

# **Understanding Private Sector Risk to Climate Change and Designing Guidance for Engagement**

**Bridging the Gap Between Businesses and NGOs in  
Climate Resilience Dialogue**

Kimberley Irby  
Kaitlyn Klingensmith  
Caroline Lucas  
Edwin Willig

A project submitted in partial fulfillment of the requirements for the degree of  
Master of Science at the School for Environment and Sustainability at the  
University of Michigan

**April 2018**

**Client:** World Wildlife Fund

**Faculty Advisor:** Ravi Anupindi (Ross School of Business)

## Executive Summary

Climate change poses immediate and new challenges to global supply chains and sustainability. World Wildlife Fund (WWF), the world's leading conservation organization, currently cultivates corporate partnerships to advance its conservation mission and is seeking new strategies for engagement to help the private sector build climate resilient supply chains that will ultimately strengthen the resilience of the landscapes, ecosystems, and communities that those companies rely on. To do so, they need to first understand the current state of corporate action and thinking on resilience to climate change.

This project seeks to map the landscape of climate change resilience thinking for private sector actors and produce materials WWF can use to assist partner companies to address climate change in supply chains. In this report, we identify how company operations are at risk due to climate change, the motivations and barriers to taking action, and the strategies employed by companies to prepare for climate change impacts.

To identify what climate resilience means to the private sector, we conducted interviews with select WWF partners with global operations and agricultural sourcing in vulnerable areas and analyzed their responses for perceptions of climate change risk. We found that the main barriers to climate change resilience thinking include: a lack of information, insufficient capacity, and organizational deficits related to minimal communication between sustainability and supply chain managers. Thus, we recommend that WWF pursues the following for corporate engagement: (1) present a clear definition of resilience and adaptation versus mitigation, (2) compel collaboration between sustainability teams and those that are directly involved in supply chain decisions, and (3) make the business case for climate resilience, as well as provide useful information about long term actions.

## Acknowledgments

The Master's Project team from the University of Michigan would like to thank our client contact, David Kuhn, and the rest of the Private Sector Engagement Team at WWF, for their general support and assistance reaching out to company contacts. We would also like to thank our primary advisor, Ravi Anupindi, for his guidance and feedback, as well as assistance reaching out to company contacts. Lastly, we would like to thank the various employees that gave us their time and insightful responses as we conducted our qualitative primary research.

# Table of Contents

<b>Executive Summary</b> .....	<b>1</b>
<b>Acknowledgments</b> .....	<b>2</b>
<b>Introduction</b> .....	<b>4</b>
<b>Part 1: How Climate Change Impacts Business</b> .....	<b>5</b>
A. The Threat of Climate Change .....	5
B. Supply Chain Risks and Climate Change.....	6
C. Impact of Climate Change on Supply Chains.....	8
D. Defining Climate Adaptation and Resilience .....	10
<b>Part 2: Understanding Climate Risk Motivations in Companies</b> .....	<b>12</b>
<b>Methods</b> .....	<b>12</b>
Motivation .....	12
Preliminary Research .....	12
Rationale for Interviews .....	12
Company Research.....	13
Conducting Interviews .....	13
Coding Interviews and Identifying Trends.....	13
Framework for Analyzing Corporate Responses .....	14
<b>Results</b> .....	<b>16</b>
Corporate Responses to Climate Change .....	16
Motivations and Barriers to Climate Action .....	22
<b>Analysis</b> .....	<b>29</b>
Climate Mitigation versus Adaptation and Resilience .....	29
Why Certain Companies Act.....	29
<b>Part 3: Frameworks and Recommendations for Building Climate Resilience</b> .....	<b>32</b>
<b>Defining and Building Corporate Resilience</b> .....	<b>32</b>
<b>The Business Case</b> .....	<b>34</b>
Financial Incentive .....	34
Competitive Advantage.....	35
Partnerships .....	35
Positive Corporate Citizenship.....	36
<b>Recommendations for Private Sector Engagement</b> .....	<b>37</b>
<b>Conclusions</b> .....	<b>40</b>
<b>Works Cited</b> .....	<b>41</b>
<b>Appendices</b> .....	<b>45</b>
Appendix A: Interview Guide .....	45
Appendix B: Framework for Analysis .....	46
Appendix C: Interview Quotes on Climate Resilience .....	47
Appendix D: Components of Effective Supply Chain Risk Management .....	48

## Introduction

Climate change presents a broad and substantial threat to societies around the world. For communities, the threat of climate change can mean flooding, heat waves, drought, or civil unrest.<sup>1</sup> For businesses, these threats challenge the stability of local and global operations and threaten business functions and corporate viability. Climate change increases the variability of natural weather events, such as drought and precipitation extremes, driving uncertainty that reduces businesses' ability to maintain cost-effective operations and provide goods to consumers.<sup>2</sup>

This report outlines current motivations and barriers to climate actions for large multinational corporations and uses these findings to produce recommendations for World Wildlife Fund (WWF) to develop corporate outreach efforts that will foster climate adaptation actions in supply chains, with the aim to ultimately create resilient landscapes. Part 1 of the report outlines climate risks and impacts for businesses and supply chains. Part 2 of the report examines and analyzes current motivations and actions surrounding climate change within organizations. Part 3 of the report outlines frameworks and recommendations for WWF to engage private sector organizations to build climate resilience.

Despite the threats of climate change, some businesses have been slow to undertake actions that improve the resilience of their supply chains. Some corporations have adopted climate change mitigation practices, such as emissions reductions and energy efficiency programs, or sustainability programs that seek to reduce deforestation or environmental degradation. However, these actions do not necessarily increase the ability of an organization's supply chain to adapt to the impacts of climate change, leaving corporations and the communities that they source from vulnerable to substantial disruptions.

Through interviews with sustainability managers, we identify information and capacity deficits as barriers to climate adaptation and clear threats to business operations as motivations for climate action. To motivate climate actions, we recommend that (1) WWF partners with companies to define climate change adaptation and resilience, (2) extend their outreach efforts to supply chain and procurement managers and foster dialogue that compels collaboration, (3) make the business case for climate resilience and frame climate change risks in terms of supply chain risk frameworks, and (4) provide support to shift company thinking from short-term to long-term potential climate impacts.

---

<sup>1</sup> IPCC, 2014: Climate Change 2014: Synthesis Report, "Summary for Policymakers," accessed February 24, 2018, [https://www.ipcc.ch/pdf/assessment-report/ar5/wg2/ar5\\_wgII\\_spm\\_en.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg2/ar5_wgII_spm_en.pdf)

<sup>2</sup> Hauke Engel, Per-Anders Enkvist, and Kimberly Henderson, "How Companies Can Adapt to Climate Change," McKinsey & Company, July 2015, accessed March 19, 2018, <https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/how-companies-can-adapt-to-climate-change>.

# Part 1: How Climate Change Impacts Business

## A. The Threat of Climate Change

Climate change is defined as the statistically significant change in climate in both mean conditions and variability that persists over long periods of time and is attributed directly or indirectly to human activity.<sup>3</sup> Since the 1950s, mean global temperatures have increased, as well as the occurrence of extreme weather events. Increased temperatures shift global atmospheric circulation patterns, resulting in regional and local environmental changes. With a warmer planet, some regions will experience more intense episodes of rainfall, while other regions will face more intense droughts. Climate change impacts human society around the world through disruptions caused by drought intensity and duration, sea level rise, storm surges and coastal flooding, leading to broader global health risks, infrastructure breakdown, and food insecurity.<sup>4</sup>

The International Panel on Climate Change (IPCC) warns that climate change will both amplify existing risks and create new risks for systems, and categorizes climate change risks into five broad reasons for concern (RFCs)<sup>5</sup>, listed here and described below:

*Risks to unique and threatened systems:* Unique and threatened systems in this context are those that are constrained within a certain geography and unable to shift due to ecological or human barriers. These systems are vulnerable to changes in temperature and precipitation, among other climatic changes, and are unlikely to persist with continued climate change. Examples of such systems include coral reefs, biodiversity hotspots, and mangrove ecosystems. The collapse of these systems threatens the livelihoods of those who depend on the systems, and the loss of potential resources and ecosystem services.<sup>6</sup>

*Risks associated with extreme weather events:* Extreme weather events such as hurricanes, heat waves, and droughts damage both human and natural systems. The occurrence of extreme events is difficult to predict; however, the frequency of occurrences is expected to increase through the 21<sup>st</sup> century.

*Risks associated with the distribution of impacts:* Climate risks and impacts are unevenly distributed across the globe in terms of geography, wealth, and other characteristics. For example, tropical areas are expected to have the highest risks for increased water stress and shifts in temperature beyond the biophysical limits for plant growth.<sup>7</sup>

*Risks associated with global aggregate risks:* Global aggregate risks are those related to declines in biodiversity, extinction, and environmental degradation, such as decreased pollination and other various ecosystem services.

*Risks associated with large-scale singular risks:* Large-scale singular events refer to tipping points in global climate processes, such as the collapse of the Antarctic or Greenland ice sheets, contributing to sea level rise.

---

<sup>3</sup> IPCC, 2014: Climate Change 2014: Synthesis Report, "Annex III: Glossary," accessed February 24, 2018, [http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5\\_AnnexIII\\_FINAL.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_AnnexIII_FINAL.pdf)

<sup>4</sup> National Climate Assessment (NCA), Full Report, accessed March 18, 2018, <https://nca2014.globalchange.gov>.

<sup>5</sup> Ibid., 13.

<sup>6</sup> Brian C. O'Neill, et. al, "IPCC reasons for concern regarding climate change risks." *Nature Climate Change* 7, no. 1 (2017), doi:10.1038/nclimate3179.

<sup>7</sup> Ibid., 31.

## B. Supply Chain Risks and Climate Change

Climate change can impact businesses and their value chains in many ways, both directly and indirectly through systemic impacts. Businesses are dependent on the agricultural and natural systems from which raw materials are procured to create products and conduct business operations. These systems face both short-term shocks such as flooding and drought, and long-term stressors such as shifts in habitat suitability with climate change with shifts in temperatures and precipitation. These risks threaten the natural resources that most supply chains rely on and pose a serious threat to business continuity and longevity. The challenges vary by sector and geography and require robust research and planning to appropriately manage. These broad societal risks are not necessarily transferable to business dialogues focused on performance and strategy and thus, must be contextualized through supply chain risk management.

Supply chain is defined as “a network between a company and its suppliers to produce and distribute a specific product,” representing the steps it takes to get the product or service to the end customer.<sup>8</sup> Any disruption in the supply chain can create a significant financial risk to companies. In a study conducted by Allianz Global Corporate & Specialty insurance, 1,807 business interruption claims were filed for a value of \$3.74 billion for their clients between 2010-2014.<sup>9</sup> Since risk is inherent in all supply chain activities, and supply chain managers consistently analyze risk for supply forecast and profit analysis.

A report by McKinsey describes corporate climate risk as either physical risk, price risk, or product risk.<sup>10</sup> Physical risks include damages to a company’s factories or other supply chain infrastructure. Price risks include increased costs and volatility for procuring raw materials and distribution. Product risks include the dislocation of product markets due to regulations, production costs, or other changes that render a product unsellable. These risks affect supply chain risk management and procurement decision-making and require managers to pursue risk management strategies to address these concerns.

Climate-related risks exist at discrete levels within an organization and can extend across all levels of the supply chain organization. Each node and link connecting the flow of materials from production to distribution within businesses contains a risk for disruption due to climate change; however, the magnitude and likelihood of each risks varies.<sup>11</sup> Table 1 outlines various types of climate risks that exist along supply chains.

---

<sup>8</sup> Investopedia, “Supply Chain,” November 17, 2017, accessed March 16, 2018, <https://www.investopedia.com/terms/s/supplychain.asp>.

<sup>9</sup> Allianz Global Corporate & Specialty, “Global Claims Review 2015: Business Interruption In Focus,” 2015, accessed April 2, 2018, <https://www.agcs.allianz.com/assets/PDFs/Reports/AGCS-Global-Claims-Review-2015.pdf>.

<sup>10</sup> Engel, Enkvist, and Henderson, “How Companies Can Adapt to Climate Change.”

<sup>11</sup> Thomas K. Dasaklis and Costas P. Pappis, “Supply Chain Management in View of Climate Change: An Overview of Possible Impacts and the Road Ahead,” *Journal of Industrial Engineering and Management* 6, no. 4 (September 2013), <http://dx.doi.org/10.3926/jiem.883>.

Supply Chain Links	Types of Climate Change Impacts/Risks
<b>Supplier</b>	Disruption or loss of raw materials
<b>Manufacturing</b>	Damage or destruction to assets
	Liability Risks
	Disruption to production facilities
	Carbon emissions regulation
	Changes to productivity and efficiency related to changes in temperature or climate
	Increased energy and maintenance costs
	Increased costs of upstream operations and product quality
	Changes in energy sources, increased demand for renewables
<b>Transportation</b>	Deteriorated roads and rails due to extreme heat or precipitations
	Increased costs due to delays
	Damages due to inadequate coastal defenses
	Insecure structures
<b>Storage and Warehouses</b>	Vulnerability of infrastructure, personnel, communications, supply
	Possible dislocation due to extreme weather events
<b>Trading and Distribution</b>	Reputational risks in downstream sectors due to transparency
	Regulation changes
	Increased production costs and prices for consumer goods
	Decreases in consumer demand
	Displacement of products due to changes in demand for other products.
	Damages to retail locations

**Table 1.** Climate-Related Supply Chain Risks - Adapted from Dasaklis and Pappis (2013)

While risk analysis, forecasting, and management is a crucial component of supply chain operations, the extent to which climate change is incorporated into these risk assessments is minor.<sup>12,13</sup> A 2013 survey by the Center for Climate and Energy Solutions found that only 28 percent of S&P Global 100 companies have completed they had done climate assessments, while only 18 percent use climate-specific tools or models to assess their risks.<sup>14</sup> While companies may be aware of climate risks, they find the risks difficult to quantify and thus struggle to integrate them into decision-making. As a result, companies operate with high levels of risk and a low understanding of the potential impacts to businesses. A study from the BSR found that, 72

<sup>12</sup> Supply Chain Risk Leadership Council, *Supply Chain Risk Management: A Compilation of Best Practices*, August 2011, 12-18, accessed March 1, 2018,

[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)

<sup>13</sup> Dasaklis and Pappis, "Supply Chain Management," 1141.

<sup>14</sup> Meg Crawford and Stephen Seidel, *Weathering the Storm: Building Business Resilience to Climate Change*, Center for Climate and Energy Solutions, July 2013, accessed March 18, 2018, <https://www.c2es.org/site/assets/uploads/2013/07/weathering-the-storm-full-report.pdf>



percent of suppliers view climate risks as potential impacts to business operations, revenue, or expenditures, while only half of those surveyed currently manage this risk.<sup>15</sup>

## C. Impact of Climate Change on Supply Chains

Although all five of the types of risks laid out by the IPCC will negatively impact business supply chains in some capacity, the risks of extreme weather events and the risks associated with the distribution of impacts are the most direct areas of concern.

### *Risks Associated with Extreme Weather Events*

In the World Economic Forum Global Risk Report of 2017, “extreme weather events” was listed as the number one global risk in terms of likelihood and the number two global risk in terms of impact, second only to “weapons of mass destruction.”<sup>16</sup> When surveyed by Allianz insurance, risk managers listed “natural catastrophes” as the top risk concern for supply chain disruption (58 percent).<sup>17</sup> These concerns are for good reason. According to the National Oceanic and Atmospheric Administration (NOAA), 2017 was a historic year in the United States for weather and climate disasters with 16 different events costing a record-breaking \$306.2 billion, exceeding the previous U.S. annual record cost of \$214.8 billion in 2005, driven by Hurricane Katrina.<sup>18</sup> The economic losses from extreme weather events are expected to reach \$360 billion annually in the U.S. by the end of the decade.<sup>19</sup>

### *Short-Term Shocks*

For agribusiness supply chains, disruptions can range from crop failures resulting from prolonged drought to infrastructure failures due to flooding. The impacts to businesses can include profit shortfalls, reputation damage, and other spikes in operating costs. The recent hurricanes impacting Texas, Puerto Rico, and Florida illustrate the massive disruption that occurs due to natural extreme weather events.

In 2017, Hurricanes Harvey and Irma caused major supply chain disruptions in the U.S. by impacting commodities used across multiple industries. In Texas, major losses were incurred for livestock (\$93 million), cotton (\$100 million) and rice and soybeans (\$8 million). Cotton was a particularly severe loss, as Texas is the largest supplier of cotton in the U.S., producing 42 percent of the nation’s cotton.<sup>20</sup> The Gulf Coast region is also the location of thousands of oil services companies that supply the plastics and resins that go into a wide variety of products. The

---

<sup>15</sup> BSR and CDP, *From Agreement to Action: Mobilizing suppliers toward a climate resilient world*, 2016, accessed March 12, 2018, [https://www.bsr.org/reports/BSR\\_CDP\\_Climate\\_Change\\_Supply\\_Chain\\_Report\\_2015\\_2016.pdf](https://www.bsr.org/reports/BSR_CDP_Climate_Change_Supply_Chain_Report_2015_2016.pdf)

<sup>16</sup> World Economic Forum, “The Global Risks Report 2017,” 2017, accessed April 14, 2018, <http://reports.weforum.org/global-risks-2017/>.

<sup>17</sup> Allianz Global Corporate & Specialty, “Global Claims Review 2015: Business Interruption in Focus”

<sup>18</sup> Adam B. Smith, “2017 U.S. Billion-dollar Weather and Climate Disasters: A Historic Year in Context,” NOAA Climate.gov, January 08, 2018, accessed April 14, 2018, <https://www.climate.gov/news-features/blogs/beyond-data/2017-us-billion-dollar-weather-and-climate-disasters-historic-year>.

<sup>19</sup> Stephen Leahy, “Hidden Costs of Climate Change Running Hundreds of Billions a Year,” National Geographic, September 28, 2017, accessed April 14, 2018, <https://news.nationalgeographic.com/2017/09/climate-change-costs-us-economy-billions-report/>.

<sup>20</sup> Blair Fannin, “Texas Agricultural Losses from Hurricane Harvey Estimated at More than \$200 Million,” AgriLife Today, October 27, 2017, accessed April 14, 2018, <https://today.agrilife.org/2017/10/27/texas-agricultural-losses-hurricane-harvey-estimated-200-million/>.

storm shut down 37 percent of U.S. chlorine output and 40 percent of ethylene output.<sup>21</sup> Ethylene is the most used petrochemical, used to create polypropylene (PP) which is used to make bottles, food containers, pallets and more. This created a shortage that drove up prices by 20 percent as manufacturers in the packaging, food and consumer goods sectors who could not get enough supplies for their operations.<sup>22</sup>

In addition to the negative impact on price and products across industries, Hurricanes Harvey and Irma caused major damage to physical parts of corporate supply chains. The trend towards centralized inventories has increased risk exposures to extreme weather events.<sup>23</sup> Francesca's, a retail clothing chain headquartered in Houston, experienced serious damage to its only e-commerce fulfillment and distribution centers, disrupting the supply chain and causing an 11 percent dip in third quarter sales.<sup>24</sup>

### *Long-Term Stressors*

Across supply chains, a warmer world increases many existing risks for businesses. Warmer temperatures lead to increased microbial growth, resulting in greater mold and rot. Flooding of storage areas or extreme desiccation can also ruin crops. The 2014 National Climate Assessment found that disease, weeds, and insect pests will also be a greater threat in a warmer, wetter world.<sup>25</sup> Climate change also threatens transportation and sales through infrastructure failures and store closures. Further, extreme heat reduces worker production and can increase mortality rates in countries that are not adapted to climate change.

### *Risks Associated with the Distribution of Impacts*

The susceptibility of supply chains is dependent on where products are sourced and distributed. A PwC report outlining risks noted that crops concentrated in specific geographic areas have a high climate risk due to potential for significant disruption<sup>26</sup>. Additional factors dictating risk include sociopolitical stability and the susceptibility of crops and other resources to climate change. For example, over 50% of the vanilla crop is grown in Madagascar, which leaves the vanilla industry vulnerable to supply interruption.<sup>27</sup>

Since tropical areas are expected to have the highest risks for increased water stress and shifts in temperature beyond the biophysical limits for plant growth, uneven

---

<sup>21</sup> Jack Kaskey, "Harvey Disrupts More Than One Third of U.S. Chemical Production," Bloomberg.com, August 28, 2017, accessed April 16, 2018, <https://www.bloomberg.com/news/articles/2017-08-28/harvey-disrupts-more-than-one-third-of-u-s-chemical-production>.

<sup>22</sup> Jennifer Hermes, "Harvey Causes Plastics Shortages & Materials Cost Increases," Environmental Leader, October 31, 2017, accessed April 16, 2018, <https://www.environmentalleader.com/2017/09/plastics-shortages-price-increases-result-harveys-aftermath/>.

<sup>23</sup> Alan McKinnon, "The Present and Future Land Requirements of Logistical Activities," *Land Use Policy* 26 (2009): doi:10.1016/j.landusepol.2009.08.014.

<sup>24</sup> MarketWatch. "Francesca's Holdings Corp.," accessed April 16, 2018, <https://www.marketwatch.com/investing/stock/fran/profile>.

<sup>25</sup> National Climate Assessment (NCA), Report Findings: Agriculture, accessed March 18, 2018, <https://nca2014.globalchange.gov/highlights/report-findings/agriculture#menu-report>.

<sup>26</sup> Martha D. Turner, "Be prepared to bounce back: Building a resilient supply chain," Booz & Company, 2011, accessed March 6, 2018, [http://www.strategyand.pwc.com/media/file/Strategyand\\_Be-prepared-to-bounce-back.pdf](http://www.strategyand.pwc.com/media/file/Strategyand_Be-prepared-to-bounce-back.pdf).

<sup>27</sup> Lova Rabary, "Madagascar vanilla producers say cyclone damaged 30 percent of crop," *Reuters*, March 14, 2017, accessed March 18, 2018, <https://www.reuters.com/article/us-madagascar-cyclone/madagascar-vanilla-producers-say-cyclone-damaged-30-percent-of-crop-idUSKBN16L26X>.

distribution of risk means also that crops located in tropical regions face higher risks of failure or declining yields than those in temperate regions.<sup>28,29</sup> This is a specific concern to agricultural suppliers who source crops concentrated in single geographic regions that may face a disproportionate amount of impact. Increasingly brittle supply chains that source from single locations are at the greatest risk to supply chain losses, and most procurement managers view their highest climate risk as supply interruptions from primary sources.<sup>30</sup>

## D. Defining Climate Adaptation and Resilience

Most strategies related to climate change involve one or more of these three words: mitigation, adaptation, and resilience. Climate change mitigation is arguably addressed more commonly and is defined by the IPCC as a human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs).<sup>31</sup> While mitigation refers to slowing the progression of climate change, the terms adaptation and resilience refer to dealing with the changes that are already occurring and are expected to occur in the future.

### *Climate Adaptation*

Adaptation is defined by the IPCC as the process of adjustment to actual or expected climate and its effects.<sup>32</sup> This definition further clarifies that in human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities, whereas in some natural systems, human intervention may facilitate adjustment to expected climate and its effects. Examples of adaptation measures include investing in natural infrastructure, such as floodplain restoration for flood protection.

Climate change is expected to cause the frequency and severity of extreme weather events to increase.<sup>33</sup> With increasing concentrations of both populations and business assets in disaster-prone areas, economic losses may increase in tandem. For instance, the 2017 hurricane season was the costliest for the United States to date. Currently, these costs are largely incurred by businesses and the public sector, reducing profits and increasing public debt.<sup>34</sup> The private sector becomes involved when businesses purchase insurance to offset expected damages from future threats. Although the safety net of insurance is more mitigative than adaptive, the increasing involvement of the insurance industry may motivate major players in the industry to partner with governments to identify and quantify risks, as well as design adaptation strategies.<sup>35</sup>

---

<sup>28</sup> David B. Lobell, Wolfram Schlenker, and Justin Costa-Roberts, "Climate Trends and Global Crop Production Since 1980," *Science* 333, no. 6042 (July 29, 2011): doi:10.1126/science.1204531.

<sup>29</sup> *Ibid.*, 31.

<sup>30</sup> Martha D. Turner, "Be prepared to bounce back: Building a resilient supply chain," Booz & Company, 2011, accessed March 6, 2018, [http://www.strategyand.pwc.com/media/file/Strategyand\\_Be-prepared-to-bounce-back.pdf](http://www.strategyand.pwc.com/media/file/Strategyand_Be-prepared-to-bounce-back.pdf).

<sup>31</sup> IPCC, 2014: "Annex III: Glossary."

<sup>32</sup> *Ibid.*

<sup>33</sup> National Climate Assessment (NCA), Report Findings: Extreme Weather, accessed March 18, 2018, <https://nca2014.globalchange.gov/highlights/report-findings/extreme-weather>.

<sup>34</sup> Pieter Terpstra and Abigail Ofstedahl, "A Business Case for Building Climate Resilience," World Resources Institute, December 23, 2013, accessed March 18, 2018, <http://www.wri.org/blog/2013/12/business-case-building-climate-resilience>.

<sup>35</sup> *Ibid.*

## *Climate Resilience*

WWF defines resilience as the ability of a socioecological system to absorb and recover from shocks and disturbances, maintain functionality and services by adapting to chronic stressors, and transform when necessary.<sup>36</sup>

When thinking about resilience, it is important to answer four questions posited by The Mercy Corps Resilience Approach: resilience of what, to what, for whom, and through what.<sup>37</sup> Answers to these questions will ultimately be answered by the stakeholder and depend on the problem, but they are critical for guiding a resilience strategy.

Climate resilience can take a variety of forms. One notable example is agroforestry, which entails planting trees within and around fields. Recently, Nespresso has partnered with Rainforest Alliance and Pur Projet to help the farmers they source from adopt agroforestry practices to ultimately increase the resilience of both the farmers and the coffee crops in their supply chain.<sup>38</sup> The tree canopies and rooting systems can help protect the crops from climate deregulations and they can generate multiple ecosystem benefits, such as: natural soil enrichment with nitrogen and organic matter, erosion reduction, water depollution and regulation, and biodiversity regeneration.<sup>39</sup> The farmers can also benefit if the trees provide diversified sources of income, such as: fruits, timber, fuelwood, medicines, and higher land value.<sup>40</sup> Furthermore, Tristan Lecomte, co-founder and president of Pur Projet, claims that they facilitate this Nespresso program by working at the landscape level, which means that they not only advise and help farmers to plant inside and around their own coffee fields, but also in the whole watershed that they depend on. He believes that this reinforces the resilience of both the farm and the farmers' revenue.<sup>41</sup> This is a clear example of a strategy with the goal to build resilience for multiple systems beyond just the company's raw materials.

Given that the negative impacts of climate change already occur and will likely continue in the future, it is critical for businesses to implement adaptation actions that address certain climate risks and build more resilient supply chains. Ideally, these strategies maintain companies' own viability as well as the viability of the landscapes and communities they depend on.

---

<sup>36</sup> Adapted from definition of resilience provided by WWF: Kuhn, D. (2017, March 29) Personal Communication.

<sup>37</sup> Mercy Corps, "Our Resilience Approach to Relief, Recovery, and Development," December 14, 2016, accessed March 6, 2018, [https://www.mercycorps.org/sites/default/files/Resilience\\_Approach\\_Booklet\\_English\\_121416.pdf](https://www.mercycorps.org/sites/default/files/Resilience_Approach_Booklet_English_121416.pdf).

<sup>38</sup> Tristan Lecomte, "How Agroforestry Can Increase Coffee Farms' Resilience to Climate Change," Nestle Nespresso, June 5, 2015, accessed March 19, 2018, <https://www.nestle-nespresso.com/newsandfeatures/how-agroforestry-can-increase-coffee-farms-resilience-to-climate-change>.

<sup>39</sup> Ibid.

<sup>40</sup> Ibid.

<sup>41</sup> Ibid.

## Part 2: Understanding Corporate Climate Risk Motivations in Companies

### Methods

#### Motivation

Our research seeks to understand whether companies consider climate resilience strategies within their operations, as well as the motivations for such actions. We conducted preliminary research to understand climate risks in the context of businesses, and then conducted interviews with sustainability managers in major multinational corporations to understand how companies currently respond to risks. We then analyze the motivations, barriers, and factors influence to climate risk and resilience decision-making.

#### Preliminary Research

Initially, we conducted secondary research to develop an understanding of the following:

- Political, social, economic, and environmental risks associated with global climate change along supply chains
- Supply chain management, particularly in relation to climate risk
- The scope of current corporate climate risk management
- Specific actions corporations employ to address climate change

This information supplied the content for the report section on climate risk and supply chains and helped provide context for the interview questions in the second phase of our research.

We examined reports from consulting firms, NGOs, and other related organizations to understand the range of strategies proposed and implemented for corporate climate risk management. We did not intend to investigate whether these strategies are specifically effective, but instead sought to understand the current spectrum of actions.

#### Rationale for Interviews

We conducted short, semi-structured telephone interviews to gather information that would help us understand how corporations currently think about climate change impacts on their operations and to determine if there is any action being taken regarding those impacts.

We conducted these interviews with sustainability and corporate social responsibility (CSR) managers in select companies in the WWF client portfolio to gain insight into how climate risk is addressed and managed within the organization, beyond what is published by the company.

We identified 16 major food and beverage companies to target for interviews based on a list of companies with prior relationships to the WWF Private Sector Engagement team. We focused on food and beverage companies because their agricultural supply chains are directly impacted by climate change.

## **Company Research**

Initial research into company structures and reporting began by reviewing company websites and other sources to find background information on the companies that were potential interviewees. Through the CSR or sustainability sections on company websites, we searched for the acknowledgment of climate risks and any indication of action addressing those risks within current environmental sustainability initiatives, such as establishing agroforestry practices to help protect crops against increased soil erosion. We also identified corporate policies and structures that address climate change and supply chain risk, such as claims of helping farmers employ climate-smart agricultural practices or evidence of collaborative efforts across many teams within a company.

We used this data from online company research to develop both general questions on how companies perceive, evaluate, and respond to past climate related risks, and specific questions that pertained to each company's current initiatives or actions.

## **Conducting Interviews**

One team member worked in Washington D.C. during the summer of 2017 to conduct the interviews. The WWF Private Sector Engagement team members facilitated contact with the interviewees and provided background information on the existing relationship. 30-minute interviews were conducted with various representatives from major food and beverage corporations, mostly from sustainability and corporate social responsibility teams. Out of the 16 companies identified as potential interviewees, we only interviewed eight due to time constraints and contact responses.

The interview focused on the company's past actions, current perceptions and plans related to climate change, global supply chain risk, and climate resilience. Interviews were recorded on a mobile phone and digitally transcribed afterwards. The general interview guide template used can be found in Appendix A.

## **Coding Interviews and Identifying Trends**

In the initial stages of scoping this project, we constructed a framework to use for coding and analyzing the responses (Appendix B). The framework used for coding includes two broad topics for evaluation. The first is corporate responses to climate change, which includes four different themes: information, capacity, culture, and organization. The second is motivations and barriers to climate action, which includes three different themes: social pressures, political pressures, and economic/financial pressures. A more detailed account of each of these categories within the coding framework is included in the results.

Interview transcriptions were first coded according to more specific categories, i.e. "buckets," that fell within the larger themes described above. Throughout this process, we highlighted phrases from the interview transcriptions that contained information relevant to one or several of the themes outlined in the coding framework and labeled it with a bucket. For example, we would highlight a phrase in which the interviewee acknowledged the effect of climate change on their supply chain, label it with the bucket "Risk Recognition," and then assign it to the "Information" theme. This hierarchical process allowed us to identify trends across the various



companies, which we presented in our results and then analyzed for implications and significance.

Ultimately, the qualitative analysis of coding the interviews provided insight into attitudes, perceptions and motivations relating to climate change, as well as corporate policies, cultures and structures informing these areas at the company. This insight is the basis for our recommendations on actions to build climate resilience engagement.

## **Framework for Analyzing Corporate Responses**

We analyzed interviews using an institutional analysis framework that focuses on understanding factors contributing to support for climate change policies. Climate change resilience actions can be described as policies implemented within a company by a series of individuals. Thus, identifying what affects decision-making will facilitate better understanding of potential future climate action. Climate change dialogue is often controversial, and we recognize that perspectives and values of different decision-makers within a company likely affects the perception of climate risk and their subsequent willingness to act to avoid climate risks. Hence, our framework seeks to understand these dynamics affecting perceptions and actions so that we can identify current factors that enable or inhibit climate resilience action and develop strategies that improve the likelihood of policy action. Our framework is adapted in part by political and institutional analysis frameworks that evaluate policy feasibility in terms of a policy's alignment with decision-maker interests and the ability of an institution to carry out the policy.

We classified factors affecting climate action into four categories: information availability, capacity to implement change, company structure, and company culture. For companies that did act in response to climate change, we classified their climate action motivation into three broad categories: social pressures, political pressures, and financial/economic pressures.

### ***Corporate Responses to Climate Change***

#### ***1. Information and Technical Knowledge***

The first component of our framework evaluates whether companies obtain and understand relevant climate risk information. Data and information are crucial for all corporate climate decision-making processes, however specific climate change information is often unavailable or incomprehensible. Companies are unable to address climate change without appropriate knowledge of both short-term and long-term impacts, and thus, may unknowingly accept high levels of risk. Understanding the current information flow within organizations enables identification of current information shortcomings and development of potential interventions. We pose specific questions partnerships to evaluate who provides information to companies and thus has influence over decisions.

#### ***2. Capacity for Action***

The second component of our framework evaluates whether companies can translate information about climate impacts into resilience actions. We evaluate whether companies perceive to have sufficient financial and human resources allocated to projects addressing climate change within their organization. Human resources include both the number of people involved in sustainability as well as the technical expertise of those involved.

### *3. Company Organization*

The capacity of a company to prioritize and implement climate resilience practices depends on how structures of companies control the flow of information and the authority of individuals to make decisions on climate actions. The formal organizational structure (or simply “organizational structure”) is an officially codified hierarchical arrangement of relationships between different jobs within the organizational units and relationships between departments within the organization. These relationships determine the overlap of roles and responsibilities related to procurement, sourcing, and sustainability within companies.

### *4. Company Culture*

The fourth component seeks to understand whether there is widespread climate awareness and support for climate resilience actions. Corporate culture refers to the beliefs and behaviors that determine how a company's employees and management interact and handle outside business transactions. Often, company culture is implied and not defined outright and is referred to as the “informal organization.”<sup>42</sup> This impacts an employee’s willingness and support to pursue climate related actions within their daily duties.

## ***Motivations and Barriers to Climate Action***

### *1. Social Pressures*

The first component of motivating factors evaluates whether companies take climate action in response to external social pressures, such as consumer demand for more transparency. It also evaluates whether companies are placing pressures on themselves internally to act responsibly, or in simple terms, “do the right thing”. Within this component and the following two, the responses are partitioned into motivations and barriers.

### *2. Political Pressures*

The second component evaluates whether pressures from governmental policies, or even non-governmental organization statements, force or otherwise promote action to address climate risk. It also evaluates if there are political pressures discouraging this action.

### *3. Financial/Economic Pressures*

The third component evaluates the financial motives and whether there are economic incentives that drive companies to take climate action. Some companies may be motivated to take action to reduce financial risk, yet there may be a barrier in terms of making the case for such long-term investments.

---





<sup>42</sup> Investopedia, “Corporate Culture,” November 17, 2017, accessed March 16, 2018, <https://www.investopedia.com/terms/c/corporate-culture.asp>.



# Results

## Corporate Responses to Climate Change

We used our corporate climate decision framework to identify themes from interviews that reflected factors and motivations guiding climate response. Table 2 summarizes our findings.

Topic	Results
<b>Information</b> 	<ul style="list-style-type: none"> <li>Managers <b>lack information</b> in key categories:               <ul style="list-style-type: none"> <li>Knowledge and/or understanding of adaptation, its <b>significance</b>, and specific impacts on the company</li> <li><b>Financial incentives</b> and return on investment (ROI) for resilience</li> </ul> </li> <li>Partnerships are key to filling information gaps               <ul style="list-style-type: none"> <li>Nonprofit (WRI, WWF, etc.), Academic, Industry-wide</li> </ul> </li> </ul>
<b>Capacity</b> 	<ul style="list-style-type: none"> <li>Sustainability teams have <b>multiple competing priorities</b></li> <li>Sustainability teams <b>are small and understaffed</b></li> <li>Climate action requires rigorous analysis managers can't currently provide</li> </ul>
<b>Culture</b> 	<ul style="list-style-type: none"> <li><b>Attitudes range</b> from sustainability as a core value to a minor priority</li> <li>Companies with sustainability core value hire employees who share value</li> <li>Sustainability teams have <b>responsibility to educate rest of the company</b>, but face challenges outside of team</li> </ul>
<b>Organization</b> 	<ul style="list-style-type: none"> <li>Sustainability teams are nested into different areas of the companies               <ul style="list-style-type: none"> <li><b>Centralized (CSR team) vs. Integrated</b> (different teams have sustainability manager/priorities)</li> </ul> </li> <li>Reporting structures and <b>level of authority of sustainability vary widely</b> <ul style="list-style-type: none"> <li>Ex: report directly to CEO vs. VP; having Chief Sustainability Officer</li> </ul> </li> </ul>

*Table 2. Summary of Interview Findings*

### Information

Companies displayed a varying level of understanding of climate change, its impacts on business operations, and the topic of resilience. Many companies interviewed understand how climate change impacts their corporate operations and seek to fill the information gap; however, our research found that there is a lack of information on certain topics that impede corporate action on climate change. Our interviews with sustainability managers suggest that corporate decision makers lack necessary information in three key categories:

- Knowledge and/or understanding of adaptation and its significance
- Knowledge and/or understanding of specific impacts on the company
- Financial incentives and return on investment (ROI) for resilience

### *Knowledge and/or understanding of specific impacts on the company*

All companies interviewed stated that they lack information on the specific climate change impacts on business operations. Companies understand the broad effects of climate change and could reference climate related impacts to their business, such as the disruptions caused by Hurricane Sandy in 2012. However, one sustainability manager of large retailer stated, “When we move beyond our immediate operations, there is something of an information challenge in understanding what our overall footprint is and our areas that are potentially the most impacted.”

Many companies cited a lack of data on how climate change is expected to specifically impact their operations in the future. A few managers noted their organizations are in the beginning phases of collect the data required to assess the risks and future impacts:

“I think we’re still in the informative stage, but we’ve done some different types of work like that just to see if this model says this and our model or projection says that, what are the considerations we could make about long-term yields of corn, for instance, in a particular region.”

“I think having robust data on the short-term impacts versus long-term impacts of climate. I think we have a really good understanding of the global impact to 2030, 2050 but how it will impact our individual ingredients, and supply chain, and cost structure, how dynamic the supply chains are and agile to be able to address those risks quickly and adjust is hard to quantify financially, so raking in the benefits of being proactive in climate. So, we’re trying to mitigate risk in the dark a bit because the quantification from a financial and scientific perspective, of where our specific issues are, is a little bit fuzzier. So, I think that’s our biggest challenge.”

### *Knowledge and/or understanding of the financial incentives and ROI*

Interviewees noted a dearth of information on financial incentives for investing in climate adaptation. Many interviewees stressed the importance of making a “business case” for acting on climate change and noted that they lack the financial information or quantification of the negative business impacts of inaction to gather internal support for action. One interviewee noted, “Until you can get more of the business case articulated, it will always be more difficult. Unless there are things that have other clear benefits, like cost savings, such as more efficient use of water (i.e. drip irrigation).”

Another manager of an agribusiness company expressed a need for “an economic compensation mechanism or market mechanism that ensures that farmers are rewarded for doing climatically advantageous practices or making climatically advantageous decisions [...] But ultimately this is an asset valuation problem. That would be a huge step forward if there were better compensation mechanisms for these things.”

Managers emphasized that they cannot quantify impacts of supply chain disruptions before disruptions occur and must attempt to minimize risk without adequate information. According to one manager, “most companies would say, ‘why would I pay \$15 million more now when you aren’t telling me this is absolutely going to happen to me and I’m not sure it’s guaranteed? I have other needs and other ways to spend that money, so I probably won’t do

that.” Another said, “The big issue is that there’s plenty of information out there that would say there are all kinds of risks. Simplifying the matter is: how do you distill those risks out of something that an investment decision could be made on. There’s a lot of information, but it’s not always actionable. So, how you close that gap in an economically material way is important.”

### *Knowledge and/or understanding of climate adaptation and its significance*

Most of the interviewees confused the concept of resilience and mitigation and emphasized company mitigation practices rather than resilience practices in their responses. Many sustainability programs address climate change only through mitigation programs. When questioned about climate change action, a manager of a large agribusiness company responded, “we’re approaching [climate change] from two different angles: one is how we decrease our carbon footprint through increased energy efficiency and two is increasing the use of renewable energy.” The same was true for another large retail company, whose manager stated, “we have good insight into our energy consumption, the U.S. grid mix, etc. We have good relationships with our utilities and other organizations like WWF and WRI and Ceres that are there to kind of help us implement projects and programs that really help us from a climate perspective.”

Sustainability managers who did know the concept of adaptation did not feel that their company and its leadership lacked this understanding. It was also noted by the sustainability manager of a large retailer that while the sustainability team understands the difference, the challenge lies in communicating this to the rest of the company: “I also think I know the difference between adaptation and mitigation, but I don't think other people do. I think for the people who work in climate - 60% of the time know the difference and that's it.” Sustainability managers who understood the concept of resilience (see Appendix C for quotes) did not feel that their company was currently resilient to climate change.

### *Partnerships*

All companies interviewed leverage partnerships with NGOs, academics and industry associations to fill information gaps on climate change impacts. All employees interviewed named various partnerships their companies have in place to acquire the scientific knowledge to understand climate change in greater depth, and also learn about best practices for taking action on climate change. The following are a few examples:

“The ones that we tend to work the most with are EDF (Environmental Defense Fund), TNC (The Nature Conservancy), Conservation International, WRI (World Resources Institute), CDP (Carbon Disclosure Project) is certainly a big partner of ours, Sustainability Consortium and BSR (Business for Social Responsibility), RMI (Rocky Mountain Institute), and others. I feel like there's not a stakeholder that we don't work with, as long as they're oriented towards problem-solving.” – Sustainability Manager, Large Retailer

“Right now what we need is partnerships with the best minds in the area, that’s why we are working with WWF and Care, as well as NCBA CLUSA, and also some consulting companies that have best practices like McKinsey, these are companies we are working with at the moment, we are trying to leverage best ideas, best practices rather than just rely on our own so that we are work class for lack of a better word when it comes to

mitigating climate change and environmental disasters around the globe.” – Sustainability Manager, Agribusiness Company

### ***Capacity for Action***

All of the interviewees noted a lack of capacity within their position or organization as a whole to implement climate resilience practices. Many sustainability professionals interviewed are situated on Corporate Social Responsibility (CSR) teams within multiple competing priorities. One manager stated, “[We’re] supposed to also consider gender diversity, things in fragile conflict states, climate change, etc. - so which one do [we prioritize]?”

Sustainability teams also tend to be small and understaffed. One manager stated, “we both come from a very small team, and so we have very limited bandwidth on new initiatives and things to take on, and so we love to hear ideas of things and the opportunities that we have to engage with third party organizations, but let’s be honest - it’s really limited, the ability that we have to take on new things.”

Additionally, companies stated that climate change action requires a baseline of rigorous analysis that many managers cannot provide. One manager stated, “Resilience and adaptation is specific to the local context. So, if you have a project that is reducing water use in a particular area, but there’s no water shortage as a result of climate, then it doesn’t count as a resilience project. There is a lot of upfront analysis required to figure out what the situation is in a particular country.” Projects that provide this analysis and act based on the research require investments in both human and financial capital, which is often unavailable within companies. The same manager stated, “It’s not easy. I think it takes a lot of upstream work and support and the margins are very tight. I wouldn’t say it’s a done business model and has been totally proven.”

Despite these challenges, one company interviewed actively built climate resilience capacity by through both in-house and outsourced sources: “Being in the business of coffee, I think this is something that we talk about a lot, quite a bit. We have agronomists that work for [us their full-time job is looking at what the latest research is, doing tests; they’re agricultural scientists that are looking at what would grow in certain conditions or in certain parts of the world and what that might mean for the future.” While this particular company indicated having more human and financial capital to address climate projects, it was an outlier in the interview process.

### ***Company Organization***

The position of sustainability managers within companies provides insight into roles, responsibilities, and potential communication channels between managers within organizations. For the companies interviewed, we see that sustainability managers are nested within different areas, with some organizations integrating sustainability across functions and others keeping sustainability teams separate from other functions.

Companies with sustainability teams functioning separately described their roles and structures as separate from procurement and sourcing teams but did note communication with those teams. One manager from an agribusiness company noted, “There is a different procurement team, but it’s integrated into our purpose-led performance. One of the major drivers that we’re pushing for is sustainable sourcing that looks at different impacts of our farmers, the farmer’s crops, and the

environment.” A manager from a food and beverage company claimed that there are several sustainability jobs or teams within the R&D department and that this department communicates with other teams such as procurement, agronomics, and packaging; however, it does not communicate with the risk management team. Similarly, one large retailer noted the following about communication between sustainability and sourcing teams:

“The sourcing team has the people who figure out what we source and who we should source it from and then make recommendations to the buyers about what we put on our shelves and how to display that information and order the materials and merchandise it. As the meat and potatoes of [our] organization, we [the sustainability team] certainly work with the sourcing team and with the merchants and the buyers, usually more discreetly on commodities or products. The responsible sourcing team looks at the social issues in the chain, primarily looking at factory compliance and some of the garment industry stuff. We've been partnering with them on a handful of other projects.”

Some companies noted that, even if the sustainability team is discrete, there are sustainability initiatives being integrated across the company, sometimes with other teams containing their own employees focused on sustainability:

“[Global Responsibility] is its own team that encompasses everything from environmental work and ethical sourcing work to community social impact. It’s a pretty broad group that does more than just environment and works on many other initiatives that are unique to [our company] ... The environmental impact team is in the social impact group and [global responsibility] sort of drives the strategy for sustainability in business. There are sustainability people that are embedded in the business. For example, store development has their own sustainability people. Facilities and operations will have their own sustainability people too.” – CSR Manager, Coffee Company

“The environmental sustainability function, which includes climate and energy work, is sort of a subset of broader Corporate Social Responsibility... We have an enterprise view and then we work pretty closely with either other sustainability teams or individuals in different parts of the business. For example, our Properties and Sourcing groups have sustainability teams and we’ve got a Food Social Responsibility team... The goal has been to embed as much of [the sustainability] work into the different business areas as possible. The corporate group makes sure that those groups are consistently approaching topics in the same way, with a similar point of view, and then identify where there might be gaps and helping to build out the capabilities to fill those gaps.” – Sustainability Manager, Large Retailer

Two company representatives indicated a top-down governance structure, with boards of directors that contain sustainability-related subcommittees. An employee from an agribusiness and food company stated, “[The sustainability department] reports to the company global CEO. We also have a sustainability committee on our board of directors that oversees all of the sustainability policies, activities, etc. of the company.” Another employee from a food manufacturing company referred to a similar governance structure and also noted communication with both procurement and supply chain manufacturing teams:

“The board of directors is accountable for our sustainability work. We have a subcommittee of the board that is the social responsibility and public policy committee. We share when we’re doing commitments and we report on our progress against our commitments for sustainability. [The sustainability team] sends biannual updates to our global leadership team, including our CEO, quarterly updates to the rest of the leadership teams, and monthly updates to our global procurement team on progress against our commitments and our global supply chain manufacturing team as well.”

### ***Company Culture***

Our interviews found that attitudes towards climate change ranged from sustainability as a core company value to sustainability as a minor priority. For companies without robust sustainability objectives, sustainability managers stated that they struggled to galvanize actions beyond GHG mitigation and cost savings on energy and other resources. Companies ranged in the extent to which sustainability is integrated into the whole company and the level of influence the sustainability team.

The company with the strongest culture in our interviews of environmental stewardship integrates sustainability values throughout the entirety of the company by hiring individuals who share these core values:

“We’re a values and mission-driven company, and we can define through informal survey data that [employees] really care about climate change and the environment and the impact that we’re making through our sourcing. Climate change mitigation is something that people can be part of at the store level and it’s not just something that folks at the corporate headquarters think about it from a policy perspective, which happens, but it’s also hands-on elements to it as well.” – CSR Manager, Coffee Company

Another agribusiness company manager noted the strong influence of their sustainability team to educate the rest of the company:

“We use tools that talk about water risk and climate risk and are able to provide those to the brand team or to the category managers, the teams that are working on sourcing, and be able to educate them on climate risk and be able to address those continuity of supply challenges that might come as we look from a short-term lens as well as a long-term lens.”

On the other end of the spectrum, a large retailer expressed the difficulties of addressing a controversial topic like climate change to other stakeholders who do not have the knowledge or appreciation of the issue:

“I think the only people who understand are those who work in climate those who are getting a master’s in environmental science. I would think the sustainability team probably gets it, but after that, there’s a pretty quick lack of understanding about the nuance or why it’s important. And I also think that we live in a society where ~30% think climate change is fiction. So, when you’re a company like [us] or any really big brand,



we’re selling to people who think climate change is a fiction. The need to figure out how we can get out of the polarization of the topic is a shared challenge.” – Sustainability Manager, Large Retailer

One interviewer noted that their priorities are not always supported beyond the sustainability team: “Our team works to help the investment officers to do that, but to be honest, it is not always their top priority.”

## Motivations and Barriers to Climate Action

Pressure	Motivation	Barrier
Social	Maintain good brand reputation (extrinsic, but aligned with the intrinsic desire for positive corporate citizenship)	Talking about adaptation and resilience may lead to an assumption that companies are shifting their focus away from mitigation efforts
Political	U.N. Sustainable Development Goals and the Paris Agreement	Lack of U.S. government leadership or guidance on the issue
Economic/Financial	Mitigate risk of business disruption caused by climate change, thus, promoting business longevity	Requires investment for the long term, which requires justification (i.e. the business case), and some companies primarily focus on short term goals

**Table 3.** Social, Political, and Economic/Financial Pressures, Including Motivations and Barriers to Climate Action.

### Social Pressures

Social pressure is the influence of external parties, such as activists or society as a whole, on a business to take certain actions or make changes to business strategy and operations. Four of the eight company representatives interviewed reported the importance of maintaining a good brand reputation as a key motivation for taking action on climate change.

### Motivations

A sustainability manager from one large retailer stated, “I think we acknowledge that, for a brand of our size and reputation, there is sort of a minimum threshold that we have to be doing.” A financial institution that supports corporate clients explicitly uses reputational benefit as a selling point for climate action, stating, “When our investment officers hear about a hotel project in a particular country, they can say, “That’s a great project, but if you do it this way, we can help you make it a green building, which will perform better and have some public benefit in terms of your reputation.” A large agribusiness company indicated motivation due to the severe consequences of not taking climate action and the devastation it would cause to its reputation.

Their representative stated, “Our role would be to think ahead to what we can do to mitigate or minimize the impact to the population, because part of what we do is also saving lives, and when things happen, we are there very quickly to respond.”

For other companies, the social pressure to make a change not only influenced steps for climate action, but also how those steps are communicated with external parties:

“A number of years ago, when we started on this journey, we were facing a lot of reputational challenges, partly because we stopped speaking to the external community. We were focused on growing and scaling our business. Our calendar was very oriented around ‘if you do the right thing for the customer, then everything flows from there.’ There wasn’t a strong desire to shout from the rooftops how great we were. Part of it is the reputation narrative that was built around us.” – Sustainability Director, Large Retailer

The motivation to maintain a good reputation is an external matter, but it is closely tied to some companies’ internal desire to be socially responsible. Corporate citizenship is defined as the “social responsibility of businesses and the extent to which they meet legal, ethical and economic responsibilities, as established by shareholders.”<sup>43</sup> The overall goal is to “produce higher standards of living and quality of life for the communities that surround them and still maintain profitability for stakeholders.”<sup>44</sup> Four companies cited achieving corporate citizenship as a fundamental motivator for taking climate action.

When asked what motivates their organization to address climate change, a sustainability manager from one food company stated, “First and foremost, we know it’s the right thing to do. And we know it’s something our consumers care more and more about. We want to be able to align our values with those of our consumers and be able to share the story of how we’re working to address these issues.” In referencing action that one large retailer took following the devastation of Hurricane Katrina, a sustainability manager stated “People were really proud to work [there] during that time [helping Katrina victims]. They really felt great about the company and the type of people we were. That, coupled with these stakeholder interviews, led to us launching our sustainability journey.” Similarly, regarding a cyclone that affected the communities that their organization sources from, an interviewee from a large agribusiness company stated, “We were there to respond to the communities, rebuilding roads, bridges, and houses. We devoted some money and we took care to help with that.” The same representative stated, “What motivates us is a critical pillar to our company strategy: making a positive impact on our planet. It’s not sufficient to go along. We want to leave the planet better than we found it.” Another company representative commented that “something [they] talk about a lot as a company is using [their] scale to impact communities around the world in a positive way.”

---

<sup>43</sup> Investopedia, “Corporate Citizenship,” March 10, 2005, accessed March 14, 2018, <https://www.investopedia.com/terms/c/corporatecitizenship.asp>.

<sup>44</sup> Ibid.



### *Barriers*

A sustainability manager from a large retailer mentioned a potential barrier from an assumption made regarding climate adaptation work:

“If I were to go out and say we're going to focus on adaptation to climate change, the message I'm sending to the world is that we've given up, climate change is here, and we're going to stop doing mitigation. I get killed when I highlight adaptation and don't emphasize everything I'm doing to clean up my own house. So, I think there's got to be a safer place for us all to get together to talk about adaptation, so it doesn't become this big attack.”

### *Political Pressures*

Political pressures are defined as regulations, policies and programs from public organizations, such as the government, non-governmental organizations and nonprofits, at the local, national and international levels. All eight of the companies interviewed cited the influence of regulation and public policy on business strategies and activities, with some political pressures creating opportunities to take climate action and others creating barriers to taking greater measures to foster climate adaptation and resilience.

### *Motivations*

Two companies cited political pressures from public organizations as having a positive impact on enabling climate action. A manager from a large agribusiness company cited the influence of UN Sustainable Development Goal #13: Climate Action, and the Paris Agreement on their company operations, saying, “We’re revising our [sustainability] plans based on the “2 degrees” emphasis and on the UN Sustainable Development Goals. As we do that, we’ll be revising going forward.”

A sustainability manager from a large retailer noted an opportunity associated with the current lack of leadership at the federal level by saying, “With respect to climate change, I think [reputation] is becoming more [part of the motivation], particularly with what’s going on at a federal level, from a policy perspective, [and] from an EPA perspective. There is just a leadership vacuum and I think businesses are seeing an opportunity to fill in that vacuum, and we are evaluating how exactly we fit into that.” Note that, in this case, the motivation to take advantage of this opportunity stems from the social pressure to achieve a positive reputation.

Two companies spoke specifically about the potential that public policy on climate adaptation and resilience has to motivate climate action. One agribusiness company noted the need for “an economic compensation mechanism or market mechanism that ensures that farmers are rewarded for doing climatically advantageous practices or making climatically advantageous decisions.” This representative further explained with an example, stating “You don’t want a farmer to plant palm oil on peat. Peat has a high carbon value that should be compensated much more directly and actively today or tomorrow than it is today. That would be a huge step forward if there were better compensation mechanisms for these things.”

Similarly, a representative from a financial institution made a suggestion in regard to a public-private interaction, stating,

“I think government or public funding can help make [resilience] more attractive to private sector investment in a targeted way. You can spend a little bit of public money and leverage more private sector money. I think that if we want to see more money going towards adaptation and resilience, that’s the way to focus it. You can’t expect governments to cover 100% of the bill, but if they can de-risk it and make it more attractive to the private sector, there’s a lot more we could do there.”

### *Barriers*

On the other end of the spectrum, companies have found significant political barriers to climate change. Unlike the retailer that sees an opportunity to fill in the federal leadership vacuum, three company representatives cited the vacuum as a barrier, given the lack of policies or recommendations on how to take climate action. A sustainability manager from an agribusiness stated, “I think the ambiguity around the U.S. government commitment sometimes makes [taking action on climate change] a bit challenging.” Another manager stated, “There is always politics that don’t go in the same direction that we would want in all countries. Where subsidies are still directed predominantly towards fossil fuels, less subsidies for fossil fuels would be as useful as more subsidies for renewable energy.” Though this statement is related more to climate change mitigation than adaptation, it speaks to the importance of public policy in company operations. A sustainability manager from a large retailer noted the same barrier, along with a potential solution, stating, “I think there’s a major role for policy advocacy. Under the current [U.S.] administration, it’s probably not fruitful, so I wouldn’t steer anyone in that direction. But I think working at state, local, and international levels would help open the door because a lot of companies, not just [us], are trying to navigate this and we need smart policy.”

Another barrier of note is the politicization of climate change. According to one agribusiness company manager, “[It makes it] a bit challenging for [them] to address and publicly talk about the issues associated with climate change without stirring up political polarization that is often associated with the issue.” A sustainability manager at a large retailer seconded this concern, stating, “I would say in the U.S., [though] not specific to [us], that the polarization of this topic makes forward movement really hard.”

### *Economic and Financial Pressures*

Since all of the companies interviewed are public, they are held accountable to generating strong quarterly returns for their investors. Thus, the economic and financial pressures to take climate action were prominent in the interviewees’ responses.

### *Motivations*

The majority of the companies interviewed are motivated to take action based on minimizing the risk of business disruption. The companies whose sourcing is dependent on areas most impacted by climate change are especially motivated to take action due to looming economic and financial risks of disruption in the supply chain and sourcing activities.

Two companies put the ultimate consequence of business disruptions caused by climate change in very simple terms. One manager said, "Less sugarcane to process equals less sugarcane to sell, [which] equals less revenue." and another stated, "Without a healthy environment, there is no healthy agriculture, there are no healthy ingredients and there are no products." A CSR manager from a coffee company stated, "Climate change threatens to reduce the amount of coffee that is available in the future, but future demand requires triple the amount of coffee production that exists today. Anyone who is buying coffee right now is looking at climate change as an issue." A large retailer detailed the risk of business disruption to their facilities:

"Second, which I think is becoming a more significant driver, is that we see risks to our business operations associated with climate change. If we think about, particularly, business disruption, whether that's stores and distribution centers here domestically (previously referred to Texas, Hurricane Harvey) - that's a big disruptor of our business and in the supply chain as well. We source a lot of our products internationally from locales that we think are becoming more and more vulnerable to the possible impacts of climate change, whether that's drought or sea level rise or extreme weather events or typically some sort of combination of all of those."

A manager at a large agribusiness company had the following response when asked about what motivates their organization to address climate change: "The intersection of climate change and agriculture [does]. Agricultural products are what we sell and buy from farmers, so [we are motivated to] understand better how agricultural production will evolve in different climate scenarios, [and] understand the role that trade plays to help promote efficiency." For this company, the risk of business disruption motivates them to understand what may happen as the climate changes and consequently, what they can do to adjust accordingly.

Three company representatives acknowledged price volatility, specifically, as a critical cause of business disruption that will probably worsen with climate change. A sustainability manager at a large retailer recognizes that for certain raw materials, "changing weather patterns is impacting where stuff is grown and the cost." A sustainability manager at a large food company stated, "Being able to get the right ingredients at the right time, in the right quality, and at the right price is our thinking from a supply chain perspective of our ingredients. All of those things are impacted by climate change." The same manager made the following point about the challenge of price volatility:

"[In the] long-term, [the motivation is] the risk that comes from not being able to budget appropriately for the wild swings in commodity prices - the lack of preparedness for that. From a statistical perspective, the volatility of the market is five times what it used to be on the main grains and we're a grain-based company, so that and fuel and oil and others. It's hard not having a consistent way to budget. Corporations in general can tolerate higher prices if they are consistent - we can budget for them accordingly. The big challenge that looms ahead is how to mitigate that risk and plan for it. It's really challenging."

Two companies recognized both the risks and opportunities associated with climate change in regard to investor relations. One sustainability manager from a food company stated, "From an

investor perspective, [climate change] presents risks and opportunities for [us] to address. We disclose those risks in our SEC filings about climate and we work to address and mitigate them wherever possible.” A manager at a financial institution recognizes the opportunity to help clients that are concerned about climate risk, stating, “Some clients want us to help them stress-test their business model to see where they might have some resilience weaknesses. Our hope is that it then turns into investment pricing [or] price-saving.”

### *Barriers*

Though not always the case, some companies strategize in accordance with mostly short-term goals, rather than long-term ones. In those cases, unless there is short-term revenue generation or cost savings associated with it, these companies will not prioritize investment in climate adaptation and resilience. Accordingly, several of the company representatives recognize the fundamental need for a business case that shows a clear return on investment for long-term climate resilience activities.

Four companies addressed the need for a business case, or otherwise the need to show a strong return on investment (ROI) for climate adaptation and resilience actions. A manager at a financial institution who works on climate issues noted:

“Resilience seems to make sense from a long-term climate perspective, [but] from a short-term business profit margin perspective, our clients don’t often see [the benefit]. Until you can get more of the business case articulated, it will always be more difficult, unless there are things that have other clear benefits, like cost savings, such as more efficient use of water (i.e. drip irrigation) ... Two big challenges [include]: the local context you have to have upfront and the lack of immediate, near-term payback.”

One sustainability manager from a food company addressed the difficulty for making the business case, especially when it comes to quantifying risks:

“The two big barriers include finding ways to quantify the risks at more of a micro level. There’s good work the World Bank and others have done at the macro level risk and quantifying that, but for specific supply chains, how do we justify the investments? At the end of the day, we’re all the shareholders that are looking for quarterly returns. So how do we justify that? That’s one. The other is being able to help us with the innovative models of financing for this stuff and public partnerships and convening for multiple different groups - how to fund this work. Taking off the projects that we have where we’re really working with a large number of smallholders - extremely expensive per person, per impact. The best way we’re able to justify it is if we’re able to contribute a relatively small amount with a number of other people and WWF can be a convener for that ... and continuing the work they’ve always done, which is being experts and aggregating and consolidating information from a global perspective and how to operationalize this work.”

Regarding ROI, the same representative noted:

“Unfortunately, the financial ROI isn’t there until there is disruption, so that is a challenge. From an ingredient perspective, [resilience to climate impacts is] being able to have really robust continuity of supply program and then finding ways where we can deliver programs on the ground to improve resiliency of farmers. ... We haven’t really found the ROI for the business to invest in the technologies, because you can’t count potential increases to costs or failures as cost-savings in calculations. It’s just not how it’s done. So, trying to justify it - you have to do that justification outside of a traditional business model. That’s challenging for our own facilities. For supply chain, it’s an indirect benefit to us. It’s basically impossible to quantify because we are a couple steps removed from the supply chain. It’s about how we tie it into other benefits, because the straight security of supply play is hard to financially justify. That’s why it needs to be coupled with things like productivity improvements, where you’re able to improve the cost structure for the farmers, and therefore the cost structure for us. Or be able to draw brand value from the partnership as well and make it great for shoppers and consumers as well.”

One sustainability manager at a large retailer suggested that a significant barrier arises from the tendency for companies to think and strategize around short-term, rather than long-term, horizons:

“I think at a macro level, while climate change is happening very rapidly in the geological time-frame, for a lot of companies, it's really hard to think about 10 years in the future. We're thinking about our next holiday season. We're maybe thinking a year out. Getting someone to think about 10 years from now in any sort of company is really tricky. There is an element of ‘where is the financial sector and goal stream rewarding long-term versus short-term,’ but I think that that sort of a misunderstanding. I think there's a little bit, for companies, of ‘what is in the pipeline 6 months [or] a year from now?’ 10 years is a lifetime, so I would say one of the impediments is that the timescales are different.” – Sustainability Manager, Large Retailer

“In the longer-term the concern is at a macro level. [There are] all these companies buying "sustainably sourced" products and feeling really good about the fact that they're sustainably sourced, but quite candidly, in 10 years, I don't know if there will be coffee in Costa Rica. So, whether it's one version of certification over another, it's kind of a moot point. From a longer-term perspective, not understanding where crops are at high risk and what the relationship with agriculture is in terms of overall ecosystem health, is a bit of a question for me.” – Sustainability Manager, Large Retailer

## Analysis

### Climate Mitigation versus Adaptation and Resilience

No company interviewed has an official definition of climate resilience, demonstrating widespread uncertainty around the term exists within the corporate world. Sustainability managers used common language when defining resilience including phrases such as, “bouncing back” or “absorbing” disruptions or shocks to the system but did not indicate how these concepts relate to their companies.<sup>45</sup> While managers recognized that climate change creates significant future challenges unless current behavior is changed, however these answers did not correspond to specific actions and many corporate actions focus on mitigation rather than adapting and transforming to meet address climate risks. Without a formal definition for resilience, companies cannot develop or evaluate resilience strategies. Because businesses engage with NGOs such as WWF to pursue environmental goals and obtain information, this presents an ideal opportunity for WWF to provide value to businesses by filling this information gap.

When asked how their organizations are addressing climate change, the focus is on reducing greenhouse gases, the overall carbon footprint, or energy consumption. For some sustainability teams, these are specific, measurable actions that can be taken and then publicized to demonstrate climate action. Mitigation provides an easier action to demonstrate progress and communicate to both investors and the general public. As one food company describes, mitigation is, “low-hanging fruit,” demonstrating that current climate actions focus on achievable goals rather than fully addressing the complex challenges related to climate risks.

Another aspect of this barrier is the misunderstanding of the importance of climate resilience and who within the company should play a role in creating it. Mitigation remains more firmly in the responsibility realm of the sustainability team, who has more of a vested interest understanding and acting on climate change, whereas resilience is more of a company-wide effort that needs buy-in and action by supply chain managers and other managers involved in procurement and distribution.

### Why Certain Companies Act

Our survey was crafted to find out what motivates companies that are spearheading the movement and why some appear to care more than others. The responses revealed a broad spectrum in corporate climate adaptation actions. One trend observed is that companies with more susceptible supply chains display greater interest in climate action.

#### *Companies perceive climate change risk as a significant threat to their operations.*

Companies with commodities already impacted by climate change are also more likely to understand the financial incentives to act. The majority of the companies interviewed recognize the threat on a broader scale, but also called out specific impacts such as drought, sea level rise, and extreme weather events. They also recognize what this means in terms of price volatility and the inherent risk of profit losses. Though many companies are increasingly recognizing this risk, the companies starting to take action may be the ones that perceive the risk as more immediate.

---

<sup>45</sup> See Appendix C for quotes from various companies reflecting their insight into resilience.



There is a potential sensitivity in risk perception depending on whether or not companies source just a few primary products and whether or not companies have vertically integrated supply chains. For example, because coffee is threatened by drought and the geographical migration of ideal conditions due to rising temperatures, businesses that source coffee beans as their core product may anticipate greater supply chain risks and have greater incentives to address these risks. Out of the few coffee companies that we researched and/or interviewed, we noticed that they consistently link their actions, such as implementing climate-smart agriculture initiatives, to the pressing threat of lost coffee viability. In contrast, large retail corporations with thousands of suppliers and various source materials for many different products may not perceive specific climate risks because they have diverse supply chains and are less dependent on specific commodities for long-term success. Certainly, some of the large retailers that we researched and/or interviewed do not have any programs in place that explicitly address building climate resilience.

Additionally, for some companies, production happens in a very specific part of the world and thus, the impacts are unique and observable. Large, multinational companies that source from various locations around the world will have a global footprint, and thus, will require a lot more work to identify which parts of their supply chains they should target for building social, economic, and ecological resilience.

***Companies recognize the competitive advantage of planning for climate impacts.***

Companies that recognize and already experience negative impacts of climate change also see the inherent opportunities that accompany making their supply chains more resilient to those impacts. Despite being aware of this potential, many companies incur challenges related to quantifying risk and making the business case with an assured long-term return on investment. Though the concept may be clear, the lack of action, or otherwise the slow build to action, is both an information and capacity issue. Companies that are taking more action have somehow found a way to make the competitive advantage clear. Unfortunately, the interview responses did not elucidate how exactly this is done, but the responses did make it evident that this is a crucial first step of the process that they need help with.

***Companies have environmental care more ingrained in their culture.***

Another reason that goes beyond whether a company is being forced to act is that the company culture is built upon sustainability as a part of general social responsibility goals. Some companies have these core values integrated in every aspect of their business, especially if the CEO mandates it. This may be partly due to the heavy influence of a consumer base that cares about social and environmental issues. These companies are not only conscious of their impact on the environment, but also the way the environment ultimately impacts their operations.

## **Corporate Capacity for Resilience**

Capacity for resilience refers to the ability of a company to fulfill its resilience objectives. Climate resilience capacity is a function of how effectively an organization obtains and translates climate risk information into strategies that build resilience. Capacity also depends on effective communication or coordination between sustainability and procurement managers within

companies, as well as the financial resources invested towards resilience. Our findings suggest companies that lack capacity for resilience have low coordination between sustainability and procurement managers and do not prioritize identifying environmental risks.

### ***Lack of Influence***

For many companies interviewed, sustainability managers involved in environmental issues lack appropriate influence or knowledge to implement climate adaptation changes. Sustainability managers are usually only responsible for company mitigation or responsibility goals, and lack authority to direct changes to supply chain and procurement. Climate change adaptation and resilience actions relate primarily to supply chain and procurement decisions, but without effective coordination, sustainability managers aren't engaged in procurement decisions and companies will struggle to become resilient.

Companies with integrated sustainability and procurement operations have a greater capacity to build resilience because there is more collaboration and coordination among teams. Further, companies that nest sustainability and environmental management at a higher corporate level are better able to have integrate climate action throughout the supply chain. When sustainability managers are not central to corporate decision-makers, they are not empowered to implement climate adaptation actions.

### ***External Investor and Policy Pressures***





Investor and policy pressures are a key external mechanism to compel changes to corporate climate responses. Some companies noted pressures from investors to disclose climate risks, however this pressure appears insufficient to compel extensive changes to corporate strategies. Companies pointed to the Carbon Disclosure Project as a positive motivator for climate risk evaluation and disclosures, however our results suggest that these disclosure efforts don't contribute to resilience actions. The current U.S political climate was also cited as a reason for inaction on climate change.



## Part 3: Frameworks and Recommendations for Building Climate Resilience

### Defining and Building Corporate Resilience

A climate resilient company can absorb impacts from a shock or disturbance and recover to a state of continued functionality.<sup>46</sup> Resilience requires changes to current practices beyond simply shifting their sourcing regions towards a focus on promoting environmental management practices that support ecosystem resilience goals. Climate resilient companies actively pursue partnerships and research that identifies climate risks and develop solutions that address these risks and invest in strategies that address these risks without further stressing the planet.

Topic	Actions
<b>Information and Planning</b> 	<ul style="list-style-type: none"> <li>Partnerships with NGOs to identify climate risks and develop resilience strategies</li> <li>Quantified social and economic impact of climate change</li> <li>Internal definition of climate resilience</li> <li>Long-term risk planning</li> </ul>
<b>Implementation and Evaluation</b> 	<ul style="list-style-type: none"> <li>Resilience strategies implemented company-wide with broad engagement</li> <li>Resilience strategies and programs evaluated based on internal resilience metrics</li> <li>Continual improvement of practices based on best available science and data</li> </ul>
<b>Company Culture</b> 	<ul style="list-style-type: none"> <li>Support for climate action across company</li> <li>Employee education on mitigation, adaptation, and resilience</li> <li>All corporate responsibility goals consider resilience</li> </ul>
<b>Organization and Leadership</b> 	<ul style="list-style-type: none"> <li>Company structure integrates sustainability and promotes cross-team collaboration</li> <li>Executive support for climate resilience</li> <li>Sustainability teams have authority and capacity to develop resilience strategies</li> </ul>

**Table 4.** *What is a climate resilient company?*

Companies must develop their own internal definition, goals, and metrics for a resilient supply chain, considering for whom the resilience benefits. Resilience should also apply beyond environmental climate change issues and focus on holistic resilience objectives that include social considerations.

Though it is challenging to establish metrics for resilience, Mercy Corps suggests that they are most effective in the context of a shock or major stress and require incorporating data on the duration and magnitude of impacts, recovery, and wellbeing before, during, and after the event. This can prove difficult because it requires timely, frequent, and targeted analysis that does not conform to conventional monitoring and evaluation systems and must be done on shocks and stressors that are often unpredictable.

<sup>46</sup> Adapted from definition of resilience provided by WWF: Kuhn, D. (2017, December 18) Personal Communication.

Besides defining ways to measure resilience, there are many other barriers to creating resilience strategies including: a lack of information about climate risks, the inability to identify and implement cost-effective solutions, and difficulty assessing capital to implement those solutions. Strategies to help build resilience include: (1) strong partnerships to pool finance and technical skills, (2) time horizon extensions, particularly on capital investments, and (3) updating outlooks and building scenarios to understand how climate change will affect operations in the years ahead. Due to the nature and scale of climate change impacts, collaboration across the private sector is important for addressing climate resilience. Companies that see a common risk or a multi-sector solution should invest together in resilience. They can begin by combining individual skills and investments into larger support and platforms for scenario planning, data, information, and tools and investing to build capacity in supply chains. Additionally, they can combine core competencies for new efforts to test and build new products, services, practices, and technologies.<sup>47</sup>

Businesses can begin to build a climate resilient supply chain by first identifying areas of vulnerability where either 1) suppliers are not aware of climate risks or lack appropriate resources to mitigate them or 2) where there are processes that rely heavily on inputs threatened by climate change. Building a climate resilient supply chain does not necessarily mandate creating a new and separate strategy. If the company understands the vulnerable areas in their supply chain, they can work to ensure that those areas are referenced appropriately in their existing business strategy, supply chain strategy, category sourcing strategies, and/or sustainability strategy. Additionally, companies must work with experts to develop robust, science-based climate targets so they can define discrete goals and measure their progress.<sup>48</sup>

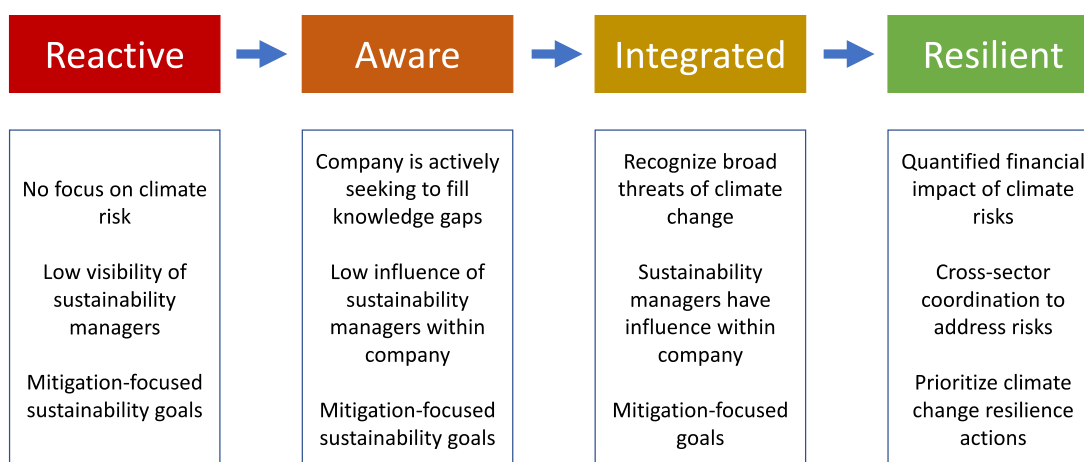
Companies progress in building climate maturity by increasing their information acquisition efforts and coordination based on these efforts. Figure 1 describes a maturity model progressing from reactive climate responses to resilient responses where agroecosystems can withstand disturbances and maintain their essential functions.

---

<sup>47</sup> Moushumi Chaudhury and Eliot Metzger, "From Risk to Resilience: It's Time for Business to Collaborate on Climate Change," World Resources Institute, March 13, 2017, accessed March 7, 2018, <http://www.wri.org/blog/2017/03/risk-resilience-its-time-business-collaborate-climate-change>.

<sup>48</sup> Tara Norton, "How to Get a Climate-Resilient Supply Chain," We Mean Business Coalition, April 08, 2015, accessed March 10, 2018, <https://www.wemeanbusinesscoalition.org/blog/how-to-get-a-climate-resilient-supply-chain/>.

# Corporate Climate Resilience Maturity



*Figure 1: The incremental stages from reactive to a resilient company.*

## The Business Case

When speaking with corporations in order to motivate them to take action to become more climate resilient, it is imperative to speak to managers underlying motivations and incentives. Managers working for a public company are often held to quarterly earnings reports and short-term standards, and climate resilience needs to fit into that perspective. Thus, when appealing to businesses and companies, there are four key categories to emphasize as reasons to act now: financial incentive, competitive advantage, partnerships, and positive corporate citizenship.

### Financial Incentive

When it comes to climate change, many companies think of challenging, costly, and complex actions. Yet many companies are forced to consider how the costs of protecting the environment measure up to not protecting it. With the increasing number of environmental disturbances, companies are feeling increasing pressure on the bottom line. Climate change impacts a variety of ingredients and supplies that all come at a costly price.

One food company noted that the financial ROI (return on investment) for climate action isn't present until a disruption occurs, impeding efforts to encourage immediate climate change action when its needed most. In many circumstances, it can actually be costlier for both the business operations by impeding them from obtaining a competitive advantage in their industry.<sup>49</sup> In fact, there are a number of benefits to adjusting business models to combat climate risks from better risk management to improved governance over supply chains. Customers typically expect final

<sup>49</sup> Dante Disparte, "If You Think Fighting Climate Change Will Be Expensive, Calculate the Cost of Letting It Happen," Harvard Business Review, July 05, 2017, accessed March 2, 2018, <https://hbr.org/2017/06/if-you-think-fighting-climate-change-will-be-expensive-calculate-the-cost-of-letting-it-happen>.

products that are delivered in a reasonable team, if not immediately to a retailer. Delays of deliveries, stockouts, and declining quality of goods (all symptoms of a lack of climate resilience) can damage company reputations and cost a company a loyal customer base.

There is also a financial incentive to be gained by appealing to a variety of customer values. Improving the resiliency of business operations to continue to produce goods to established standards ensures companies can maintain their current customer segments through delivery of the same value proposition. Building climate resilience through measures that simultaneously reduce company's impacts on the environment can also appeal to customers that value the conservation and preservation of the world around them. Thus, to truly take advantage and reduce climate risks, businesses must first fully understand the potential disruptions and challenges to their fullest extent.

## **Competitive Advantage**

Climate resiliency strategies also can create a competitive advantage for companies that take advantage of them. A recent study by Acclimatise finds resilience strategies can increase a company's competitiveness by increasing production efficiency and reducing costs.<sup>50</sup> For companies that depend on agricultural commodities for ingredients or supplies in final products, ensuring a non-disruptive supply of these materials can keep costs low for businesses that are typically price sensitive. New opportunities such as drought resistant seeds and low-drip irrigation can improve climate resilience and agribusiness efficiency.<sup>51</sup> These actions alleviate financial consequences of supply disruption by allowing businesses to take charge and minimize climate risks.

Each company's approach to climate change will depend on its particular business model, but the approach must be designed in a way that it can be embedded in the company's overall strategy. Climate resilience strategies should work in a similar fashion in that they should be embodied holistically within a company's overarching strategy rather than as a side thought that is added on to current business operations. Companies must also include tactics to diminish the costs and risks of climate change throughout the supply and value chain.<sup>52</sup> One of the initial key considerations is to identify and assess vulnerabilities to climate disruptions, followed by actions to address vulnerabilities, achieve operational effectiveness, and leverage a more secure position in the marketplace.<sup>53</sup>

## **Partnerships**

Businesses are run by managers who are simply human and seek simplistic, clear, and concise information. When it comes to climate resilience, there is no clear information and each company is its own base case. In order to be truly effective and take advantage of climate resilient strategies, companies will have to leverage relationships to gather all the pieces of the

---

<sup>50</sup> Multilateral Investment Fund, "Can Supply Chains Gain Competitive Advantages by Becoming More Climate Resilient?" accessed March 3, 2018, <https://www.fomin.org/en-us/Home/News/article-details/ArtMID/18973/ArticleID/12783/Can-supply-chains-gain-competitive-advantages-by-becoming-more-climate-resilient.aspx>.

<sup>51</sup> Ibid.

<sup>52</sup> Harvard Business Review, "Climate Business | Business Climate," November 23, 2015, accessed March 3, 2018, [https://hbr.org/2007/10/climate-business-\\_business-climate](https://hbr.org/2007/10/climate-business-_business-climate).

<sup>53</sup> Ibid.

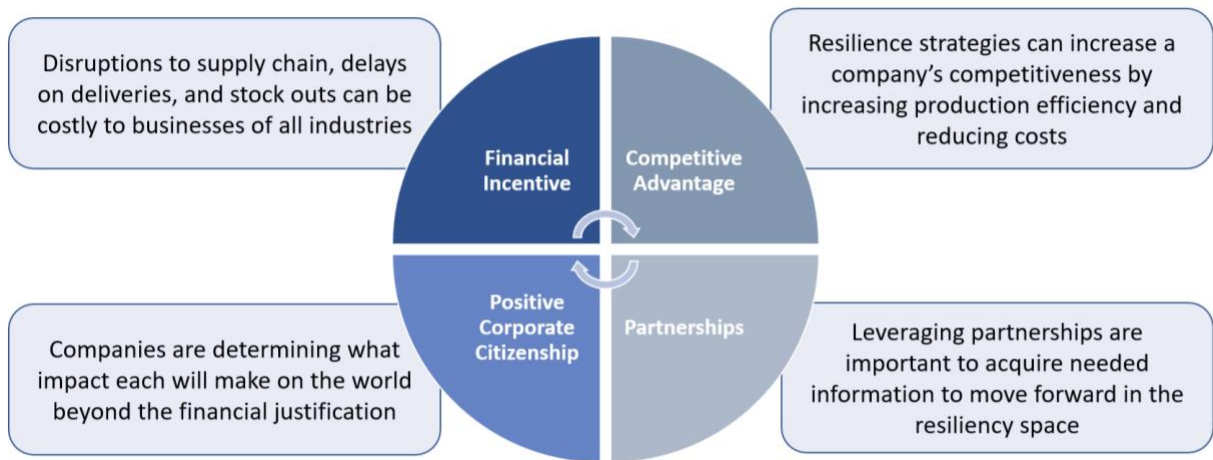
pie and get a clearer, overarching picture of climate resilience. Partnerships are one strategy for building capacity and filling in the necessary gaps to take action. Some of the companies that we interviewed are aware that capacity is largely localized, and that resilience and adaptation is specific to the local context. In these cases, building partnerships is one of the few ways to get ahead of the curve and improve a knowledge gap.

For instance, reducing water use in areas with abundant water supplies doesn't qualify as a resilience project. Significant upfront analysis is required to figure out what the situation is in a particular country. Two food companies also recognized the importance of leveraging partnerships simply to acquire needed information to move forward in the resiliency space. There was one company in particular that found universities to be an excellent source of information due to the reciprocal nature of the relationship that allowed them to compare long-term supply and demand analyses. Regardless of the tactics used, it is evident that knowledge sharing, and relationship building is essential to truly advancing climate resilience.

### Positive Corporate Citizenship

There is often a connotation that businesses only care about profits and their impact on the world is rarely considered. However, the results of the interviews conducted for this study indicate that positive corporate citizenship is increasingly higher on the agenda. While stating the financial and competitive advantages is important to initiate climate dialogue and action, companies are also more responsive to knowing their climate resilient actions are also minimizing their impact on the environment.

There were two food companies and one large retailer that consider positive corporate citizenship in the core of the company values. The retailer in particular considers how it can use its scale positively to impact communities around the world in a positive way. Regardless of whether investors, shareholders, or customers value “the right thing to do”, companies are taking it upon themselves to determine what that means for their organization and what kind of impact each will make on the world.



**Figure 2:** The Business Case for Corporate Climate Resilient Action.

# Recommendations for Private Sector Engagement

## 1. Present a clear definition of adaptation and resilience versus mitigation.

It is clear from both the company research and interviews that there is still quite a bit of confusion surrounding what makes adaptation and resilience different from mitigation in regard to climate change. Before engaging with companies on identifying climate risk in the supply chain and helping them craft strategies for building resilience, it is imperative that WWF and the company in question are on the same page in terms of understanding the fundamental difference between preventing the progression of climate change and preparing for the inevitable changes to come. WWF should use positive examples that other similar companies have done (i.e. “mini” case studies) to educate private sector stakeholders on how each term translates into action.

Climate Term	Definition	Example Business Activities
Mitigation	Human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs)	<ul style="list-style-type: none"> <li>- Switching from coal to renewable energy sources</li> <li>- Reducing water and energy usage</li> <li>- Redesigning packaging to reduce waste</li> </ul>
Adaptation	Process of adjustment to actual or expected climate and its effects	<ul style="list-style-type: none"> <li>- Purchasing climate insurance to offset expected threats</li> <li>- Diversifying supplier base by moving to new geographic areas to mitigate disruption risks</li> </ul>
Resilience	The ability of a socioecological system to absorb and recover from shocks and disturbances, maintain functionality and services by adapting to chronic stressors, and transform when necessary	<ul style="list-style-type: none"> <li>- Agroforestry in coffee industry (planting trees within and around fields to reap multiple ecosystem benefits)</li> <li>- Providing capital, training and other inputs to build capacity of small-holder farmers in value chain</li> </ul>

*Table 5. Defining Mitigation, Adaptation & Resilience*

## 2. Evaluate the corporate climate resilience of the company and understand its current motivations and barriers.

Since each company varies immensely in its capacity to act on climate change, WWF should begin the engagement by assessing the state of maturity of the company by evaluating the four key areas of information, capacity, culture and organizational structures (see Table 3). The assessment can then be mapped to the Corporate Climate Resilience Maturity Model (see Figure 3) to understand the stage in which the company is currently operating (Reactive, Aware, Integrative, Resilient). Through this process, WWF will identify the key motivations and barriers of the organization and will be able to craft a more personalized engagement strategy that meets the specific needs of the organization.

## 3. Find and engage the appropriate stakeholders.

A common finding from the interviews was that the sustainability or CSR teams are not communicating with the procurement or supply chain teams, at least not on climate change issues. Identify individuals or teams in the organization beyond sustainability and CSR that are



relevant to the supply chain and facilitate interactions between sustainability and procurement teams. Sample supply chain titles include chief procurement officers, supply chain directors, category managers, sourcing directors, and others involved in sourcing and supply chain sustainability.

Although WWF may not be able to invoke structural changes, such as increasing a company's capacity to act or increasing the sustainability team's influence within a company, it can diversify its contacts, so it can reach the people that are not thinking about climate change as much as sustainability members. In addition, the team at WWF must have a good idea about the scale of the climate issue to talk with the most relevant person. For example, if the company sources multiple products, then WWF not only has to help the company identify which raw materials are most at risk, but also connect with the employees that are in control of sourcing the raw materials for those products.

#### **4. Make the business case for climate resilience.**

Since most public companies are driven by short-term returns and respond to the economic and financial pressures from climate change, WWF should use the Business Case for Climate Resilient Action framework to make a compelling case to take climate action beyond mitigation efforts. To make the business case, WWF should take the following steps:

- a) Being aware of climate change risks and their impacts on a company's supply chain is the first step towards building climate resilience. In order to increase corporate awareness, companies must understand the full financial incentives, the opportunity for competitive advantages, and the increase in positive corporate citizenship that can be obtained from climate resilience. Explaining these aspects in a succinct, compelling, and clear manner is critical to gain and keep the attention of managers in positions of influence.
- b) The next step is to identify the most vulnerable parts and identify key measures for adaptation.<sup>54</sup> This allows adaptation and resilience enhancing measures to be identified and prioritized, and allows businesses to refine their supply strategies based on the analysis of the exposure of key commodities and suppliers.<sup>55</sup> Ideally this should be executed before expanding the supply to other possible suppliers/locations or switching to domestic suppliers to reduce risk inherent to long-distance transport logistics.
- c) Depending on their role within the investment value chain, firms can take several tangible steps including strengthening of governance and risk management to align with best practice frameworks. Managers can also adapt business models to changing demands of investors or develop a set of related policies or goals.<sup>56</sup> While there are a variety of actions companies can take to build their climate resilience, the key aspect revolves around understanding that there are more opportunities to avoid risk and increase a long-term competitive advantage.

---

<sup>54</sup> Ibid.

<sup>55</sup> Ibid.

<sup>56</sup> EY, *Climate change: The investment perspective*, 2016, accessed March 4, 2018, [http://www.ey.com/Publication/vwLUAssets/EY-climate-change-and-investment/\\$FILE/EY-climate-change-and-investment.pdf](http://www.ey.com/Publication/vwLUAssets/EY-climate-change-and-investment/$FILE/EY-climate-change-and-investment.pdf).

## **5. Frame climate change impacts as supply chain risks and use company risk mitigation frameworks.**

Framing climate change impacts as supply chain risks reduces barriers to understanding climate risks for corporate decision-makers that lack knowledge of climate barriers. It also reduces the risk of politicizing climate change activities, which may impede progress, particularly in companies that lack a strong sustainability culture.

Climate risk management must also fit within companies' risk management strategies to help align sustainability and supply chain objectives. Supply chain risk management literature suggests that businesses are more likely to act on a risk that applies to products that are critically important to operations.<sup>57</sup> Risk is evaluated based on the severity of an event (high to low impact), and the likelihood of the event occurring (high to low frequency, and businesses can establish a level of acceptable risk based on these calculations and develop plans to reduce these risks. A typical risk analysis and mitigation procedure follows this four-step process:<sup>58</sup>

- 1) Identify and understand risks
- 2) Evaluate options to mitigate risks
- 3) Implement practices to mitigate risks
- 4) Analyze success and adapting practices to better address risks

By using framing climate change impacts in the context of the supply chain and using risk management frameworks already in place at the company, WWF will be able to make headway with supply chain managers and other stakeholders crucial to building resilience. Please see Appendix D for a more detailed outline of supply chain risk management practices.

## **6. Provide useful information to help companies shift focus to long-term potential impacts.**

Some of the company interviewees cited the tendency for businesses to be more concerned with short-term financial goals than long-term profitability and business longevity, which constitutes a barrier for climate resilience thinking. Due to the difficulty of both predicting the long-term effects of climate change and implementing long-term projects that go beyond mitigation and encompass adaptation/resilience, this will be the most challenging hurdle when engaging with companies on the issue. To overcome this hurdle, WWF can encourage its partners to have climate scenario analyses done by other organizations, such as C2ES, to address this issue and fill in some of the data gaps to help companies shift their mindset to possible long-term business impacts.

---

<sup>57</sup> Supply Chain Risk Leadership Council, *Supply Chain Risk Management*, page 11.

<sup>58</sup> *Ibid.*, 2.



## Conclusions

WWF is in a unique position to add value to the private sector while also achieving its mission “to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature” by partnering with large corporations to create strategies that foster both business and climate resilience. By understanding the motivations and barriers of taking climate action by the private sector and coupling it with the science and trusted brand of WWF, a public-private partnership can be created to build climate resilience that create shared value for both corporations and global communities.

## Works Cited

- Allianz Global Corporate & Specialty. "Global Claims Review 2015: Business Interruption In Focus." 2015. Accessed April 2, 2018.  
<https://www.agcs.allianz.com/assets/PDFs/Reports/AGCS-Global-Claims-Review-2015.pdf>.
- BSR and CDP. "From Agreement to Action: Mobilizing suppliers toward a climate resilient world." 2016. Accessed March 12, 2018.  
[https://www.bsr.org/reports/BSR\\_CDP\\_Climate\\_Change\\_Supply\\_Chain\\_Report\\_2015\\_2016.pdf](https://www.bsr.org/reports/BSR_CDP_Climate_Change_Supply_Chain_Report_2015_2016.pdf).
- Chaudhury, Moushumi, and Metzger, Eliot. "From Risk to Resilience: It's Time for Business to Collaborate on Climate Change." World Resources Institute. March 13, 2018. Accessed March 7, 2018. <http://www.wri.org/blog/2017/03/risk-resilience-its-time-business-collaborate-climate-change>.
- Clark, Duncan. "What Is Climate Change Adaptation?" The Guardian. February 27, 2012. Accessed March 18, 2018.  
<https://www.theguardian.com/environment/2012/feb/27/climate-change-adaptation>.
- Crawford, Meg, and Stephen Seidel. *Weathering the Storm: Building Business Resilience to Climate Change*. Center for Climate and Energy Solutions. July 2013. Accessed March 18, 2018. <https://www.c2es.org/site/assets/uploads/2013/07/weathering-the-storm-full-report.pdf>
- Dasaklis, Thomas K., and Costas P. Pappis. "Supply Chain Management in View of Climate Change: An Overview of Possible Impacts and the Road Ahead." *Journal of Industrial Engineering and Management* 6, no. 4 (September 2013): 1124-138.  
<http://dx.doi.org/10.3926/jiem.883>
- Disparte, Dante. "If You Think Fighting Climate Change Will Be Expensive, Calculate the Cost of Letting It Happen." Harvard Business Review. July 05, 2017. Accessed March 2, 2018. <https://hbr.org/2017/06/if-you-think-fighting-climate-change-will-be-expensive-calculate-the-cost-of-letting-it-happen>.
- Drye, Willie. "2017 Hurricane Season Was the Most Expensive in U.S. History." National Geographic. November 30, 2017. Accessed March 14, 2018.  
<https://news.nationalgeographic.com/2017/11/2017-hurricane-season-most-expensive-us-history-spd/>.
- Engel, Hauke, Per-Anders Enkvist, and Kimberly Henderson. "How Companies Can Adapt to Climate Change." McKinsey & Company. July 2015. Accessed March 19, 2018.  
<https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/how-companies-can-adapt-to-climate-change>.

- EY. *Climate change: The investment perspective*. 2016. Accessed March 4, 2018.  
[http://www.ey.com/Publication/vwLUAssets/EY-climate-change-and-investment/\\$FILE/EY-climate-change-and-investment.pdf](http://www.ey.com/Publication/vwLUAssets/EY-climate-change-and-investment/$FILE/EY-climate-change-and-investment.pdf)
- Fannin, Blair. "Texas Agricultural Losses from Hurricane Harvey Estimated at More than \$200 Million." *AgriLife Today*. October 27, 2017. Accessed April 14, 2018.  
<https://today.agrilife.org/2017/10/27/texas-agricultural-losses-hurricane-harvey-estimated-200-million/>.
- Harvard Business Review. "Climate Business | Business Climate." November 23, 2015. Accessed March 2, 2018. [https://hbr.org/2007/10/climate-business-\\_business-climate](https://hbr.org/2007/10/climate-business-_business-climate).
- Heal, Geoffrey, and Jisung Park. "Temperature Stress and the Direct Impact of Climate Change: A Review of an Emerging Literature." *Review of Environmental Economics and Policy* 10, no. 2 (August 23, 2016): 347-62. doi:10.1093/reep/rew007.
- Hermes, Jennifer. "Harvey Causes Plastics Shortages & Materials Cost Increases." *Environmental Leader*. October 31, 2017. Accessed April 16, 2018.  
<https://www.environmentalleader.com/2017/09/plastics-shortages-price-increases-result-harveys-aftermath/>.
- Investopedia. "Corporate Citizenship." March 10, 2005. Accessed March 16, 2018.  
<https://www.investopedia.com/terms/c/corporatecitizenship.asp>.
- Investopedia. "Corporate Culture." November 17, 2017. Accessed March 16, 2018.  
<https://www.investopedia.com/terms/c/corporate-culture.asp>.
- Investopedia. "Supply Chain." November 17, 2017. Accessed March 16, 2018.  
<https://www.investopedia.com/terms/s/supplychain.asp>.
- IPCC, 2014: *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland. Accessed February 24, 2018. <https://www.ipcc.ch/report/ar5/>
- Kaskey, Jack. "Harvey Disrupts More Than One Third of U.S. Chemical Production." *Bloomberg.com*. August 28, 2017. Accessed April 16, 2018.  
<https://www.bloomberg.com/news/articles/2017-08-28/harvey-disrupts-more-than-one-third-of-u-s-chemical-production>.
- Leahy, Stephen. "Hidden Costs of Climate Change Running Hundreds of Billions a Year." *National Geographic*. September 28, 2017. Accessed April 14, 2018.  
<https://news.nationalgeographic.com/2017/09/climate-change-costs-us-economy-billions-report/>.
- Lecomte, Tristan. "How Agroforestry Can Increase Coffee Farms' Resilience to Climate

- Change." Nestle Nespresso. June 5, 2015. Accessed March 19, 2018. <https://www.nestle-nespresso.com/newsandfeatures/how-agroforestry-can-increase-coffee-farms-resilience-to-climate-change>.
- Lobell, David B., Wolfram Schlenker, and Justin Costa-Roberts. "Climate Trends and Global Crop Production Since 1980." *Science* 333, no. 6042 (July 29, 2011): 616-20. doi:10.1126/science.1204531.
- MarketWatch. "Francesca's Holdings Corp." Accessed April 16, 2018. <https://www.marketwatch.com/investing/stock/fran/profile>.
- McKinnon, Alan. "The Present and Future Land Requirements of Logistical Activities." *Land Use Policy* 26 (2009). doi:10.1016/j.landusepol.2009.08.014.
- Mercy Corps. "Our Resilience Approach to Relief, Recovery, and Development." December 14, 2016. Accessed March 6, 2018. [https://www.mercycorps.org/sites/default/files/Resilience\\_Approach\\_Booklet\\_English\\_121416.pdf](https://www.mercycorps.org/sites/default/files/Resilience_Approach_Booklet_English_121416.pdf).
- Multilateral Investment Fund, "Can Supply Chains Gain Competitive Advantages by Becoming More Climate Resilient?" Accessed March 3, 2018. <https://www.fomin.org/en-us/Home/News/article-details/ArtMID/18973/ArticleID/12783/Can-supply-chains-gain-competitive-advantages-by-becoming-more-climate-resilient.aspx>.
- National Climate Assessment. Full Report. Accessed March 18, 2018. <https://nca2014.globalchange.gov/report>.
- National Climate Assessment. Report Findings. Accessed March 18, 2018. <https://nca2014.globalchange.gov/highlights/report-findings/agriculture#menu-report>.
- Norton, Tara. "How to Get a Climate-Resilient Supply Chain." We Mean Business Coalition. April 08, 2015. Accessed March 10, 2018. <https://www.wemeanbusinesscoalition.org/blog/how-to-get-a-climate-resilient-supply-chain/>.
- O'Neill, Brian C., Michael Oppenheimer, Rachel Warren, Stephane Hallegatte, Robert E. Kopp, Hans O. Pörtner, Robert Scholes, Joern Birkmann, Wendy Foden, Rachel Licker, Katharine J. Mach, Phillippe Marbaix, Michael D. Mastrandrea, Jeff Price, Kiyoshi Takahashi, Jean-Pascal Van Ypersele, and Gary Yohe. "IPCC reasons for concern regarding climate change risks." *Nature Climate Change* 7, no. 1 (2017): 28-37. January 4, 2017. doi:10.1038/nclimate3179.
- Rabary Lova. "Madagascar Vanilla Producers Say Cyclone Damaged 30 Percent of Crop." Reuters. March 14, 2017. Accessed March 18, 2018. <https://www.reuters.com/article/us-madagascar-cyclone/madagascar-vanilla-producers-say-cyclone-damaged-30-percent-of-crop-idUSKBN16L26X>.

Smith, Adam B. "2017 U.S. Billion-dollar Weather and Climate Disasters: A Historic Year in Context." NOAA Climate.gov. January 08, 2018. Accessed April 14, 2018.  
<https://www.climate.gov/news-features/blogs/beyond-data/2017-us-billion-dollar-weather-and-climate-disasters-historic-year>.

Supply Chain Risk Leadership Council. *Supply Chain Risk Management: A Compilation of Best Practices*, 12-18. August 2011. Accessed March 1, 2018,  
[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)

Terpstra, Pieter, and Abigail Ofstedahl. "A Business Case for Building Climate Resilience." World Resources Institute. December 23, 2013. Accessed March 18, 2018.  
<http://www.wri.org/blog/2013/12/business-case-building-climate-resilience>.

Turner, Martha. "Be prepared to bounce back: Building a resilient supply chain." Booz & Company. 2011. Accessed March 6, 2018,  
[http://www.strategyand.pwc.com/media/file/Strategyand\\_Be-prepared-to-bounce-back.pdf](http://www.strategyand.pwc.com/media/file/Strategyand_Be-prepared-to-bounce-back.pdf).

World Economic Forum. "The Global Risks Report 2017." 2017. Accessed April 14, 2018.  
<http://reports.weforum.org/global-risks-2017/>.

# Appendices

## Appendix A: Interview Guide

### 1. Corporate Policy, Structure, and Culture Regarding Climate Change

- a. Are you incorporating climate change information in your procurement or risk management decisions?
  - i. If so, how has this strategy evolved over time?
- b. Who is responsible for creating your current corporate policies addressing climate change and how frequently are they updated?
- c. What motivates your organization to address climate change?
- d. Are there external impediments on your company for thinking about climate change? (Such as policy, information deficits, etc.)
- e. Which other company departments do you work with on climate change issues?
- f. Does the company consider climate adaptation in addition to climate mitigation?

### 2. Supply Chain Risk Perception

- a. What do you perceive to be the greatest climate-related risks to your supply chain and sourcing activities both now and in the future?
- b. Which geographic areas and crops or commodities do you perceive most at risk?

### 3. Supply Chain Risk Response

- a. In the past 10 years, what climate-related incidents have occurred that have disrupted or negatively impacted your supply chain?
  - i. What were the business consequences of those events/disruptions?
  - ii. In retrospect, what could the company have done to mitigate the impacts of the event and/or negative consequences?
- b. What measures does the company currently have in place to manage potential climate risks?
- c. What would the company need to take further decisive action on climate change?
- d. What other partners or organizations are you working with on these issues?
- e. How could a partner like WWF help your company in managing climate risk?

### 4. Climate Resilience

- a. What is your understanding of the term “climate resilience”?

## Appendix B: Framework for Analysis

### Corporate Responses to Climate Change

- 1) *Information and Technical Knowledge*
  - a. Do companies understand potential impacts of climate change?
  - b. Where do companies get their information and influence regarding climate change? i.e. cross-sector partnerships, resources, science-based targets, etc.
- 2) *Capacity for Action*
  - a. Do companies have capability and expertise to address climate change risk? i.e. resources, influence within sustainability and sourcing teams, interactions among organization, etc.
- 3) *Company Structure*
  - a. Do employees responsible for addressing climate change risk have appropriate capacity to act within their company?
  - b. How is climate risk addressed within corporate structures and teams?
- 4) *Corporate Culture*
  - a. Do companies prioritize or support actions to address climate change risk?
  - b. How is sustainability integrated in strategic priorities?
  - c. Does the company have public or private policies, statements and reporting around sustainability goals?

### Motivations and Barriers to Climate Action

- 1) *Social Pressures*
  - a. Are companies taking climate action in response to social and media pressure?
  - b. Are corporations seeking simply to “do the right thing”?
- 2) *Political Pressures*
  - a. Do governmental policies force action to address climate risk?
- 3) *Economic/Financial Pressures*
  - a. Do economic incentives drive companies to take climate action?
  - b. Do companies take action to reduce financial risk?



## Appendix C: Interview Quotes on Climate Resilience

*“Climate change is here, and we need to figure out how to persevere and thrive given all these changes and knowing that there will be dark days. Resiliency is figuring out how to bounce back effectively and quickly when there are disruptions.” – Sustainability Manager, Large Retailer*

*“As a country, we are not resilient. We are not prepared for what is inevitably coming our way, so resilience to me is creating a plan to address things that are coming our way, unless we drastically change our behavior. [It’s] talking about coffee-growing regions and the ability to overcome challenges and bounce back and thrive in a climate-stressed future. And to navigate and predict - maybe predict isn’t the right word - but to anticipate what’s coming based on what the data says and trying to get out ahead of it.” – CSR Manager, Coffee Company*

*“[Resilience is] the creation of strategies or assets that would enable a business to operate within a very narrow range of confidence of future results, regardless of climate eventuality [or] climate scenarios.” – Sustainability Manager, Agribusiness and Food Company*

*“Climate resilience is being able to - let’s say, for a farmer - continue to be able to farm with the quality and the yield in the face of a changing climate and with climate pressures. I think for our facilities, it would be being able to make the food we make at the quality and food safety and efficiency levels that we need given the climate pressures that our facilities, our supply chains, and our distribution networks are facing in the future.” – Sustainability Manager, Food Company*

*“A [resilient] system can absorb or function with minimal disruption in the face of physical and social changes that will happen as a result of climate change. From a physical perspective, infrastructure is in place to deal with flooding or more hurricanes or stronger thunderstorms or less frequent but more voluminous thunderstorms/rainstorms.” – Sustainability Manager, Large Retailer*

*“[Resilience is] the capacity of a food system... to absorb a shock and continue performing after the shock under the influence of climate basis.” – Sustainability Manager, Food and Beverage Company*

*“[Resilience is] building in enough significant robustness in our overall climate practice, and things that could impact the climate, to the extent that when you have natural disasters, they don’t really change the environment significantly.” – Sustainability Manager, Agribusiness Company*

*“I think of [resilience] as flexibility and [the ability to] respond to the situation that is happening. I think there’s an element of strength, that [the system] can withstand [disturbances] and is not going to come and go. It’s going to be there in a more permanent way.” – Climate Policy Manager, Financial Institution*

## **Appendix D: Components of Effective Supply Chain Risk Management**

(Source: *Supply Chain Risk Management: A Compilation of Best Practices*, Supply Chain Risk Leadership Council)

1. Leadership
  - 1A. Executive Leadership
  - 1B. Line/Functional Leadership
  - 1C. Governance
  - 1D. Resources & Commitment
  - 1E. Program Communication
2. Planning
  - 2A. Supply Chain Mapping
  - 2B. Context and Operating Environment
  - 2C. Stakeholder Identification
  - 2D. Risk Tolerance
  - 2E. Risk Categories
  - 2F. Business Impact
  - 2G. Event Likelihood and Consequence
  - 2H. Risk Prioritization
  - 2I. Risk Treatment
  - 2J. Stakeholder Consultation
3. Implementation
  - 3A. Risk Monitoring
  - 3B. Risk Treatment
  - 3C. Event Communication
4. Evaluation
  - 4A. Program Metrics
  - 4B. Performance Review
  - 4C. Audit / Drill / Test
5. Improvement
  - 5A. Continuous Program Improvement
  - 5B. Change Management