sectors and stakeholder groups in pursuit of urgent, ambitious, and sustained climate-related action; and the **stabilization** of the climate system through the implementation of *resilience wedges*. This report is part of our strategy, specifically addressing supply chain professionals.

## THE WEDGES APPROACH TO ENHANCING CLIMATE RESILIENCE

Given the scale of the challenge and the variety of climate change risks and opportunities to which each company is exposed, BSR has proposed a “wedges”

---

<sup>10</sup> IPCC 2014b.

<sup>11</sup> IPCC, 2014a; IPCC, 2014b.

<sup>12</sup> CDP, 2011, ii.

<sup>13</sup> Schuchard, R. and Springer, N., 2013.

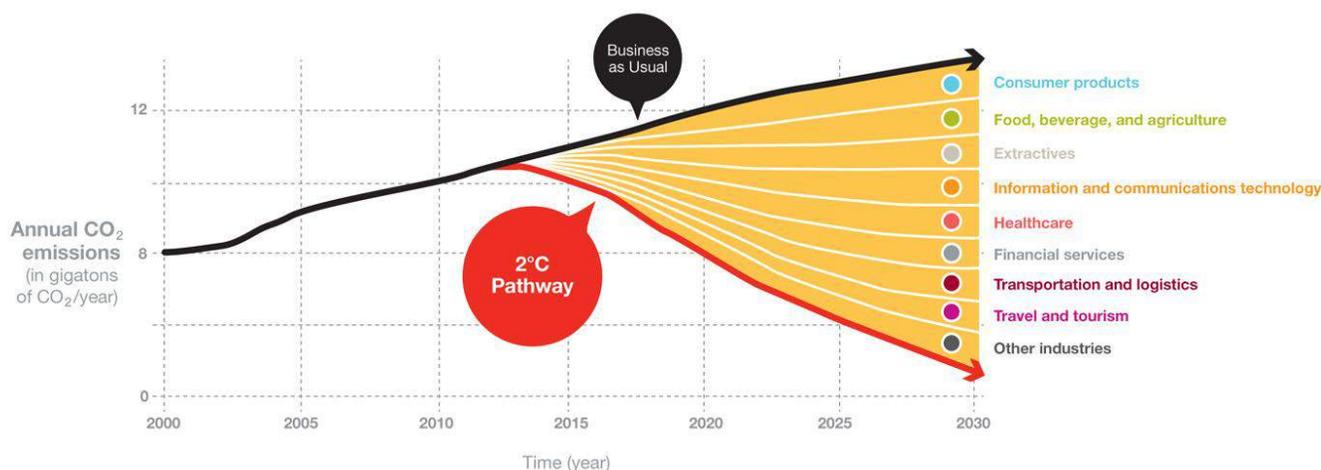
approach to support identification of mitigation and adaptation activities that are specific to each industry.

This approach is supported by the idea that each industry has an emissions reduction “wedge” that represents the total emissions that industry must reduce in order to support climate stabilization. Many of the industry-specific mitigation and adaptation activities that make up these wedges are supply chain activities.

While some wedges cut across industry supply chains—such as shifting to lower-GHG fuels or enhancing water management—others are unique to specific industries. For example, industries that are highly dependent on natural resource inputs, such as food, beverage, and agriculture, and consumer products, share wedges that address high input risks. To learn more about industry-specific wedges, see BSR’s industry translation reports for agriculture, transport, and primary industries and extractives.<sup>14</sup>

The “Framework for Climate-Resilient Supply Chains” that we present in this report builds on our wedges approach.

**FIGURE 1: BSR Resilience Wedges**



## A FRAMEWORK FOR SUPPLY CHAINS

Addressing climate change in the supply chain has business benefits. Companies that engage with suppliers on climate are more likely to reduce emissions and see a financial return from their emissions reductions investments than those who do not engage with their value chains.<sup>15</sup>

When companies consider climate resilience for their supply chains, the default is to start with emissions reductions. However, it is equally important to develop adaptive capacity to help supply chain partners minimize the consequences of exposure to climate change and to tackle the underlying drivers of climate

<sup>14</sup> To view the translation reports, visit: <http://www.cisl.cam.ac.uk/business-action/low-carbon-transformation/ipcc-briefings>

<sup>15</sup> CDP, 2015a, 11.

change vulnerability. In many cases, businesses may already be implementing programs to develop adaptive capacity. For example, some companies are investing in female workers in the supply chain by providing them with access to financial literacy and leadership training. This not only enhances the ability of these women to become more economically secure, but also increases their resilience in the face of climate change, as women are often more vulnerable to climate impacts due to their lack of resources and access.

**In this report, we provide a framework for businesses to develop climate-resilient supply chains.** This framework considers the complexity of global supply chains and operates with the assumption that companies are looking to achieve climate resilience as quickly as possible, within the realities of their supply chain operations today. We hope that our proposed framework and approach will help member companies and others to achieve climate-resilient supply chains.

### Who Is this Report for?

This report is designed to provide insights for chief procurement officers, supply chain directors, category managers, sourcing directors, and others involved in sourcing and supply chain sustainability across industries. The goal is to educate and inform these practitioners so that they may consider ways that climate change is affecting their businesses' supply chains, and to present practical ways to address the risks and seize the opportunities herein.

While this report is relevant for any company considering ways to integrate climate resilience into their supply chain approach, the report focuses on three industries: consumer products, which includes retail, apparel, and luxury; food, beverage, and agriculture; and ICT. These industries were chosen as supply chains generally represent a significant and very publicly visible part of the industry business model. Many companies in these sectors are under public and stakeholder scrutiny for their supply chain practices. In addition, BSR has a long history of working with companies in these sectors, and these sectors are core to our Business in a Climate-Constrained World strategy.

Case studies and interviews were gathered from these three industries, and companies in these industries will find specific guidance throughout this report.

### The Changing Climate Is Changing Supply Chains

Most of the companies interviewed for this report observed that climate change is already affecting their supply chains. Specifically, companies called out changes in quality and availability of specific raw materials, a degradation in biodiversity, and an impact on the human workforce in their global supply chains. Companies already are factoring climate and weather into their risk models, are seeking alternative materials and resources, and are looking for new ways to secure supply and minimize disruptions in their supply chains. Disruptions can impact any aspect of the supply chain, including critical infrastructure, communications, logistics, supply, manufacturing, and distribution. Therefore they are crucial to any risk mapping.<sup>16</sup>

---

<sup>16</sup> ASIS International, 2014, xii.

## SUPPLY CHAIN RISKS AND OPPORTUNITIES TO MANAGE THEM

Supply chain risks created by climate change can be organized as the following areas, which are a subset of the risks for business we set out in BSR's anchor "Business in a Climate-Constrained World" report.<sup>17</sup>

- » **Physical Risk to Suppliers:** Risk of abnormal weather and other physical climate risks impacting suppliers' assets and operations. This includes direct impacts such as damage to facilities and investments, and has a ripple effect of disruption to manufacturing and distribution.
- » **Input Risk:** Risk of reduced availability or increased cost of key business inputs such as raw materials, water, and energy.
- » **Regulatory Risk:** Risk of changing regulations in sourcing or distribution markets that result from a rising price on high carbon sources and energy-intensive activities that depend on them.
- » **Labor and Community Risk:** Risk of climate-related disruptions in community social, environmental, and economic infrastructure that impact supplier workforce availability and productivity, and undermine the realization of human rights in supplier communities. This risk is linked to the "sustainability risk" identified in BSR's anchor report, "Business in a Climate-Constrained World."<sup>18</sup>
- » **Stakeholder (Reputational) risk:** This is inherent in all of the above risks, as they all have potential reputational implications both for businesses and their supply chain partners.

These supply climate chain risks can be addressed both by mitigation and adaptation efforts, both of which need to be considered in a balance to develop resilient supply chains.

---

<sup>17</sup> Cameron, E., Erickson, C. and Schuchard R., 2014.

<sup>18</sup> Cameron, E., Erickson, C. and Schuchard R., 2014.

**TABLE 2: Supply Chain Climate Risks**

Supply Chain Risks	Opportunities for Mitigation (Emissions Reduction)	Opportunities for Adaptation
<b>Physical Risks</b>	<p><b>Encourage supplier participation in renewable energy programs and adoption of energy-efficiency measures</b></p> <p><b>Move to low-carbon transportation methods</b>, including green freight initiatives to reduce emissions of black carbon</p>	<p><b>Encourage and enable suppliers to build infrastructure</b> to minimize the consequences of exposure to climate change risks (e.g., flood defenses or seawalls)</p>
<b>Input Risks</b>	<p><b>Consider material substitutions</b> to lower-GHG raw materials and inputs</p> <p><b>Educate buyers and suppliers</b> about how to reduce emissions in the production of inputs and raw materials</p>	<p><b>Build infrastructure</b> to minimize the consequences of exposure to climate change risks (e.g., flood defenses or seawalls)</p> <p><b>Adopt new technology</b> and processes to reduce the climate impacts of key raw materials and inputs</p> <p><b>Diversify and/or identify new sources</b> for raw materials and inputs</p>
<b>Regulatory Risks</b>	<p><b>Support legal reform</b> that will encourage or require businesses to reduce emissions</p>	<p><b>Support legal reform</b> that enables or incents investment in resilience</p>
<b>Labor and Community Risks</b>	<p><b>Educate the local community</b> around farms or production sites about how to reduce their emissions</p>	<p><b>Invest in gender initiatives</b></p> <p><b>Look for opportunities for institutional capacity-building</b></p>
<b>Stakeholder Risks</b>	<p><b>Educate suppliers</b> about how to train their workforces</p>	<p><b>Make investments</b> in local early warning systems, health care, and education</p> <p><b>Invest in biodiversity and ecosystem services</b></p> <p><b>Develop social safety nets</b></p>

# Understanding Climate Risks to Your Industry

## Translating Climate Risks

The nature of supply chain climate risk differs across industries, with most companies' supply chains exposed to multiple, intersecting climate risks. While some risks are common across industries, such as energy use and mix, others are unique to specific industries.<sup>19</sup> Furthermore, the level of risk exposure is different across industries. For example, businesses that rely on agricultural supply chains have greater exposure to climate-driven input risks than do companies in the ICT sector.

What follows is an overview of climate risks for three industry sectors. Individual companies will need to consider their specific supply chains in order to identify the full spectrum of relevant climate risks.

## Industry Perspectives

### FOOD, BEVERAGE, AND AGRICULTURE

Agricultural supply chains rely on natural cycles for their stability and productivity, and therefore are sensitive to shifts in ecological systems.<sup>20</sup> Practitioners, including our interviewees from the food, beverage, and agriculture industry, report that climate change already has had direct impacts on their supply chains.

Extreme weather events already are affecting agricultural suppliers and buyers in significant ways: increasing costs, jeopardizing the quantity and quality of yields, and making decisions about planting and harvesting increasingly difficult.<sup>21</sup> For climate-related disasters such as floods, droughts, and tropical storms, 25 percent of all damage and losses are incurred in the agriculture sector.<sup>22</sup> In the ten years spanning 2003 to 2013, natural disasters caused US\$70 billion in crop and livestock production losses in 67 developing countries.<sup>23</sup> These climate-related weather events sent shocks through global supply chains. For example, prolonged drought in Russia in 2010 decimated one-fifth of the country's wheat crop. As a consequence, Russia banned wheat exports, leading to a spike in wheat futures and significant price pressures on major food companies such as General Mills, Kellogg's, and Premier Foods.<sup>24</sup>

Climate vulnerability embedded in agricultural supply chains impacts companies not only when catastrophic natural disasters hit sourcing regions, but also through less visible climactic changes. Extreme temperatures or climate-related weather events can impact agricultural workers' ability to get to work, or their productivity once at work. For example, unusually high temperatures may reduce the efficiency of agricultural workers who work outdoors. Shifting disease burdens caused by changing climate may lead to higher rates of illness among agricultural workers, contributing to worker turnover and absenteeism.

Agricultural losses and disruptions impact not only the balance sheets of companies with agricultural supply chains in climate-vulnerable regions, but also

---

<sup>19</sup> Cameron, E., Erickson, C. and Schuchard R., 2014.

<sup>20</sup> Cameron, 2014.

<sup>21</sup> Oxfam, 2012; Cameron, 2014.

<sup>22</sup> UNFAO, 2015.

<sup>23</sup> UNFAO, 2015.

<sup>24</sup> Pleven, 2010; Polansek, 2010; Andrejczak, 2010; Geller, 2010.

the food security, safety, and livelihoods of millions of workers in agricultural supply chains. Food shortages and soaring food costs in 2008 sparked riots and instability from Haiti to Bangladesh to Egypt.<sup>25</sup> Furthermore, significant portions of the global labor force may face involuntary displacement, conflict, and poverty as a result of their reliance on agricultural livelihoods. Agriculture employs more than 30 percent of the labor force in countries such as Bolivia, Cambodia, Cameroon, Guatemala, India, Indonesia, Nicaragua, Niger, Philippines, Sri Lanka, and Vietnam, as well as more than 60 percent of people in Burkina Faso, Ethiopia, Kenya, Madagascar, Mali, Tanzania, Uganda, and Zambia.<sup>26</sup>

Food, beverage, and agriculture companies are rising to the challenges that face their industry. For example, PepsiCo engages growers around the world through its Sustainable Farming Initiative to assess and address a range of climate-related factors, including carbon footprint, water use, and agricultural chemicals management. Starbucks supports farmer communities through a range of efforts including farmer loans to help coffee cooperatives manage risk and strengthen their businesses, and farmer-support centers in key growing regions to provide technical consultation and training in the context of a changing climate.

## **INFORMATION AND COMMUNICATIONS TECHNOLOGY**

ICT supply chains are exposed to a number of climate risks related to inputs, geographic location of suppliers, changing regulations, and workforce instability. Resource-intensive processes and availability of materials such as rare earths may be threatened by scarcity and rising costs of key inputs, such as energy and water. Higher temperatures will exacerbate energy demands, potentially leading to outages that could threaten ICT suppliers' ability to operate. While some ICT companies are calling for a tax on carbon, emerging regulations and carbon tax schemes may put financial pressure on ICT companies and their suppliers, as they would be required to pay more for the energy they use and/or the emissions they generate.

The industry relies heavily on sourcing locations that are vulnerable to climate change, creating exposure to risks related to extreme weather events that could disrupt manufacturing or logistics. These locations also are at risk of workforce instability and negative human rights impacts. Some of these geographical supply chain vulnerabilities already have been exposed. For example, flooding in Thailand in 2011 swamped ICT suppliers with six feet of standing water, causing a major disruption to the global supply of hard drives, and in turn, personal computers and other electronic devices.<sup>27</sup> Acer, the fourth-largest personal computer manufacturer, cut its quarterly sales projection by 5-10 percent.<sup>28</sup> Toyota, Honda, and Nikon all reported supply shortages or disruption of operations as a result of this weather event.<sup>29</sup>

While climate change poses clear risks to ICT supply chains, it also presents an opportunity for the ICT sector to contribute new products and services that enable other sectors to build resilience. Many ICT companies already are leveraging innovation capacity and intellectual property to develop data monitoring and coordinated response solutions that support climate resilience. Through its CityNext program, Microsoft is providing cities with services and devices that collect and analyze data in order to surface opportunities to cut

---

<sup>25</sup> Plevin, 2010; CNN, 2008.

<sup>26</sup> UNFAO, 2015.

<sup>27</sup> Fuller, 2011.

<sup>28</sup> Kwong, 2011.

<sup>29</sup> Kwong, 2011.

energy costs, improve forecasting, and detect potential equipment failures.<sup>30</sup> Microsoft is also supporting research to advance the development of data visualization and management technologies that aid environmental research and climate scientists.<sup>31</sup>

Other ICT companies have made similarly encouraging strides. Following the 2013 tsunami in the Philippines, Hewlett-Packard deployed fully automated container health care centers in Tacloban City, an area seriously affected by the disaster. In addition to providing access to healthcare services, the health care centers uploaded patient data to the cloud, allowing public health experts to track health patterns and respond to disease outbreaks.<sup>32</sup> Through a partnership with the UN Refugee Agency, UPS provides support for efficient and equitable distribution of nutrition and critical supplies to refugees using the company's supply chain tracking technology, Trackpad.<sup>33</sup> These examples illustrate the massive potential for ICT companies to contribute to climate-resilient supply chains.

## CONSUMER PRODUCTS

Like ICT and agriculture supply chains, consumer products suppliers—those that supply apparel, furniture, personal care, beauty, and luxury goods—also are exposed to a number of climate-related risks. Consumer products suppliers are often situated in areas vulnerable to the physical impacts of climate change, and disruptions in supply and labor and community instability are key risks. In addition, consumer products supply chains face the potential for shortage of raw materials and necessary natural resources. In a recent survey of nearly 300 executives from the sector, respondents rated availability and cost of raw materials as the No. 1 risk facing consumer products companies.<sup>34</sup> Climate change also may contribute to diminished consumer purchasing power and shifting consumer needs, impacting buying cycles and demand for products and services.

Climate change also allows consumer products supply chains to demonstrate capacity for innovation. Opportunities lie in exploring alternative materials, deploying lower-GHG manufacturing processes, and applying closed-loop principles to operations and product design. For example, Nike recently launched a waterless dyeing process that reduced energy use by about 60 percent in a pilot textile manufacturing facility.<sup>35</sup> H&M, the biggest organic cotton user in the world, has significantly reduced the embedded GHG emissions in its clothing since organic cotton uses no chemical pesticides or fertilizers.<sup>36</sup>

---

<sup>30</sup> Microsoft, 2014.

<sup>31</sup> Microsoft, 2014.

<sup>32</sup> BSR, 2014.

<sup>33</sup> UPS, 2015.

<sup>34</sup> Ernst & Young, 2013.

<sup>35</sup> Environmental Leader. 2013.

<sup>36</sup> H&M, 2015.

## Framework for Climate-Resilient Supply Chains

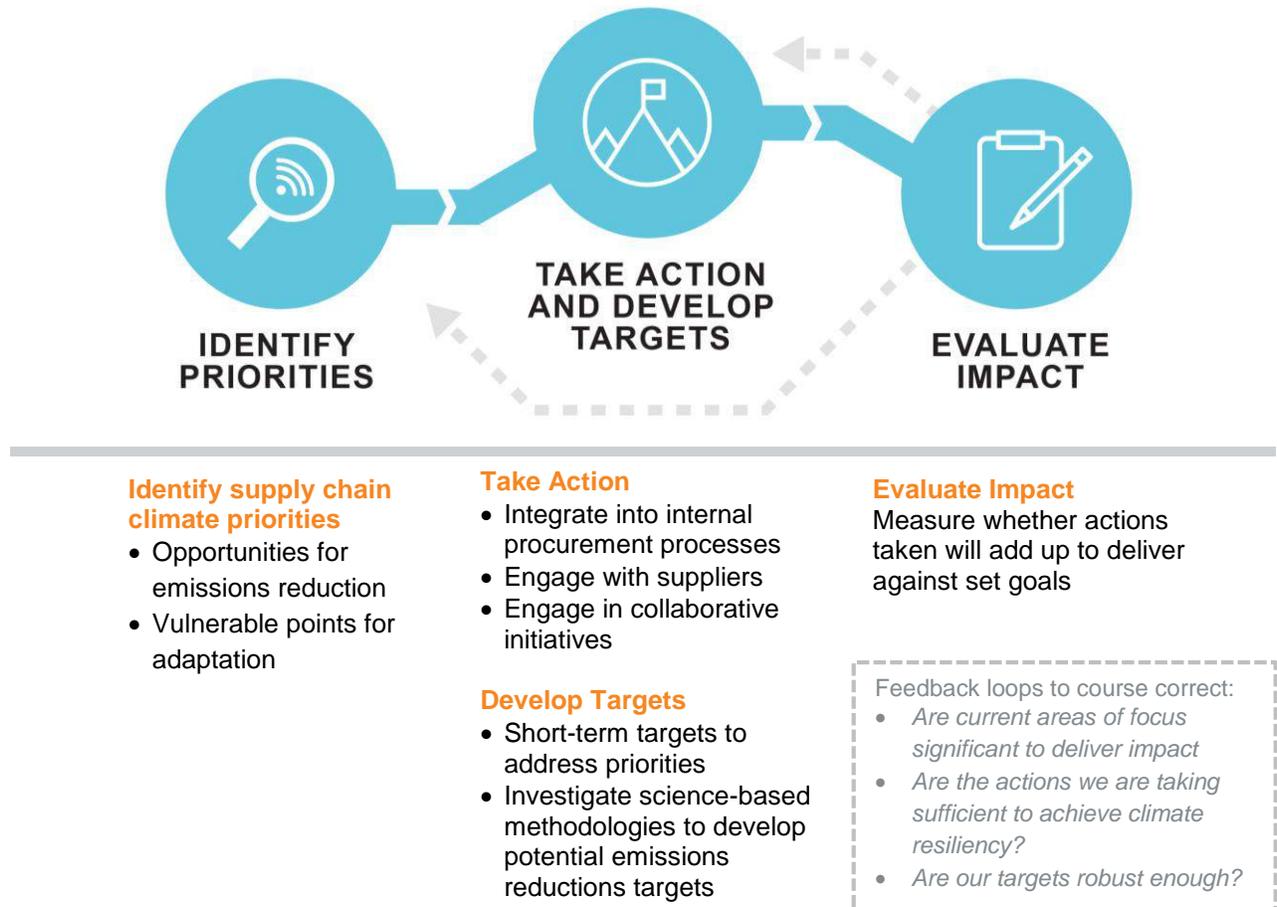
Climate risks and opportunities in the supply chain are linked to core business risks and opportunities, as we have demonstrated in the section above. To develop a climate-resilient supply chain, a company does not need to develop a stand-alone “climate-resilient supply chain strategy.” Resilient supply chains are effective supply chains, and climate targets and actions should be mainstreamed into existing supply chain and related business strategies and programs.

Companies that are already taking action to develop climate-resilient supply chains have approached the challenge in a pragmatic way. The framework we outline below is a three-step process, echoing the journey that many companies have undertaken. The framework is designed to maximize a company’s ability to move quickly to address risks and opportunities, and to ensure that the company does not get too bogged down by calculation or analysis.

The framework starts with the crucial step of identifying priorities within the supply chain. From there it suggests a parallel process in which businesses can both set targets and take action. The framework culminates in the evaluation of impact, with an opportunity to course-correct if more impact is deemed necessary. These steps constitute an iterative process with a feedback loop for progressive improvement and refinement.

The forthcoming chapter will go into detail about each of the steps.

**FIGURE 2:** Framework for Climate Resilient Supply Chains



## THE TRANSPARENCY IMPERATIVE

Supply chain transparency, the ability to visualize suppliers and the flow of inputs, goods, and services in a given supply chain, is a fundamental element of a sustainable supply chain program.

Transparency in the supply chain is also critical to building climate resilience, as information about the supply chain is essential to identifying hotspots, prioritizing interventions, and verifying progress toward goals. Companies that lack visibility into their suppliers' geographic locations, key issues, and decision-making systems will have a difficult time taking steps to mitigate their climate vulnerability.<sup>35</sup> By contrast, companies that have a high degree of supply chain transparency are better positioned to mitigate risks posed by climate change and realize opportunities in their supply chains.

Following the journey of each and every product in a company's purchasing portfolio is challenging, and some areas of the supply chain are particularly opaque.<sup>36</sup> Technological advances have helped to enable greater transparency, but a fully transparent supply chain remains elusive. Companies should continue to strive for improved transparency, though even without full supply chain transparency, companies can use the resilient supply chain framework presented in this report.

Starbucks has achieved a high level of farm-level transparency through a decade of engagement with suppliers through its CAFÉ practices program, a verification program that promotes sustainable farming and social practices that meet the company's standards. Through this program, Starbucks keeps a pulse on supplier performance, surfaces emerging climate-related risks, and deploys resources to the areas of its supply chains that need them most.

*"As part of the application process, we document the farmers that make up each supply chain, and we have lots of information about the farms we purchase from through our CAFÉ practices program. As part of this program, farmers also self-report whether they have had pests or if they have suffered from drought or coffee rust, and we can target our resources accordingly to provide support."*

– Kelly Goodejohn, Director,  
Ethical Sourcing, Starbucks



## 1. Identify Climate Priorities

A recent study from the Organisation for Economic Co-operation and Development found that while companies generally are aware of the physical impacts of climate change, few undertake formal assessments of the specific risks they face and follow-up with action on adaptation to reduce those risks.<sup>37</sup> An assessment of specific risks through understanding the social and environmental ecosystems around your supply chain is an essential first step to building climate resilience.

As described in section 2.3, companies face a breadth of supply chain climate risks, and determining where to focus can be a challenge. Structured assessment of the supply chain can help companies to identify **supply chain climate priorities—the areas of a particular supply chain that offer the most opportunity for creating supply chain resilience—including both areas of high GHG emissions and areas of high climate vulnerability.** These climate priorities are identifiable aspects of a supply chain that have an impact on the business's climate performance and climate risk profile.

Companies can identify their climate priorities in different ways, and at the end of this section we include three case studies of how companies have gone about doing it.

For companies seeking a method to identify their priorities, BSR suggests assessing and evaluating business-critical spend categories—and the geographies from which goods in those categories are sourced—against two dimensions: Quantity of emissions generated and level of vulnerability to climate impacts. These two dimensions can be mapped to produce a visual representation of the priorities.

This exercise can be broken down into the following steps:

- » Step One: First, companies can choose the categories of spend in scope for the exercise, focusing on categories of high spend, as well as any categories that are deemed high-priority, such as key raw materials that are not sourced directly.
- » Step Two: Companies then can aim to provide 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 generated by a product category
  - The vulnerability dimension is scored based on:
    - The extent to which a category is sourced from climate-vulnerable countries, regions, or ecosystems
    - The extent to which the category relies on climate-vulnerable natural resource inputs, such as water, to produce the product

<sup>37</sup> Agrawala, 2011.

<sup>34</sup> PwC, 2012.

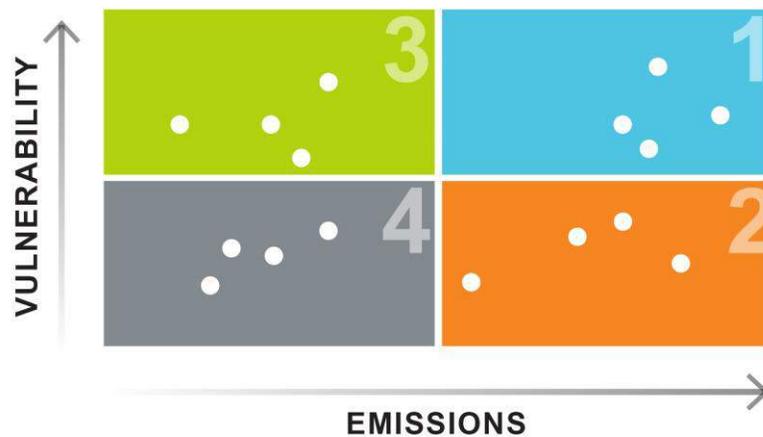
<sup>35</sup> Schuchard, 2011.

<sup>36</sup> UNGC and BSR, 2010.

- 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 aware of risks sufficiently, or lack sufficient resources to mitigate risks

Companies can map product categories across the two dimensions in order to visualize the aspects of their supply chains that offer the greatest potential for building resilience. This process also provides companies with insight into the mix of potential interventions—mitigation, adaptation, or a combination of both—that can best address the range of climate risks in their supply chains. **Figure 3** provides an illustrative example of this supply chain climate priorities map.

**FIGURE 3:** Supply Chain Climate Priorities Map

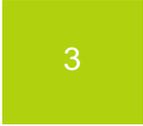


### INTERPRETING THE SUPPLY CHAIN CLIMATE PRIORITIES MAP

The supply chain climate priorities map illustrates the range of climate risks within a company's supply chain, including areas of high emissions as well as areas that are highly vulnerable to climate impacts. Using the placement of categories and geographies on the map, companies can better equip themselves to understand risks and to make decisions about where and how to act efficiently and successfully to build resilience in the supply chain.

Interpreting this map contributes to prioritizing actions required for building a climate-resilient supply chain. Below is a guide for interpretation.

**TABLE 3:** Interpreting the Supply Chain Resilience Map

QUADRANT	ACTION	IMPLICATION
	<b>Act Holistically</b>	Spend categories and geographies that land in the upper-right quadrant are those that represent both the highest emissions and highest vulnerability. Supply chain interventions for these climate priorities should include both emissions reductions interventions and those that build adaptive capacity.
	<b>Mitigate</b>	Spend categories and geographies in the lower-right quadrant are climate priorities where emissions reductions interventions should be deployed.
	<b>Build Adaptive Capacity</b>	The upper-left quadrant captures spend categories and geographies where adaptive capacity-building approaches are needed.
	<b>Monitor</b>	Categories and geographies that map to the lower-left quadrant have lower emissions and less vulnerability than others. Because the map focuses on key categories of spend, it is worth monitoring these categories on an ongoing basis.

**INFORMATION SOURCES FOR IDENTIFYING PRIORITIES**

Companies can look to a variety of public and company-specific data sources to understand and prioritize emissions and vulnerability priorities, including:

**TABLE 4: Public Sources**

Tool	Resource
<b>Climate Monitoring and Prediction Tools</b>	<ul style="list-style-type: none"> <li>Climate Administration Knowledge Exchange (<a href="#">CAKE</a>): includes a library of risk and adaptation planning tools and case studies</li> <li><a href="#">Google Earth Engine</a>: mapping resources on topics such as deforestation, land cover, forest carbon</li> <li><a href="#">International Research Institute for Climate and Society</a>: near- and long-term climate forecasts</li> <li>U.S. National Oceanic and Atmospheric Administration's <a href="#">Climate Prediction Center</a>: U.S. climate projections, including weather hazards and drought</li> </ul>
<b>Country-Based Climate Risk and Vulnerability Projections</b>	<ul style="list-style-type: none"> <li><a href="#">ND-GAIN</a> Global Adaptation Index: country ranking of vulnerability to climate change and readiness to improve resilience</li> <li><a href="#">weADAPT</a>: collection of climate projections including country-level vulnerability to climate change</li> </ul>
<b>Lifecycle Assessment</b>	<ul style="list-style-type: none"> <li><a href="#">GHG Protocol Third Party Databases</a>: open source Lifecycle Assessment (LCA) data</li> <li><a href="#">LCA Commons</a>: open source North America agriculture LCA data</li> </ul>

**TABLE 5: Company Sources**

Tool	Description
<b>Internal Business Intelligence/Risk Management Processes</b>	Companies often have risk management specialists who monitor business-relevant risks. Depending on the data sources for these risks, climate impacts already might be integrated in a company's ongoing risk processes.
<b>Data and Information from Strategic Suppliers</b>	Companies might collect information from key suppliers that can help to identify climate priorities. These may include: Emissions data, impacts of resource scarcity, recent natural disasters or weather impacts, or price volatility related to inputs at risk.
<b>Lifecycle Assessment</b>	Company-specific product or process LCAs provide a quantifiable picture of energy use.

<b>Energy Audit</b> <sup>37</sup>	Energy audit is a detailed analysis of the energy performance of a company's systems and processes to surface areas of high energy use, inefficiency, or waste.
<b>GHG Protocol Supply Chain Standard</b> <sup>38</sup>	GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard provides a framework for companies to identify which parts of their value chains they should target to reduce emissions.



## Key Questions for Procurement and Supply Chain Professionals

Procurement and supply chain professionals can consider the following questions to identify supply chain climate priorities:

- What are the categories or supply chain processes that generate the highest total emissions in my supply chain?
- What are the categories or processes that generate the highest emissions intensity?
- Where do I have strategic sourcing relationships in physical locations that are at high risk to climate impacts?
- Are there particular geographic concentrations of my extended supply chain that are vulnerable to changes in climate?
- Which categories do I source that rely on climate-sensitive inputs such as water, or require specific temperatures or weather patterns that are likely to be impacted by climate change?
- Are there aspects of my supply chain that have extended and/or vulnerable logistics or distribution routes? If so, what are they?
- Are there parts of my supply chain where suppliers are not sufficiently aware of the climate risks they face, or where suppliers lack appropriate resources to mitigate or adapt to these risks?

<sup>37</sup> ISO, 2014.

<sup>38</sup> Greenhouse Gas Protocol, 2014.



## CASE STUDIES

**These three short case studies provide examples of how the companies interviewed for this report identified their supply chain climate priorities.**

**Starbucks** has collected thousands of data points that reflect the climate vulnerability and risks of its 170,000 farm suppliers. Through its CAFÉ practices program, Starbucks samples a subset of its suppliers to understand their productivity, experience with pests and disease, extent of erosion, and use of sustainable agriculture practices such as buffer zones. As a companion to this data-driven approach to risk assessment, Starbucks also relies on first-hand knowledge from coffee buyers and suppliers who travel to the field to meet with farmers. Also, by purchasing its own coffee farm, Starbucks gained firsthand knowledge of the experiences that coffee farmers face and can share research and development learnings through an open source model that will benefit the entire coffee industry.

Using this data, Starbucks buyers and ethical sourcing specialists partner to pinpoint where producers in the supply chain already are threatened by climate change impacts such as water scarcity or changing pest pressures, and where the risk of climate-related impacts is high. Starbucks then shifts its field agronomists to provide support to producers who have the greatest needs.



**PepsiCo** leveraged product LCA results and future scenario predictions as an input into the development of its flagship Sustainable Farming Initiative (SFI), a tool to engage with its global growers to assess and promote practices that reduce environmental and social impacts while improving economic strength and viability. SFI addresses a host of climate-related factors: Carbon footprint, water use, and agricultural chemical management, including reducing the use of and replacing nitrogen-based fertilizers, proper tilling practices, and on-farm fuel reductions.

PepsiCo used LCA data to understand and prioritize the areas of highest emissions impact. Rather than assessing the entire product portfolio or chasing the numbers to the last fraction of CO<sub>2</sub>, PepsiCo selected indicator products that roughly represent emissions impacts of similar product categories.

The results helped the company identify levers for change. Since agriculture was identified as one of the biggest impact areas across many products, the company strengthened its focus and commitment to driving sustainable farming practices across its supply chain. The three-year-old SFI is a good example of one such practice; it is the beginning of a centralized agriculture program for PepsiCo that will continue to reach global markets in the years ahead.



**Kering** pioneered an Environmental Profit & Loss (EP&L) Account to increase the company's understanding of the environmental impact of its business, in its own operations and across its entire supply chain, and to calculate the monetary value of this impact. The EP&L approach has been praised as a new way for business to value natural capital.

Kering measures its environmental footprint by examining GHG emissions, water use, water pollution, land use, air pollution and waste. The company analyzes impact through its own operations (retail, offices, transport), as well as through the operations of its suppliers, from raw materials through to manufacturing.

Though the methodology is complex and there is a significant amount of data to collect, the EP&L approach has been successful in enabling Kering to identify the most intensive areas, including high-climate impact areas of the company's business and extended supply chain. Company officials hail the approach as something that ultimately can help them make better business decisions. Kering has received wide internal buy-in from taking this approach and has open-sourced the methodology to encourage corporate natural capital accounting more broadly.

Marie-Claire Daveu, Kering's chief sustainability officer and head of international institutional affairs, stated, "We have been proud to pioneer the EP&L approach to help change the traditional systems that are no longer viable in the face of climate change. We would like to encourage other companies to take up this approach to understand and account for their impacts on natural capital."



## 2. Take Action and Develop Targets

Considering the urgency of climate change, companies should set targets and take action in tandem. In reality, the processes tend to happen iteratively and in overlapping ways. The companies we interviewed for this report reported a variety of approaches. This section explores both topics.

### TAKE ACTION

Climate action takes many forms and companies can be more efficient by adopting a structured approach to identify actions with the highest potential for impact.

Companies also might benefit from taking an industry-specific approach to prioritizing actions. In collaboration with the University of Cambridge Institute for Sustainability Leadership, BSR has identified the major resilience wedges for three industries: agriculture, transport, and primary industries and extractives<sup>39</sup>. The resilience wedges identified in these briefing reports represent the key steps for adaptation and mitigation in the context of the climate risks specific to each industry. A subset of supply chain-specific wedges for the three industries profiled in this report are illustrated below:

**TABLE 6:** Food, Beverage, and Agriculture Resilience Wedges

Mitigation Activities	Adaptation Activities
Sequester carbon in soils	Improve soil, land, and livestock management
Optimize use of nitrogen fertilizers	Adopt adaptive water management techniques
Reduce food loss and waste along the supply chain	Improve crop heat tolerance
Reduce methane emissions from agricultural practices such as open burning, manure management, or paddy rice cultivation	Enhance supplier community access to information

---

<sup>39</sup> To view these translation briefings, visit: <http://www.cisl.cam.ac.uk/business-action/low-carbon-transformation/ipcc-briefings>

**TABLE 7: Consumer Products Resilience Wedges**

Mitigation Activities	Adaptation Activities
Change fuel mix to lower-GHG products	Adopt adaptive water management techniques
Utilize lower-GHG materials	Enhance supplier community access to information
Design products to enable consumers to lower GHG footprint	Develop products and services to meet consumer needs that arise from climate impacts
Deploy lower-GHG manufacturing processes	

**TABLE 8: Information and Communications Technology Resilience Wedges**

Mitigation Activities	Adaptation Activities
Change fuel mix to lower-GHG products	Incorporate climate impacts into site selection criteria
Improve efficiency of data centers and networks	Design sites to use radically less water and energy
Implement closed-loop design and manufacturing principles	Create new products and services to enable adaptation of other sectors
Enable the shift to lower-GHG technologies by consumers	Develop products and services to meet consumer needs that arise from climate impacts

By considering these industry-specific activities, companies can begin to develop an impactful suite of climate actions that address climate priorities and take advantage of industry-wide mitigation and adaptation levers such as the examples in the tables above. With these priority-focus areas in hand, companies will be ready to take action and develop targets.

## TYPES OF ACTION: INTERNAL, SUPPLIER, AND COLLABORATIVE

There are three types of supply chain climate actions: internal, with suppliers, and in collaboration. Internal action is about working with your internal teams in procurement and related functions to improve requirements and processes to more successfully consider climate impact in sourcing and procurement decisions. Supplier action is about setting requirements and encouraging suppliers to reduce their emissions or develop adaptive capacity, and to participate in programs with these goals. Collaborative action is about joining, leading, or starting initiatives with other businesses and stakeholders—initiatives that can be commodity-focused, industry-focused, or geographically-focused.

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

**Your business** likely has much information about its specific supply chain risks. If there is a supply chain risk management team in place, team members already will be monitoring a number of risks that are related to climate change. If there is no such team, one avenue is to talk to individuals in key departments about the climate priorities identified. 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.<sup>40</sup>

There are multiple opportunities to consult with **your suppliers** about how they are addressing 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 you may be using.

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.

---

<sup>40</sup> Supply Chain Risk Leadership Council, 2011, 6.



## Key Questions to Ask

 <b>Your Business</b>	 <b>Your Suppliers</b>	 <b>Peer companies, Stakeholders, Collaborative Initiatives</b>
<ul style="list-style-type: none"> <li>• What are the biggest perceived risks now and in the future?</li> <li>• Of the supply chain climate priorities that we have identified, which do you think are most relevant?</li> <li>• What actions are you already taking to address these risks?</li> <li>• Where are there gaps that we are not addressing?</li> </ul>	<ul style="list-style-type: none"> <li>• What are you doing about the climate priorities that we have identified?</li> <li>• What do you see as the biggest risks now and in the future?</li> <li>• What actions are you already taking to address those risks?</li> <li>• What programs have you put in place to tackle these issues?</li> <li>• To what extent are you working with any companies or organizations on programs to address these risks?</li> </ul>	<ul style="list-style-type: none"> <li>• What initiatives exist that focus on these climate priorities?</li> <li>• How have the existing initiatives contributed to overall climate resilience?</li> </ul>

The following sections go into more detail about the types of actions that companies can take. The sections provide specific examples from companies interviewed for the report and other BSR members.



## EXAMPLES

### How to incentivize buyers:

**Walmart** incentivizes its buyers to incorporate sustainability attributes relevant to the category, which includes climate change, with its suppliers. Five percent of buyers' performance evaluation, which impacts their annual raise, is based on sustainability work.<sup>40</sup>

### How to incorporate climate resilience at each step of the procurement process:

**BSR's Center for Sustainable Procurement** outlines a framework for incorporating sustainability criteria, including climate resilience, at each step. From defining the business need to developing a category strategy, sourcing strategy, selecting and negotiating with suppliers, and performance management, the Center offers tools and case studies that highlight the actions different businesses have taken.

<sup>40</sup> Gunther, 2013.



## Your Business: Enhance Your Internal Requirements and Processes

When considering supply chain action, companies often start thinking about what to do with their suppliers. There is a lot of opportunity for both emissions reductions and adaptation by starting internally and looking at opportunities to adapt procurement, sourcing, and supply chain processes.

These functional areas are more in tune to climate change than they were before. Beth Sauerhaft, senior director of corporate agro sustainability at PepsiCo, said, "Talking about impacts from climate change began with a holistic approach that focused on a variety of areas such as investment in renewable energy and efficient technologies, innovating to improve the efficiency of point-of-sale equipment, our truck fleets, and reducing the use of packaging and supporting recycling. We then became more focused on the agricultural piece and our procurement associates increasingly consider climate change impacts. If there's a drought or flood and yields won't be what a buyer has anticipated, it impacts pricing. Procurement associates are increasingly tuning into this; I think it's happening more and more. They see that climate change drives increasing commodity pricing volatility."



## ACTIONS YOU CAN TAKE

In practice, incorporating climate considerations means integrating requirements throughout the whole procurement lifecycle. These requirements address categories of spend relevant to supply chain climate priorities.

**Incorporate climate resilience into the request for proposal, tendering process, and supplier-selection process.** To operationalize this approach, consider adding questions and scoring criteria that reward suppliers which have taken climate action, for example through reporting GHG emissions or conducting a climate vulnerability assessment. This especially would be relevant for specific categories related to climate priorities.

**Add climate resilience performance metrics to the supplier development and performance management processes.** Equip supplier development managers to engage with suppliers on climate topics through implementing relevant performance metrics.

**Lengthen contractual relationships with key suppliers in categories related to climate priorities.** Evidence and experience show longer-term relationships enable better sustainability performance with suppliers.

**Include climate related targets/incentives for buyers (at least for categories related to the climate priorities).** Buyers need to be aware of how climate affects their categories; incentivizing buyers to develop climate resilience will formalize this responsibility.

**Consider climate vulnerability in the development of category and sourcing strategies for categories related to climate priorities.** Require that specific category managers consider the impacts of climate.



## EXAMPLES

### How to engage supplier communities to build resilience:

[Starbucks'](#) holistic approach to farming community support ranges from farmer loans to technical training to social development investments.

### How to engage suppliers to make improvements: [BT's Better Future Supplier Forum](#)

encourages and rewards supplier sustainable innovation.

### How to provide benefits to suppliers: [CDP Action Exchange](#)

is a program that allows suppliers to receive special benefits in return for reporting their emissions. All participating suppliers are given advice and connected to potential solutions providers to improve their emissions reductions.



## Your Suppliers: Engage and Require your Suppliers to Take Action

Suppliers already might be engaged in actions that build climate resilience, even if they are not referring to them as actions related to climate resilience. Most of the companies we interviewed for this report gave examples of suppliers that already were adapting to climate change or mitigating their climate impact.

Louise Nicholls, Head of Responsible Sourcing, Packaging and Plan A at Marks & Spencer, stated, "Wherever I go in the world, suppliers are talking about how the planet is changing. It's often not in a technical or scientific way, but people are talking about changes in the soil, what's happening in terms of annual temperatures, annual rainfall, how the seasons are changing, and how that's impacting malnutrition, crop rates, etc. Farmers are the very best at this. They are living and breathing the changes, outside in the environment experiencing them, and having to think about how they adapt. Even at smallholder level, there is a much greater focus on precision farming. Farmers are increasingly thinking about 'how much water have I got,' and 'Where is my soil good enough?' and adapting what and how much they can grow."

Gabrielle Giner, Environmental Sustainability Program Manager at BT Group reports that the BT team is constantly impressed by the suppliers who participate in their BT Better Future Supplier Forum Game Changing Challenge innovation program, through which suppliers bring innovative sustainable ideas to BT that help the company to achieve its goals on climate.



## ACTIONS YOU CAN TAKE

Engaging suppliers or requiring them to develop climate resilience takes a number of forms.

**Promote the importance of climate resilience and action to suppliers.** For example, highlight the topic at a supplier summit or during supplier development meetings.

**Require or encourage suppliers to report their climate impacts.** Guide suppliers to report directly to the company or through public reporting mechanisms such as the CDP or the suppliers' sustainability report.

**Reward suppliers for demonstrating climate resilience.** Examples of rewards and incentives include supplier awards, better business terms, or more long-term business.

**Require suppliers to participate in regional/commodity-focused programs.** Examples include the Better Cotton Initiative, Starbucks farmer support programs, or BSR's Energy Efficiency Partnership.

**Develop supplier support (technical and financial) mechanisms.** Supplier support centers and loans for technology that enable suppliers to adapt to

climate impacts are examples of capacity-building interventions that can support climate action.

**Develop platforms to share supplier best practices.** Examples include McDonald’s “Best of Sustainable Supply” and Tesco’s Supplier Hub.



**EXAMPLES**

**How to collaborate locally:** Marks & Spencer supplier, [Finlays](#), working with other lake users, government, and key stakeholders worked together to demonstrate good water stewardship of Lake Naivasha in Kenya, a key water source for flower suppliers. Marks & Spencer supported development of standards to benchmark and demonstrate this was good water stewardship.

**How to collaborate on a material commodity:** Along with multiple brands, [H&M](#) is an active member of the Better Cotton Initiative (BCI). BCI already has provided 220,000 farmers with knowledge and support to grow cotton that uses less water and fewer chemicals, cares for soil and natural habitats, and promotes good working conditions on the land.

**How to expand industry collaboration:** In 2015, the [Electronics Industry Citizenship Coalition](#) (EICC) partnered with the CDP to encourage electronics companies to disclose through CDP’s Supply Chain Program. EICC and CDP plan to publish joint reports on industry trends.



**Collaborative Initiatives:  
Join and Lead Relevant External Initiatives**

Collaboration is one of the main focus areas of BSR’s “Business in a Climate-Constrained World” strategy. As stated in our recently released anchor report update, “We believe that collaboration across industries and with multiple stakeholder partners creates an ecosystem for climate action, allowing industries to enable each other and the communities in which they operate.”<sup>41</sup> Collaborative action enables sustainability impacts beyond the reach of individual companies, especially in extended multitier supply chains, where climate priorities may be many tiers away from a business’ direct commercial relationships.



**ACTIONS YOU CAN TAKE**

Companies should collaborate as much as possible with other companies that have significant supply chain overlap, and with suppliers and stakeholders in their most important supply chain geographies. External initiatives in which companies engage can be global in nature or specific to regions or ecosystems such as watersheds. The right mix of supply chain collaborations in which a company is engaged will vary based on the companies’ climate priorities, level of ambition, and resources available to manage external partnerships.

The following list of collaborative initiatives provides examples of existing supply chain collaborative initiatives that focus on climate-relevant goals; these examples were cited by the interviewees as relevant to the three target industries for this report.

<sup>41</sup> Cameron, 2015, 4.

**TABLE 9: Supply Chain Collaborative Initiatives**

Supply Chain Collaborative Initiatives
<ul style="list-style-type: none"><li>• Better Cotton Initiative</li><li>• CDP</li><li>• Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants</li><li>• Consumer Goods Forum</li><li>• Electronics Industry Citizenship Coalition</li><li>• Forest Stewardship Council</li><li>• SAI Platform</li><li>• The Sustainability Consortium</li><li>• Tropical Forest Alliance 2020</li></ul>
BSR-Led Supply Chain Collaborative Initiatives
<ul style="list-style-type: none"><li>• Clean Cargo Working Group</li><li>• Climate Science Initiative</li><li>• Center for Sustainable Procurement</li><li>• Ecosystems Services Working Group</li><li>• Future of Fuels</li><li>• Sustainable Luxury Working Group</li><li>• Center for Technology and Sustainability</li><li>• Future of Internet Power</li></ul>

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 of the impact, or the measurability of results.

## DEVELOP TARGETS

Setting measurable, time-bound climate targets helps companies to reduce emissions faster and more profitably than acting on climate without concrete targets. Companies that set GHG reduction targets deliver larger emission reductions with higher financial returns than companies without such targets.<sup>42</sup>

In order to drive toward climate resilience in the supply chain, companies should set climate targets that mobilize action on identified climate priorities. Since building resilience requires acting on emissions as well as strengthening areas of climate vulnerability, supply chain climate targets should encompass both. The majority of Fortune 500 companies have set emissions reduction goals, but most of these do not include the supply chain (Scope 3). Moreover, while some companies are acting to address climate vulnerability through supply chain strategies, many are not aligning these activities explicitly with climate action.

---

<sup>42</sup> WWF and CDP, 2013.

## TARGETS FOR EMISSIONS REDUCTIONS IN THE SUPPLY CHAIN

While quantitative emissions reduction targets across the supply chain are the ideal, not all suppliers or segments of the supply chain may be ready to commit to quantitative goals today. In this case, companies can encourage supply chain partners to set qualitative climate targets. This commitment represents a positive step toward quantitative emissions reduction targets. 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 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

Building on these steps, a company can develop quantitative emissions reduction targets that include the supply chain and are aligned with the most current science. This means they must be ambitious enough to hold global surface warming to no more than 2°C. These commitments are known as science-based targets.



## SCIENCE-BASED CLIMATE TARGETS

Although setting GHG reduction targets has become common practice for large multinational companies, most targets are not aggressive enough to meet the global climate target to hold the global mean temperature rise to less than 2°C above preindustrial levels. We currently are on a trajectory to reach 4°C by the end of the century.

Companies must act with more urgency and ensure that their contributions will achieve the needed change. The process of setting science-based climate targets will do just that. More than 30 companies, including BT, General Mills, Honda Motor Company, National Grid, and Unilever, already have committed to setting science-based targets.

There are reasons to develop **science-based targets**:

- Science-based targets align company carbon emissions reductions with global emissions budgets generated by climate models
- Stakeholders are increasingly looking to companies to set science-based targets
- Starting in 2016, CDP will incorporate questions to incentivize and track company use of a science-based approach into the process of setting climate targets

For companies to set science-based reduction targets that align with the aggressive emissions reduction pathways outlined by IPCC, there are three key questions to ask:

- **How low will you go?** Within the IPCC recommendations, there is a wide range of potential reductions. Companies need to identify the level of ambition based on IPCC recommendations, and the resources available to implement the recommendations
- **How much will your company reduce your emissions?** How much will you rely on today's vs. tomorrow's technologies? How will you iterate and adjust targets over time? In order to answer these questions, companies need to identify their own emissions reduction opportunities and confirm achievability of targets based on the availability of methodologies that are applicable to their respective sectors. Companies also need to validate targets with experts and NGOs, and work with stakeholders, including suppliers and partners, to innovate new approaches to reduce emissions
- **What is your fair share?** What part of global emissions reductions are your company's responsibility? There are several different ways to calculate the emissions reductions needed from a company, including globally applicable and sector-based approaches. Companies need to select a methodology to determine their fair share and then develop targets with an action plan.

Climate science also is key for companies to set adaptation targets. Computer models of the climate used by the IPCC enable the prediction of inevitable temperature rises and associated climate events, which allow companies to assess vulnerability and develop adaptation targets to manage the unavoidable climate risks across supply chains.

**Case of a company to set science-based targets:** General Mills recently has announced a commitment to set targets and disclose a plan for reducing GHG emissions, including Scope 3 emissions, using a science-based methodology. BSR is working with General Mills to develop these targets.

## HELPING SUPPLIERS SET TARGETS

Of the 2,415 companies that are CDP Supply Chain program members (including 2,363 suppliers and 52 major purchasing organizations), 38 percent of the suppliers set emission reductions targets, in comparison to 92 percent of purchasing companies.<sup>43</sup>

Each individual supplier has its own unique set of GHG emissions opportunities and investment priorities, and suppliers' experiences and capabilities also vary, making it difficult to set a single target for all.

The best approach to helping suppliers to set targets is to set clear expectations and leave significant flexibility for how the targets can be met. Companies can provide guidance, practical tools, or example approaches that suppliers can use to discover and implement customized solutions.

<sup>43</sup> CDP, 2013a

## TARGETS FOR ADAPTIVE CAPACITY IN THE SUPPLY CHAIN

Adaptation targets can be 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 resilience, companies have much opportunity to do more to set targets around developing adaptive capacity.

For example, ICT companies have the opportunity to help build resilience by designing products that will help players in multiple industries to track climate risk data such as weather patterns more effectively. Companies in the consumer products industry could make commitments to supporting women workers in the supply chain. Food, beverage, and agriculture companies might set targets that focus on sustainable agriculture trainings for farmers or investments in research and development to breed drought-resistant crops. Given that adaptive capacity is a relatively nascent idea for many companies, most of these organizations are in a position to demonstrate leadership, innovation, and link adaptation targets directly to corporate priorities.

The following table provides examples of BSR member companies' targets and commitments as related to climate-resilient supply chains. We have classified these activities as "emissions reduction" or "adaptation," but, in practice, many of these activities generate benefits toward both dimensions of resilience. For example, a commitment to zero deforestation reduces emissions that would otherwise result from cutting down trees (emissions reduction) and also preserves biodiversity and ecosystem services (adaptation).

**TABLE 10:** Climate-Resilient Supply Chain Targets and Commitments

Company	Select Emissions Reduction Targets/Commitments	Select Adaptation Targets/Commitments
<b>IKEA</b>	<ul style="list-style-type: none"> <li>Encourage and enable direct suppliers to become 20 percent more energy-efficient by August 2017, compared to 2012 baseline</li> <li>By August 2015, reduce carbon emissions of suppliers by 20 percent, compared to 2012 baseline in relative terms, measured by CO2/m3 goods purchased</li> <li>By August 2016, reduce carbon emissions from the transport of goods by 20 percent compared to 2011 baseline, and by 30 percent compared to 2012 by August 2020 (compared in relative terms and measured by m3 transported goods)</li> <li>Become forest-positive by 2020 by promoting the adoption of sustainable forestry methods beyond the internal business</li> </ul>	<ul style="list-style-type: none"> <li>Support the development of small-scale social entrepreneurs into IKEA suppliers, a move that can lead to demonstrable social benefits such as tackling poverty</li> <li>By December 2016, the IKEA Foundation will develop programs to help families and communities secure access to quality drinking water in water stressed areas</li> </ul>

<p><b>Kering</b></p>	<ul style="list-style-type: none"> <li>• Remaining GHG emissions offset in scopes 1 and 2 of the GHG protocol for the Group via REDD+ projects</li> <li>• Commitment to renewable energy in own operations</li> <li>• Commitment to support and promote energy-efficiency programs with key suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• 100 percent of leather from domestic livestock within Kering’s products will be from verified sources that do not result in converting sensitive ecosystems into grazing lands or agricultural lands for food production for livestock by 2016.</li> <li>• 100 percent of paper and packaging for Kering will be sourced from certified sustainably managed forests with a minimum of 50 percent recycled content by 2016.</li> </ul>
<p><b>Marks &amp; Spencer</b></p>	<ul style="list-style-type: none"> <li>• By 2015, key global raw materials will have identified the major environmental and social hotspots, key mitigations to address them and will report on an annual basis progress on increasing the proportion purchased from sustainable sources with the aim of achieving 100 percent by 2020</li> <li>• By the end of 2015, complete a study of the carbon impact of end-to-end logistics footprint in order to identify hotspots</li> <li>• By 2015, top 100 clothing factories will install energy-efficient lighting, improved insulation, and temperature controls, to reduce their energy usage by an estimated 10 percent</li> <li>• Will reduce GHG emissions by 25 percent in absolute terms by 2020; will maintain carbon neutrality for M&amp;S operated activities worldwide until at least 2020</li> <li>• By 2015, we will review possible adaptations to climate change at our top 50 UK stores. We will then develop a plan in collaboration with our landlords to agree which adaptations will be implemented by 2020.</li> <li>• M&amp;S food suppliers to implement a Gold/Silver/Bronze sustainability benchmarking standard to improve human resources, environmental, and efficiency performance. By 2015, 30 percent of product by volume will come from factories that have reached Silver level, rising to 100 percent by 2020</li> </ul>	<ul style="list-style-type: none"> <li>• Commit to formulate a “circular economy” policy by 2016, ensuring that what happens to products, materials, and equipment after these materials have been used or at ‘end of life’ is part of the equation</li> <li>• Provide a training and education program for 500,000 workers by 2015 including basic health care</li> <li>• Establish a Global Community Program by 2020 to benefit people in the key regions of the world where M&amp;S products are sourced; increase the scale of existing activities and launch new social and environmental initiatives to strengthen the resilience of communities and security of supply by 2020.</li> </ul>

<b>Microsoft</b>	<ul style="list-style-type: none"> <li>Maintain the commitment, which Maintain the commitment (that was achieved in 2014) toward achieving carbon neutrality and net-zero emissions for datacenters, software development labs, offices, and employee air travel by increasing energy efficiency and investing in renewable energy and carbon offset projects</li> </ul>	<ul style="list-style-type: none"> <li>Continue to scale Social and Environmental Accountability supply chain programs in 2015 such as Environment, Health &amp; Safety capability building to continue to enhance worker living and working conditions</li> </ul>
------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



### 3. 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, and whether there is any need for a company to amend its approach.

#### PUT METRICS IN PLACE

Metrics enable a company to understand the outcomes and impacts of its climate actions, and allow the company to adjust its targets over time.

There is a dizzying array of possible supply chain metrics from which to choose. A recent study analyzed the metrics used in academic literature to measure performance in sustainable supply chains.<sup>43</sup> The results showed that a total of 2,555 different metrics were published in 445 different articles. Despite this plethora of metrics, the most commonly published metrics include those that measure energy use and GHG emissions.

There is growing momentum around consistent, comparable climate metrics and disclosures, particularly for GHG emissions. Our interviews with companies indicated that most of them have emissions metrics they are tracking and reporting, either internally, or externally through sustainability reports, annual reports or to organizations like the CDP.

The following table includes examples of metrics for emissions reduction and adaptive capacity.

---

<sup>43</sup> Ahi and Searcy, 2015.

**TABLE 11:** Supply Chain Resilience Metrics

Target	Outcomes and Impacts	Metrics (Baseline vs. Target)
<b>Emissions Reduction</b>	Increased investment in efficiency	<ul style="list-style-type: none"> <li>• Amount of financial investment in renewable energy</li> <li>• Amount of financial investment in energy efficiency</li> </ul>
	Achieved scope 3 emissions reduction	<ul style="list-style-type: none"> <li>• Metric tons CO2e (absolute)</li> <li>• Metric tons CO2e per unit total revenue (normalized)</li> <li>• Metric tons CO2e per unit total production (normalized)</li> </ul>
<b>Adaptive Capacity</b>	Reduced vulnerability of supply chain to climate change	<ul style="list-style-type: none"> <li>• Amount of financial investment in infrastructure that help minimize the consequences of exposure to climate risks</li> <li>• Amount of financial investment in gender initiatives</li> <li>• Number of suppliers or percent of spend with suppliers located in especially climate-vulnerable geographies</li> </ul>
	Increased readiness of supply chain for climate change	<ul style="list-style-type: none"> <li>• Number of suppliers reported to have a preparedness plan for disaster relief</li> <li>• Number of suppliers reported increased knowledge on climate adaptation</li> </ul>

While the specific metrics may vary by industry, they can build on existing work on carbon accounting and reporting standards. We believe standardized metrics would be best achieved through linkages to science-based targets. CDP, GHG Protocol, and WWF recently launched a joint initiative, titled “Mind the Science, Mind the Gap,” to engage companies in setting ambitious carbon reduction targets in order to achieve the reductions necessary to be in a 2°C decarbonization pathway. A set of sector-specific methodological guidance, corporate engagement strategy, and monitoring and reporting tools will be developed to help companies develop science-based targets.

## **CONSIDERATIONS FOR COMMUNICATING RESULTS**

BSR would like to see more reporting of supply chain climate performance. More and more companies are setting ambitious climate targets and starting to measure and report on the outcomes and impacts of their efforts to achieve the targets. For example, Marks & Spencer has been reporting on progress toward achieving zero-carbon operations every year since the launch of its Plan A.<sup>44</sup> Furthermore, announcing ambitious, public-facing goals with companion accountability processes can mobilize industry-wide support and collaboration. Walmart’s bold and focused action on supply chain sustainability performance has helped to trigger ambition and partnership from supply chain partners, NGOs, and peers.

The need to improve the quality of disclosure on specific climate performance metrics is critical. To date, climate reporting has been hampered by companies focusing on disclosing activities versus impacts, and sidestepping direct disclosure about climate risks and how they are managed. More than a quarter of Global 500 companies are rated “low” or “midrange” by the CDP on “quality” of climate disclosure.<sup>45</sup> To improve the quality of disclosure companies should communicate on their overall approach to managing climate risks, the actions they are taking and plan to take relative to those risks, and progress toward climate targets that captures both activities and impacts.

---

<sup>44</sup> Marks & Spencer, 2014.

<sup>45</sup> CDP, 2013b.

## Conclusion

Considering the imminent threat of climate change, companies should put significantly more effort toward developing climate resilience in their supply chains. Although supply chains are complex and it might seem it is more difficult to influence the activities of business partners, supply chains offer an opportunity for impact that is magnitudes greater than addressing the issue only within a company's own operations.

In summary, the framework in this report suggests three practical steps that companies can, and should, take.

### **1. Identify Supply Chain Climate Priorities**

Look holistically at the supply chain and identify which categories and geographies represent the greatest opportunity for emissions reduction, developing adaptive capacity, or the combination of both.

Companies are taking different approaches to identifying their climate priorities, and BSR sets out a methodology in this report. There is a good amount of publically available and internally available data that can help any company to achieve this step.

### **2. Take Action and Develop Targets in Tandem**

Take action by integrating considerations for climate resilience into internal procurement processes. Engage with suppliers, and join and lead collaborative initiatives. Start by taking an inventory of what the business, suppliers, and other stakeholders are already doing. Companies and suppliers might need help to see that some of their current actions are already supporting climate resilience, and how they can amplify the impact of those activities.

Develop short-term targets to address climate priorities, and investigate science-based methodologies to develop more robust emissions reductions targets. There is significant opportunity for companies to set out bold targets; these targets can be both around emissions reduction and developing adaptive capacity.

### **3. Evaluate Progress**

Ensure ongoing evaluation of progress against climate targets. BSR strongly urges companies and others to support the development of consistent, comparable metrics, and to report publicly on progress.

We hope that this three-step framework helps companies take their approach to climate in their supply chains to the next level. We look forward to working with our members, supply chain professionals and partners to make climate-resilient supply chains a reality.

## References

- Agrawala, S., et al. 2011. "Private Sector Engagement in Adaptation to Climate Change: Approaches to Managing Climate Risks." *OECD Environment Working Papers* 39. OECD Publishing: Paris. <http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/WKP%282011%299&docLanguage=En>.
- Ahi, Payman and Cory Searcy. 2015. "An analysis of metrics used to measure performance in green and sustainable supply chains." *Journal of Cleaner Production* 86: 260-377. <http://www.sciencedirect.com/science/article/pii/S0959652614008270>.
- Andrejczak, Matt. Aug. 5, 2010. "ADM Up, Kellogg Down Amid Wheat Spike." *The Wall Street Journal*. <http://www.wsj.com/articles/SB10001424052748703748904575411581724625118>.
- ASIS International. 2014. "Supply Chain Risk Management: A Compilation of Best Practices." ASIS International: Alexandria, Virginia. [https://www.asisonline.org/Standards-Guidelines/Documents/SCRM\\_Executive%20Summary.pdf](https://www.asisonline.org/Standards-Guidelines/Documents/SCRM_Executive%20Summary.pdf).
- BSR. 2013. "Finding the Supply Chain Carbon Lever: Workshop Summary." BSR: San Francisco. [http://www.bsr.org/files/BSR\\_Supply\\_Chain\\_Carbon\\_Lever\\_Workshop\\_2013.pdf](http://www.bsr.org/files/BSR_Supply_Chain_Carbon_Lever_Workshop_2013.pdf).
- BSR. 2014. "Planning for the Unplanned: The Role of Corporate Responsibility in Unforeseen Events." BSR: San Francisco. <http://bsr14.org/program/view/planning-for-the-unplanned-the-role-of-corporate-responsibility-in-unforese>.
- Cameron, Edward. 2014 "Key Findings from Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC AR5) for Agriculture." BSR and the University of Cambridge Institute for Sustainability Leadership and Judge Business School: Cambridge.
- Cameron, Edward, Cammie Erickson, and Ryan Schuchard. 2014. "Business in a Climate-Constrained World: Catalyzing a Climate-Resilient Future through the Power of the Private Sector." BSR Working Paper. BSR, San Francisco.
- Cameron, Edward, Cammie Erickson, Emilie Prattico, and Ryan Schuchard. 2015. "Business in a Climate-Constrained World (Second Edition): Creating an Action Agenda for Private-Sector Leadership on Climate Change." BSR Working Paper. BSR: San Francisco.
- CDP. 2011. "Supply Chain Report 2011." CDP: London. <https://www.cdp.net/CDPResults/CDP-2011-Supply-Chain-Report.pdf>.
- CDP. 2013a. "Reducing Risk and Driving Business Value." CDP: London. <https://www.cdp.net/CDPResults/CDP-Supply-Chain-Report-2013.pdf>.
- CDP. 2013b. "CDP Global 500 Climate Disclosure Leadership Index 2013." CDP: New York. <https://www.cdp.net/en-US/Results/Pages/CDP-2013-disclosure-scores.aspx>.
- CDP. 2015a. "Supply Chain Sustainability Revealed: A Country Comparison, Supply Chain Report 2014-15." CDP: New York. <https://www.cdp.net/CDPResults/CDP-Supply-Chain-Report-2015.pdf>.
- CDP. 2015b. "Commit to adopt a science-based GHG emissions reduction target." CDP: New York. <https://www.cdp.net/en-US/Pages/RTP/adopt-science-based-targets.aspx>.
- CNN. April 14, 2008. "Riots, instability spread as food prices skyrocket." *CNN*, <http://www.cnn.com/2008/WORLD/americas/04/14/world.food.crisis/>.

Environmental Leader. December 2013. "Nike's Waterless Dye Factory Cuts Energy Use 60%." *Environmental Leader*. <http://www.environmentalleader.com/2013/12/03/nikes-waterless-dye-factory-cuts-energy-use-60/>.

Ernst & Young. 2013. "Disrupt or be disrupted: Creating value in the consumer products brand new order," E&Y: London. [http://www.ey.com/Publication/vwLUAssets/Disrupt\\_or\\_be\\_disrupted:\\_creating\\_value\\_for\\_brand\\_new\\_order/\\$FILE/EY\\_Disrupt\\_or\\_be\\_disrupted\\_lowres.pdf](http://www.ey.com/Publication/vwLUAssets/Disrupt_or_be_disrupted:_creating_value_for_brand_new_order/$FILE/EY_Disrupt_or_be_disrupted_lowres.pdf).

Fuller, Tom. Nov. 6, 2011. "Thailand Flooding Cripples Hard-Drive Suppliers." *The New York Times*, <http://www.nytimes.com/2011/11/07/business/global/07iht-floods07.html>.

Geller, Martinne. Sept. 22, 2010. "Update – General Mills posts profit beat, keeps forecast." *Reuters*. <http://uk.reuters.com/article/2010/09/22/generalmills-idUKN229976720100922>.

Global Reporting Initiative (GRI). 2014. "Linking GRI and CDP." GRI: Amsterdam. <https://www.globalreporting.org/resourcelibrary/Linking-GRI-and-CDP-2014.pdf>.

Greenhouse Gas Protocol. 2014. "The Scope 3 Evaluator." Greenhouse Gas Protocol. <http://www.ghgprotocol.org/node/453>.

Gunther, Marc. April 15, 2013. "Game on: Why Walmart is ranking suppliers on sustainability." *GreenBiz*, <http://www.greenbiz.com/blog/2013/04/15/game-why-walmart-ranking-suppliers-sustainability>.

H&M. "More Sustainable Materials: Cotton." H&M. Accessed May 2, 2015. <http://about.hm.com/en/About/sustainability/commitments/conscious-fashion/more-sustainable-materials/cotton.html>.

HP. 2013. "2013 Living Progress Report." HP: Palo Alto. <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04152740>.

Intergovernmental Panel on Climate Change (IPCC). 2014a. "Climate Change 2014: Impacts, Adaptation, and Vulnerability, Technical Summary." Cambridge University Press: Cambridge and New York.

IPCC. June 5, 2014b. "Press Release: Concluding Installment of the Fifth Assessment Report: Climate change threatens irreversible and dangerous impacts, but options exist to limit its effects." IPCC: Copenhagen. [http://www.ipcc.ch/pdf/ar5/prpc\\_syr/11022014\\_syr\\_copenhagen.pdf](http://www.ipcc.ch/pdf/ar5/prpc_syr/11022014_syr_copenhagen.pdf).

ISO. 2014. "ISO 50002:2014 Energy audits – Requirements with guidance for use." Accessed May 2, 2015. [http://www.iso.org/iso/catalogue\\_detail?csnumber=60088](http://www.iso.org/iso/catalogue_detail?csnumber=60088).

Kwong, Robin. Oct. 28, 2011. "Computer makers caught in wake of Thai floods." *Financial Times*, <http://www.ft.com/cms/s/2/a86771a6-0149-11e1-b177-00144feabdc0.html#axzz3WGaHRy5l>.

Marks & Spencer. 2014. "Plan A Report." Marks & Spencer: London. <http://planareport.marksandspencer.com/>.

Microsoft. 2014. "Citizenship Report." Microsoft: Redmond. <http://www.microsoft.com/about/corporatecitizenship/en-us/reporting/>.

Nike. 2014. "FY12/13 Corporate Responsibility Report." Nike: Beaverton. <http://www.nikeresponsibility.com/report/content/chapter/climate-energy>.

Oxfam. 2012. "Climate Change Risks and Supply Chain Responsibility." Oxfam International: Oxford. <https://www.oxfam.org/sites/www.oxfam.org/files/dp-climate-change-risks-supply-chain-responsibility-27062012-en.pdf>.

Pacala, Stephen and Robert Socolow. 2004. "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies." *Science*, 305: 968–972.

Pleven, Liam, Gregory Zuckerman, and Scott Killman. Aug. 5, 2010. "Russian Export Ban Raises Global Food Fears." *The Wall Street Journal*.  
<http://www.wsj.com/articles/SB10001424052748703748904575410740617512592>.

Polansek, Tom. Aug. 5, 2010. "Wheat Goes Up, Prices to Follow." *The Wall Street Journal*.  
<http://www.wsj.com/articles/SB10001424052748704741904575409753062072006>.

PwC. 2012. "Next-generation supply chains." PwC: London, 2012.  
<http://www.pwc.com/gx/en/consulting-services/supply-chain/global-supply-chain-survey/assets/pwc-next-generation-supply-chains-pdf.pdf>.

Schuchard, Ryan. Feb. 17 2011. "Helping Businesses Adapt to Climate Change." GreenBiz. <http://www.greenbiz.com/blog/2011/02/17/adapting-climate-change-bsrs-new-industry-series>.

Schuchard, Ryan and Nate Springer. May 10, 2013. "3 Ways Business Can Benefit from Scope 3 Emissions Reductions." GreenBiz. <http://www.greenbiz.com/blog/2013/05/10/3-ways-business-can-benefit-scope-3-emissions-reductions>

Supply Chain Risk Leadership Council. 2011. "Supply Chain Risk Management: A Compilation of Best Practices." Supply Chain Risk Leadership Council.  
[http://www.scrhc.com/articles/Supply\\_Chain\\_Risk\\_Management\\_A\\_Compilation\\_of\\_Best\\_Practices\\_final\[1\].pdf](http://www.scrhc.com/articles/Supply_Chain_Risk_Management_A_Compilation_of_Best_Practices_final[1].pdf).

UNEP. "Climate Change Mitigation." UNEP. Accessed May 3, 2015.  
<http://www.unep.org/climatechange/mitigation/>.

UNFAO. 2015. "The Impact of Natural Hazards and Disasters on Agriculture and Food and Nutrition Security." FAO: Rome. <http://www.fao.org/3/a-i4434e.pdf>.

UNGC and BSR. 2010. "Supply Chain Sustainability: A Practical Guide for Continuous Improvement." UN Global Compact: New York.  
[http://www.bsr.org/reports/BSR\\_UNGC\\_SupplyChainReport.pdf](http://www.bsr.org/reports/BSR_UNGC_SupplyChainReport.pdf).

UPS. 2015. "Press Release: THE UPS Foundation Links Advanced Tracking Technology with Global Humanitarian Relief." UPS: Atlanta. <http://www.justmeans.com/press-release/the-ups-foundation-links-advanced-tracking-technology-with-global-humanitarian-relief>.

WWF and CDP. 2013. "The 3% Solution." CDP: London.  
[https://c402277.ssl.cf1.rackcdn.com/publications/575/files/original/The\\_3\\_Percent\\_Solution\\_-\\_June\\_10.pdf?1371151781](https://c402277.ssl.cf1.rackcdn.com/publications/575/files/original/The_3_Percent_Solution_-_June_10.pdf?1371151781).