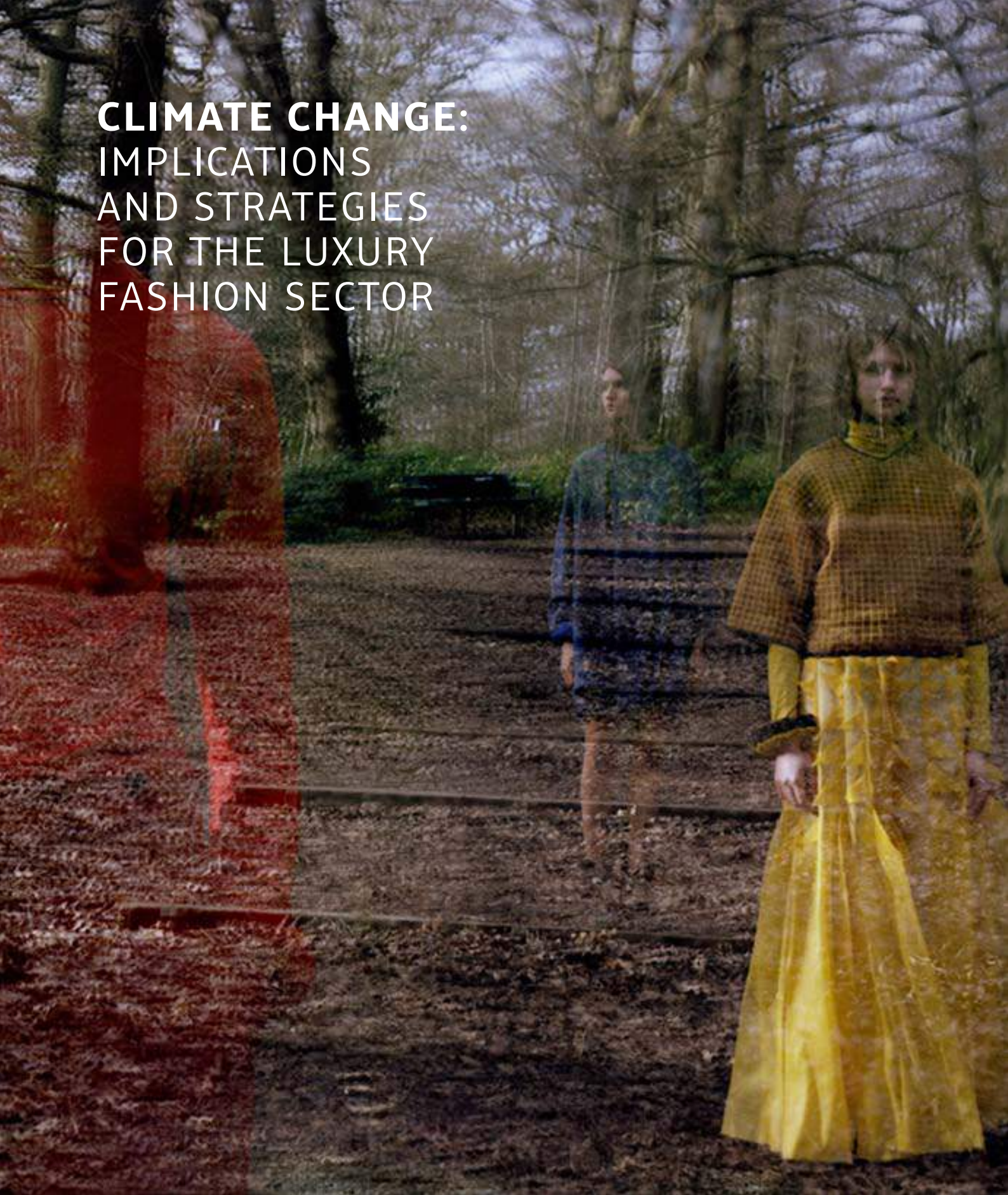


CLIMATE CHANGE: IMPLICATIONS AND STRATEGIES FOR THE LUXURY FASHION SECTOR



CONTENTS

FOREWORD	page 03
ABOUT THIS REPORT	page 04
EXECUTIVE SUMMARY	page 07
INTRODUCTION	page 11
CLIMATE CHANGE RISKS FOR LUXURY FASHION	page 13
THE RAW MATERIAL IMPERATIVE: UNDERSTANDING CLIMATE’S IMPACTS	page 18
THE WAY FORWARD: A RESILIENCE AGENDA FOR LUXURY FASHION	page 29
CONCLUSION	page 41
RAW MATERIAL HOTSPOT MAPS	page 43
GLOSSARY	page 55
REFERENCES	page 57

FOREWORD

AS A SOCIETY, WE ARE
FACING ENORMOUS
CHALLENGES FROM THE
INEVITABLE IMPACT OF
CLIMATE CHANGE.

To mitigate this impact and adapt to these changes, there are important contributions that we can make as individuals, in civil society, and in the public and private sectors. The business community has a particular responsibility to act. I am pleased that there are some excellent opportunities to align around specific initiatives through the upcoming COP21 in Paris and the newly launched framework of the Global Sustainable Development Goals. Beyond doubt, business can and has to drive change. We can replace the outdated ‘compete and consume’ business models with ones that are ‘collaborative and regenerative’ and that build resilience across our supply chains.

The first step in making this change is to identify climate priorities across the business. Companies need to map and understand their complex supply chains and measure their impact. This will reveal both risks and opportunities, and will enable prioritization of actions and monitoring. According to the Carbon Disclosure Project (CDP), around 50 percent of an average corporation’s carbon emissions come from the supply chain. At Kering, our own Environmental Profit and Loss (E P&L) account has shown us that the majority (67 percent) of our carbon emissions occur in raw material production and its initial processing stages. Clearly this is the area in a business’ activities on which to focus significant attention and action. With this in mind, our ‘Climate Change: implications and strategies for the luxury fashion sector’ report aims to shine a light on the risks and opportunities of climate change in the provision of key strategic raw materials for the luxury fashion sector.

Fashion companies rely on agricultural production for their raw materials. This is where climate change will have significant consequences through temperature changes, water scarcity, and impact from catastrophic climatic events, such as cyclones and droughts. Luxury fashion has additional vulnerabilities because raw material quality is critical to create outstanding products and because some of these materials derive from nature-based systems and ecological processes that can be easily disrupted by climate change. As such, our report focuses on six key raw materials frequently used by the luxury fashion sector and highlights

geographic and thematic priorities, giving background as to why particular materials are more or less vulnerable to climate change. Additionally, the report highlights how to build resilience in our supply chains through enhanced efficiency and innovative approaches for raw material production. It outlines some of the key actions and solutions that are already available for businesses, including working with primary producers to develop agricultural systems that incorporate reduced emissions and dependency on water and that offer diversity of livelihood options.

Through this in-depth climate change analysis, we can see that the impact of climate change is already locally pronounced on the production of some raw materials and that climate change trends show an increase in such risks. Undoubtedly, without an active strategy, it would also lead to an impact on the bottom line. In addition, it is clear that the broader social consequences of disruption on raw material production will be significant, particularly as rural communities, which are already fragile, are a large producer of raw materials.

For Kering, the analysis of climate change risk summarized in our report is essential to help us develop appropriate, innovative, and robust business approaches and actions to respond to climate change. Our report is also significant as it is the first time there has been a specific focus on the luxury fashion sector, which aims to offer our customers the most desirable products, and its vulnerabilities to climate change. It provides an opportunity for large multinational businesses like Kering, where the supply chain is critical, to develop climate resilience both through emissions reduction and adaptive approaches. This guidance will help reduce risk, ultimately providing us with important business advantages now and into the future. We hope that our report can be a catalyst for other companies in luxury fashion, and the apparel sector more broadly, to build their own roadmaps to climate change resilience. For businesses today, implementing an ambitious climate strategy is non-negotiable in order to remain successful in our rapidly changing world.

Marie-Claire Daveu

Chief Sustainability Officer and Head
of international institutional affairs,
KERING

ABOUT THIS REPORT

IN THIS REPORT, BSR AND LUXURY GOODS LEADER KERING HIGHLIGHT SOME OF THE KEY RISKS AND OPPORTUNITIES POSED BY CLIMATE CHANGE FOR THE LUXURY FASHION SECTOR.

The report provides an overview of climate change risks across the value chain and demonstrates the importance of addressing raw materials in any robust and ambitious climate strategy.

The report builds on information and analyses from several sources:

- BSR's climate strategy outlined in the publication, *'Business in a Climate Constrained World: Creating an Action Agenda for Private-Sector Leadership on Climate Change'*¹ (to be referred to as the 'BSR Climate Framework'), which seeks to catalyze private sector action in response to climate change. In this report, the BSR Climate Framework is specifically adapted to the luxury sector and is used in the interpretation of climate risk mapping.
- Raw materials and climate-mapping data in this report are based on an in-depth analysis commissioned by Kering and carried out by Verisk Maplecroft² in August 2015 (the 'Kering-Maplecroft report'). This analysis focuses on six raw materials that are central to the luxury fashion sector—cotton, beef leather, sheep and lamb leather, vicuña, cashmere, and silk. It evaluates the consequences of climate change on primary production and initial processing locations.

- The Environmental Profit & Loss Account (the 'E P&L')³ is a natural capital accounting methodology pioneered by Kering and used to quantify the company's environmental impact in terms of greenhouse gas (GHG) emissions and air pollution, water use and pollution, and waste and land use change. It enables the company to identify risks and vulnerabilities (including around climate change) across its vast global supply chains and to prioritize its actions. It is a model of how companies can account for their impact and dependency on natural capital.
- A detailed literature review that was conducted to verify hypotheses and identify concrete cases to help illustrate climate change risks for companies.

The intended audience for this report includes luxury industry executives, including C-suite business leaders as well as individuals in functions such as sourcing, product design, merchandising, marketing, sustainability, and philanthropy. The report is also intended for other industry stakeholders involved in evaluating climate change risk and building adaptive business strategies.

BSR and Kering intend that, as an outcome of this report, luxury fashion companies will be armed with increased awareness of the consequences of climate change for their businesses and will consider taking appropriate action across their supply chains to build new and more resilient approaches. In particular, it is hoped that there will be an increased focus on raw material production where climate change will have a significant impact on agricultural and natural ecosystems as well as on the communities that depend directly on these production systems for their well being and livelihoods.

1 Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

2 Verisk Maplecroft is a consultancy that helps organisations optimise and strengthen their risk management processes and supply chains by providing a full spectrum solution that blends an unparalleled portfolio of global risk analytics with world-leading analysis, real-time locational monitoring, and innovative risk calculator technology. Please see maplecroft.com for more information.

3 For more information on the E P&L methodology, see kering.com.

ABOUT BSR

BSR is a global nonprofit that works with its network of more than 250 member companies to build a just and sustainable world. BSR develops sustainable business strategies and solutions through consulting, research, and cross-sector collaboration. BSR's climate strategy is to mobilize its business network, global reach, industry insights, and issue expertise in support of sustained business action on climate change through translation of climate risks, stabilization of emissions, and collaboration to increase adaptive capacity.

ABOUT KERING

A world leader in apparel and accessories, Kering develops an ensemble of powerful Luxury and Sport & Lifestyle brands: Gucci, Bottega Veneta, Saint Laurent, Alexander McQueen, Balenciaga, Brioni, Christopher Kane, McQ, Stella McCartney, Tomas Maier, Sergio Rossi, Boucheron, Dodo, Girard-Perregaux, JeanRichard, Pomellato, Qeelin, Ulysse Nardin, PUMA, Volcom, Cobra and Electric. By 'empowering imagination' in the fullest sense, Kering encourages its brands to reach their potential, in the most sustainable manner. Present in more than 120 countries, the Group generated revenues of €10 billion in 2014 and had more than 37,000 employees at year end. The Kering (previously PPR) share is listed on Euronext Paris (FR 0000121485, KER.PA, KER.FP).

ABOUT THE AUTHORS

This report was written by BSR experts Elisa Niemtzwow, Dr. Emilie Prattico, Tara Norton, and Bryndis Woods and Kering experts Dr. Helen Crowley and Christine Driscoll Goulay. Any errors that remain are those of the authors. Please direct comments or questions to BSR's Elisa Niemtzwow at eniemtzow@bsr.org or Kering's Helen Crowley at Helen.crowley@kering.com.

ACKNOWLEDGEMENTS

The authors wish to thank the following people for their peer review and feedback: Ben Packard, Beth Richmond, Edward Cameron, Eric Olson, Dr. Gemma Cranston, Dr. James Allan, Jean Jouzel, Jean Roger-Estrade, the Nicolas Hulot Foundation, Dr. Richard Hewston, and Dr. Sissel Waage.

Photo credits: © Craft of Use by Kerry Dean, London College of Fashion, and Shutterstock imagery

DISCLAIMER

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

SUGGESTED CITATION

Crowley, H; Driscoll Goulay, C; Niemtzwow, E.; Norton, T.; Prattico, E; and Woods, B. 2015. 'Climate Change: Implications and Strategies for the Luxury Fashion Sector.' BSR Working Paper in collaboration with Kering. BSR, San Francisco.

Published November 2015

EXECUTIVE SUMMARY

LUXURY FASHION BRANDS,
LIKE MANY OTHER COMPANIES
WITH GLOBAL FOOTPRINTS,
FACE THE RISK OF BUSINESS
DISRUPTIONS AND
INCREASING COSTS DUE
TO CLIMATE CHANGE.

Across their value chains—from their supply chains to manufacturing sites and from distribution centers to retail locations—the impact of climate change is already being felt and will likely continue to worsen. Some of these impacts are common to other global businesses, such as potential transport and delivery disruption, resource scarcity, and challenges of social change. However, the luxury sector is particularly sensitive to climate change because it relies on high-quality raw materials and materials that come from natural and agricultural systems that are limited

geographically and can be particularly vulnerable to climate variations. It is clear that the fundamental value proposition of luxury fashion brands—that includes rare, high-quality materials—is at risk in the face of climate change.

While the report outlines the climate risks facing global luxury fashion companies, it also focuses on the impact of climate change at the very base of the supply chain where raw materials are produced and where the impact will be significant on the natural and agricultural systems that deliver these materials. Current and future climate risks around six key raw materials—cashmere, cotton, beef and calf leather, sheep and lamb leather, vicuña, and silk—are reviewed and presented. Detailed analysis shows that climate change is already having obvious effects on these materials and that this impact is likely to increase over time.

‘Luxury fashion brands,’ as referred to in this report, include high-end, ‘soft’ apparel and accessories brands (as opposed to ‘hard’ luxury, such as watches and jewellery), which are defined by products of exceptional quality and by the leadership position and influence in society these brands hold.*

⁴ For more information, see Pinkhasov and Nair, 2014.

CLIMATE CHANGE RISKS FOR LUXURY FASHION

Luxury fashion companies face five main types of risk due to the impact of climate change: input, physical, market, stakeholder, and regulatory.⁵ In light of these risks and the fact that the importance of different risks will vary over time and over geographies, it is imperative that companies take a deep look at their supply chains and operations to understand where they are exposed to risk from the direct and indirect impact of climate change. Natural capital accounting methodologies, such as Kering's E P&L, represent one way of measuring the impact and exposure.

THE RAW MATERIAL IMPERATIVE: UNDERSTANDING CLIMATE'S IMPACT

According to the CDP, more than 50 percent of an average corporation's carbon emissions typically are from its supply chain.⁶ The Kering E P&L also shows clearly that much of the carbon emissions and overall nearly three-quarters of the company's environmental impact is, in fact, at the base of the supply chain. Within global supply chains, it is at raw material production, extraction, and initial processing that businesses such as Kering interface with agricultural and natural systems. And it is here that significant risks and opportunities need to be addressed.

For the luxury fashion sector, raw material quality is paramount. This presents a special vulnerability for companies when a changing climate can impact quality

as well as the availability of these materials. The E P&L provided the first insights into supply chain risk for Kering.

Kering followed up on this by commissioning a more detailed report from Verisk Maplecroft into the climate change risk and vulnerabilities of six key raw materials (the 'Kering-Maplecroft' report). The highlights of this analysis are presented in this report. The research by Verisk Maplecroft focused on regions of the world where the raw materials (particularly high-quality varieties) are produced, and it evaluates the impact of climate change on these regions over the next 50 years and beyond.

Regions that are likely to be significantly affected by climate change are identified as 'hotspots.' Identified hotspots can be consulted for each raw material, as projected for the time period 2036-2060, in Figures 2-6.

The Kering-Maplecroft study provides three important findings for the luxury fashion industry relating to raw materials:

- Climate change is already driving a reduced availability of luxury fashion's raw materials, and will continue to do so.
- The impact of climate change will likely escalate over time and will lead to a reduction in raw material quality that will drive significant business risks for the luxury sector.
- The consequences of climate change will also be evident in negative effects on small-scale producers relying on raw material production for their livelihoods.

Each raw material evaluated in the Kering-Maplecroft report has its own characteristic vulnerability to climate change (see Table 1). However, extra fine cotton, vicuña, and cashmere face particularly significant risks because of the limited geographic scope of their production regions and their dependence on natural systems.

⁵ For more information on climate risks to business, see Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

⁶ A.T. Kearney, 2011.

THE WAY FORWARD: A RESILIENCE AGENDA FOR LUXURY FASHION

It is imperative that companies develop a strategic approach to tackling the challenges posed by climate change risks to their business and across their supply chains. Key to this will be outlining a clear agenda to build resilient supply chains focusing on the prioritization of actions and mechanisms for monitoring impacts. Background and guidance for the development of a resilience agenda can be found in two recent BSR reports.⁷ The context for the agenda is the 'resilience wedge' approach, which outlines a suite of broad actions for the private and public sector designed to meet the ambition of keeping global warming within the 2°C limit—an essential threshold to stave off the worst of climate change's consequences for both natural and social systems.⁸ The agenda covers the dual aspects of resilience—mitigation and adaptation—by addressing GHG emission reduction efforts, as well as adaptive capacity-building measures. These measures are actions that companies can take to adjust their practices in their own operations, or in their value chains, to proactively manage risks and seize opportunities associated with climate change.⁹

In brief, there are three critical actions luxury fashion companies can take to build resilience and manage climate change risks:

1) Invest in targeted raw material resilience

This involves a three-step process for companies: **1)** first, identify raw material priorities by mapping supply chains against climate change risks; **2)** then take action and set targets with supply chain partners and other stakeholders; and **3)** finally, monitor impact.

2) Prepare your operations for a low-emissions future

Luxury fashion brands can swiftly contribute to the new low-emissions economy by reducing their own GHG emissions and by implementing measures at key points in their value chains that facilitate adaptation. In addition to a focus around raw material production and processing, key areas for attention can include: **1)** product design and manufacturing; **2)** more effective energy and fuel management in manufacturing facilities, offices, stores, and logistics; **3)** working on the efficient siting of facilities and stores; and **4)** investing in and procuring from suppliers that are climate resilient.

3) Make climate action irresistible

Luxury fashion brands can harness their leadership position as 'influencers' to build awareness of and excitement around a climate-smart world. Luxury brands can catalyze action on climate change through their clients, as well as more broadly in the public sphere.

⁷ Cameron, E., Erickson, C., Prattico, E. & Schuchard, R., 2015, and Norton, T.; Ryan, M.; and Wang F., 2015.

⁸ For more information on the 2°C limit, please see Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

⁹ For more information on resilience and adaptive capacity, please see Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

INTRODUCTION

AS THE REALITY OF CLIMATE CHANGE SETS IN, ALL BUSINESSES, INCLUDING LUXURY FASHION BRANDS, MUST NOW CONSIDER HOW TO OPERATE IN A RAPIDLY CHANGING AND VOLATILE WORLD.

The leading body for the assessment of climate change, the Intergovernmental Panel on Climate Change (IPCC)—to which thousands of experts contribute voluntarily—reports that the observed impact of climate change is already widespread and consequential.¹⁰ Climate change has led to devastating impacts from storm damage, food insecurity through crop failure, growing water scarcity, and increased risks to human health and productivity.¹¹

For business, these effects translate into tangible costs as evidenced by the \$67 billion dollars of damage due to Hurricane Sandy¹² in 2012 and the \$32.5 billion of damage and losses to the manufacturing sector in Thailand following severe flooding in 2011.¹³ Like many other consumer goods companies with global footprints, luxury fashion brands face risks in their supply chains, distribution centers, retail locations, and consumer base due to climate change.¹⁴ This report aims to help luxury fashion brands focus on and understand some of these risks and to give some preliminary guidance on ways of responding to these risks.

What is meant by ‘luxury fashion’? In this report, the focus is on high-end ‘soft’ apparel and accessories brands (as opposed to ‘hard’ luxury that includes watches and jewellery). Luxury fashion is defined by products of exceptional quality and by the brands’ influence in society.¹⁵ At the heart of luxury fashion lies a considered and refined product. Luxury brands rely on high-quality and precious raw materials and highly skilled people to create exceptional products. The value of luxury brands is driven by their ability to connect with their clients’ dreams and aspirations, while setting trends and creating ideals. Many luxury clients are also influencers themselves, offering the sector a distinct and visible position in society.

To protect the quality and availability of their product offerings, luxury fashion brands must now consider actions to build resilience in their businesses in the face of climate change threats. BSR’s Climate Framework defines building ‘resilience’ as: 1) implementing a series of measures that allows a company to reduce the full suite of GHGs and other pollutants that cause climate change, while 2) building adaptive capacity in the face of inevitable climate impacts.¹⁶

A truly resilient global business builds ‘adaptive capacity’ by looking to avoid unmanageable climate change (for example, by reducing emissions across its value chain and investing in REDD+ projects) and by trying to manage unavoidable climate change (for example, by investing in green infrastructure, building climate-proof facilities, focusing on the climate resilient production of raw materials, and working with local communities in their value chains). This report highlights some of the climate change risks luxury fashion companies are facing and outlines some approaches to adapt to these risks by building resilience into value chains. Through its own commitment, the luxury fashion sector can then also leverage its leadership position to catalyze broader positive climate action.

The report has the following structure:

- First, it gives an overview of the most important climate-related business risks facing luxury fashion across its value chain.
- Second, it focuses on an area in the supply chain where risks from climate change are arguably the greatest for luxury fashion—risk to raw materials—by reviewing results from the Kering-Maplecroft study, which evaluates the climate change risks associated with the production of cotton, cashmere, vicuña, beef leather, sheep and lamb leather and silk.
- Third, it proposes a ‘resilience agenda’ for luxury fashion that includes individual, company, and collaborative actions to reduce climate risks and strengthen capacity to adapt to climate challenges, especially in raw material sourcing where the sector is so vulnerable.

¹⁰ IPCC, 2014.

¹¹ Ibid; Bloomberg, Paulson and Steyer, 2014.

¹² NOAA, 2014.

¹³ World Bank, Government of Thailand and GFDDR, 2012.

¹⁴ Wong and Schuchard, 2011.

¹⁵ For more information, see Pinkhasov and Nair, 2014.

¹⁶ Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

CLIMATE CHANGE RISKS FOR LUXURY FASHION

THE IMPACT OF CLIMATE CHANGE IS LIKELY TO BE 'SEVERE, PERVASIVE, AND IRREVERSIBLE' AS A RESULT OF INCREASED, UNPRECEDENTED GHG CONCENTRATIONS IN THE ATMOSPHERE,¹⁷

according to the IPCC 5th Assessment Report (AR5), the repository of the most reliable scientific knowledge on climate change under the auspices of the United Nations.

This rapidly changing climate can affect business in a variety of ways:¹⁸

- **Climate-related hazards**, such as an increase in the intensity and frequency of extreme weather events like hurricanes and droughts and changes in precipitation patterns affecting the availability of water;¹⁹ and
- **The vulnerability and exposure of natural systems and human livelihoods** to climate change, including the loss and degradation of biodiversity and ecosystem services (such as water filtration, soil replenishment, crop pollination) as well as related social consequences (such as loss of livelihoods).

The result of these impacts of climate change is a series of risks to business:²⁰ (See overleaf)

¹⁷ IPCC, 2007.

¹⁸ Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

¹⁹ IPCC, 2007.

²⁰ For more information, see Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

1

INPUT RISKS

- **Definition:** Risk to the availability, quality, and cost of raw materials and inputs that are used for a company's products.
- **Example:** This report goes into detail about 'input risk' linked with raw materials themselves in the next section. However, it is also important to think about the 'indirect inputs' that go into the production of raw materials, processing, and manufacturing. Water, for example, is such an input, and climate change will affect water availability. Cotton, leather, textile manufacturing, and garment production all rely heavily on water. For manufacturing, supplier factories located in water-stressed regions will face increased competition and regulatory requirements for water.

2

PHYSICAL RISKS

- **Definition:** Risk to the security of and access to a company's own operations and assets.
- **Example:** Extreme weather events resulting from climate change can impede manufacturing operations and disrupt and delay the transportation of raw materials and finished products. Extreme weather can also affect the livelihood and mobility of people, which could increase workforce instability in operations and supply chains and impinge on consumers' access to retail stores.²²

3

MARKET RISKS

- **Definition:** Risk that there will be changes in market demand created by climate change. This includes potential changes in demand for specific products as well as in the effectiveness of marketing messaging.
- **Example:** The way products are designed and conceived will need to change. For example, it may become increasingly relevant to consider products that work well with less distinct seasonal changes and warmer temperatures. Also in terms of marketing, as climate change creates more and more impacts, brands may want to express their commitment to mitigating climate change in different ways. The new client segments that are driving luxury brand growth are Millennials and 'Aspirationals.' 'Aspirationals' represent 51 percent of consumers in China, love shopping (93 percent), and want to do so responsibly (95 percent).²³ Brands that ignore this new consciousness risk maintaining an outdated positioning.

²¹ FAO, 2015; Cotton Incorporated, 2015.

²² Mellery-Pratt, 2014.

²³ Baranowski and Miller, 2014.

²⁴ Divestment is the opposite of investment; the removal of investment capital from stocks, bonds, or funds. The global movement for fossil fuel divestment asks institutions to move their money out of oil, coal, and gas companies for both moral and financial reasons. For more information, see Howard, 2015.

²⁵ The Dow Jones Sustainability Indices were launched in 1999 as the first global sustainability benchmarks. The indices are offered cooperatively by RobecoSAM and S&P Dow Jones Indices. The family tracks the stock performance of the world's leading companies in terms of economic, environmental, and social criteria. The indices serve as benchmarks for investors who integrate sustainability considerations into their portfolios, and provide an effective engagement platform for companies who want to adopt sustainable best practices. For more information, see sustainability-indices.com.

4

STAKEHOLDER RISKS

- **Definition:** Risk that comes from failing to deliver against expectations from stakeholders who care about the changing climate.
- **Example:** Just as luxury brands face evolving consumer needs and expectations, they also face the influence of other key stakeholders, such as civil society, employees, and investors, who increasingly have concerns about climate performance. For example, the divestment movement²⁴ has shown how many stakeholders are holding investment portfolio managers and companies accountable for climate impacts. Investors themselves, a key stakeholder for luxury, are increasingly including climate risk in their decision-making by taking into account metrics such as the Dow Jones Sustainability Index²⁵ and transparency on reporting climate risk.







5

REGULATORY RISKS

- **Definition:** Risk of changing regulations that result from a rising price on high carbon sources and the energy intensive activities that depend on them. These regulations, though they concern climate primarily, have an effect on the broader regulatory landscape too, including policies on air quality and on the protection of biodiversity, natural systems, and water.
- **Example:** In 2008, China strengthened regulation for the prevention and control of fresh water pollution and use of water resources via amendments to its 2002 'Water Law'. This law provides more stringent penalties for polluters; a wastewater discharge permit system; the option for citizens to bring class-action suits against polluters; improved water quality standards; increased transparency; and penalties for inadequate government enforcement. Consequently, companies that rely on water-intensive processes have had to adapt to a shifting regulatory framework—and they will have to continue doing so.

IN LIGHT OF ALL THESE RISKS AND THE FACT THAT THE IMPORTANCE OF DIFFERENT RISKS WILL VARY OVER TIME AND OVER GEOGRAPHIES, IT IS IMPERATIVE THAT COMPANIES TAKE A DEEP LOOK AT THEIR SUPPLY CHAINS AND OPERATIONS TO UNDERSTAND WHERE THEY ARE EXPOSED TO RISK FROM THE DIRECT AND INDIRECT EFFECTS OF CLIMATE CHANGE. NATURAL CAPITAL ACCOUNTING METHODOLOGIES, SUCH AS KERING'S E P&L, REPRESENT ONE WAY OF MEASURING SUCH IMPACTS AND EXPOSURE.

CASE STUDY: THE E P&L—A PROCESS FOR IDENTIFYING SPECIFIC RISKS

		TIER 0: OPERATIONS AND STORES	TIER 1: FINAL ASSEMBLY	TIER 2: PREPARATION OF SUBCOMPONENTS	TIER 3: RAW MATERIAL PROCESSING	TIER 4: RAW MATERIAL PRODUCTION
GREENHOUSE GAS EMISSIONS					UPSTREAM IN THE SUPPLY CHAIN	
WATER CONSUMPTION		ENVIRONMENTAL REPORTING				
WASTE						
WATER POLLUTION						
AIR POLLUTON		ADDITIONAL ENVIRONMENTAL IMPACTS				
LAND USE						

Kering’s Environmental Profit & Loss (E P&L) methodology²⁶ provides a system to identify environmental risks and opportunities for the company. By measuring environmental impact along all segments of the value chain, Kering brands are able to track their impact and dependency on the natural capital that either defines their products, such as raw materials, or enables production, such as energy systems, clean water, clean air, and efficient waste management systems. This enables the group to make better-informed decisions about how it interacts with and can better support natural capital.

KERING HAS ‘OPEN SOURCED’ THE E P&L METHODOLOGY SO OTHER COMPANIES CAN USE IT TO GAIN A MORE ACCURATE UNDERSTANDING OF THEIR OWN SPECIFIC DEPENDENCIES AND RISKS.

26 Kering, 2012.

THE RAW
MATERIAL
IMPERATIVE:
UNDERSTANDING
CLIMATE'S
IMPACTS

ACCORDING TO THE CDP²⁷, MORE THAN 50 PERCENT OF AN AVERAGE CORPORATION'S CARBON EMISSIONS TYPICALLY ARE FROM ITS SUPPLY CHAIN.

The E P&L that Kering pioneered illustrates this. Significantly, it also shows that much of the carbon emissions and nearly three-quarters of the environmental impact are, in fact, at the base of the supply chain where raw materials are produced and extracted. It is at that point in supply chains that businesses such as Kering interface with agricultural and natural systems and, as such, there are business risks that need to be addressed. For the luxury fashion sector, the quality of raw materials is paramount, and this creates an added vulnerability for companies because it is clear that climate change can impact quality in many ways.

In the Kering-Maplecroft study, Kering selected six key raw materials based on the following characteristics:

- 1) they are essential to luxury;
- 2) quality is critical; and
- 3) they are derived from different types of production systems across different regions.

While the production of sheep (for leather and wool) and the production of cashmere often rely on native grasslands in semi-arid areas, cotton, silk, and leather are produced often in more managed and modified agricultural systems. However, vicuña stands out as an example of a raw material derived from a native animal that is part of a natural ecosystem, which is very limited in area.

Each of the raw materials has its own vulnerabilities to climate change, but taken together, as a suite of materials, they highlight the range of climate change risks that Kering and other luxury brands face in their and other luxury brands raw material production across the world.

The research by Verisk Maplecroft focused on regions of the world where the raw materials (particularly high-quality varieties) are produced, and it evaluates the effects of climate change on these regions over the next 50 years and beyond. Regions that are likely to be significantly affected by climate change (for the time period 2036-2060) are identified as 'hotspots'. These hotspots for each raw material can be consulted as projected for the time period 2036-2060, in Figures 2-7.

To identify these hotspots, Maplecroft used a methodology that considers the effects of three variables on each raw material:

- **climate extremes** (changes in the frequency and/or intensity of extreme events);
- **climate variability** (changes in day-to-day or year-to-year variability); and
- **long-term shifts in climate** (long-term changes in average temperature and rainfall).

The resulting hotspot mapping (Figures 2-7) shows that there are few areas that are safe from current and impending climate change.

27 A.T. Kearney, 2011

KEY FINDINGS: DISRUPTIONS TO RAW MATERIAL AVAILABILITY, PRODUCER LIVELIHOODS, AND QUALITY

The Kering-Maplecroft study provides three important findings for the luxury fashion industry:

- Climate change is already driving a reduced availability of luxury fashion's raw materials, and will continue to do so.
- The impact of climate change will likely escalate over time and will lead to a reduction in raw material quality that will drive significant business risks for the luxury sector.
- The consequences of climate change will also be evident in negative impact on the small-scale producers relying on raw material production for their livelihoods.

Over the last several years, climate change has reduced cotton crop yield and quality, impaired vicuña survival and the livelihoods of the communities who depend on the sale of the fibres, and led to a decline in cashmere production in the high-quality producing regions of Mongolia, resulting in more difficult socio-economic conditions for the nomadic herders who raise the animals.

The Kering-Maplecroft study forecasts that the effects of climate change will likely escalate over time if resilience strategies are not adopted. This poses substantial risks to luxury fashion companies, especially in the case of some varieties of cotton, vicuña, and cashmere, as they are constrained to geographic areas with specific climatic requirements.

For the other raw materials in the study, the impact of climate change will vary widely according to the type of raw material (ie, cattle hide versus calf skin) or specific production location and quality of input (ie, available grazing pastures for cattle and sheep).

It is important to note that the Kering-Maplecroft analysis does not consider the inherent adaptive capacity of the raw material to climate change, nor any efforts undertaken by the production system to build resilience. For example, cattle are sensitive to high heat and humidity. However, countries such as the United States and Australia have a much greater technical and financial capacity to implement adaptation measures (such as climate controlled, indoor rearing) than countries such as India and Pakistan. Also, for grazing systems that produce sheep and cattle, there is a complex interaction between the grazing pressure and impact of climate change that will ultimately determine the limitations of the production system.

In addition, the analysis has not taken into consideration some of the significant but difficult to predict impacts of climate change that will also influence how and where land will be used such as commodity prices, movement of people and competition for land for different food, fibre and fuel.

These issues should be kept in mind when analyzing the likelihood of climate impact on raw material sourcing and designing resilient solutions.

28 Hewston, Allan, Dobson and Nichols, 2015.

VICUNA



The hair from the Vicuña is widely considered to be the most expensive animal fibre in the world. It is highly valued by the luxury fashion industry for its fineness, and it is primarily used to create soft and warm garments or blends for luxury fabrics.

Vicuña belong to the camel family and are only found in Chile, Peru, Bolivia, Ecuador, and Argentina, in the Puna eco-region of the Central Andes, at an elevation of 3,500 to 5,200 meters above sea level. This area is already at risk from climate change. In one illustration, the 2010 draught in Bolivia caused vicuña watering holes to reach dangerously low levels or dry up entirely.²⁹ Through impacts on productivity of Vicuña, climate change also increases the vulnerability of the communities who herd and shear the animals.

For example, Bolivia is the poorest country in Latin America where 65 percent of the population lives below the poverty line and two-thirds of the population work as subsistence farmers, miners, and traders. Bolivian vicuña herders are dependent on the animal as an income source. Most Bolivians have a low capacity to adapt to changing conditions brought

on by climate change because they do not have access to adequate social, financial, technological and government resources that are needed to mobilize and build resilience.³⁰

Maplecroft's analysis finds that the entire vicuña territory is a regional climate change risk hotspot (see Fig. 2). Peru is the most at risk in the period 2036-2060, and this region is already susceptible to water shortages that pose challenges to vicuña survival.³¹

It appears that maintaining a supply of high quality vicuña fibres will require coordinated and focused effort.³²

²⁹ Eldiario, 2015 as cited in Hewston, Allan, Dobson and Nichols. 2015.

³⁰ Bachofen and Cameron, 2009.

³¹ Flores, 2012, as cited in Hewston, Allan, Dobson and Nichols. 2015.

³² Such efforts have precedence. For example, in 1994, a consortium of luxury brands, Loro Piana, Emegildo Zegna, and Incalpaca of Peru established a programme with local governments and communities to reinforce the export of vicuña textiles and products. See Hewston, Allan, Dobson and Nichols. 2015.

COTTON



One of the world's most widely produced crops, cultivated in over 80 countries, cotton is ubiquitous in fashion because it is a versatile, comfortable, and breathable textile. Luxury fashion brands often prefer extra-long staple (ELS) cotton varieties—like Egyptian and Pima cotton—for many products because of the long, fine fibres which enable the production of smoother, finer, and long-lasting fabric.

The factors that determine cotton's ideal growing conditions include temperature, soil moisture, precipitation, and sunshine. Water availability (quantity and timing) is critical and differs according to whether the cotton is rain-fed or irrigated. Cotton yields can be reduced by drought and scarcity of water for irrigation as well as by other climate extremes. This has been illustrated in several recent examples: in Australia, 2014 droughts resulted in the reduction of the country's cotton production estimates by as much as 35 percent; in California, an important producer of high-end pima cotton, 2015 production is predicted to be down by 26 percent compared with last year due to water shortage; and a 2013 drought in Texas saw cotton yields reduced by 18 percent.³³

Because of its plant structure, cotton displays a degree of inherent resilience to varying climates. However, it is often grown in countries that are exposed to risks associated with elevated and variable temperature and water availability. According to the Kering-Maplecroft analysis, African and South American countries exhibit the highest exposures (see Fig. 3), and Somalia and Peru display extreme risks. In addition, temperature increases may be detrimental to yields in countries where cotton production is already occurring at the upper range of growing temperatures, such as in India and Pakistan. Overall, the effects of climate change on cotton production are likely to be highly complex and specific to particular regions.

³³ Packham, 2014; Daniels, 2015; Fuchs, 2013.

CASHMERE



Cashmere is the hair from the fine winter undercoat grown by certain breeds of goat. Premium quality cashmere favored by luxury fashion consists of the longest, thinnest, whitest fibres collected from the neck region of the animal. This soft, warm, and strong fibre is in high demand by luxury brands and fashion brands for many products.

The production of cashmere is highly dependent on ambient temperature for the growth of goats' winter coats, water availability, and the extreme winter conditions of the typically elevated production locations. The majority of cashmere is produced in Central Asia (Mongolia and China), where climate variables indicate conditions will become more challenging. In particular, increased temperature leads to reduced quality of cashmere fibre.³⁴

The combination of changing climatic and ecosystem conditions have already led to declines in premium-quality cashmere fibre availability through the degradation of native grasslands upon which the goats' depend, increasing water scarcity, and extreme winter storms. For example, in 2010, more than 9 million livestock animals perished in Mongolia,

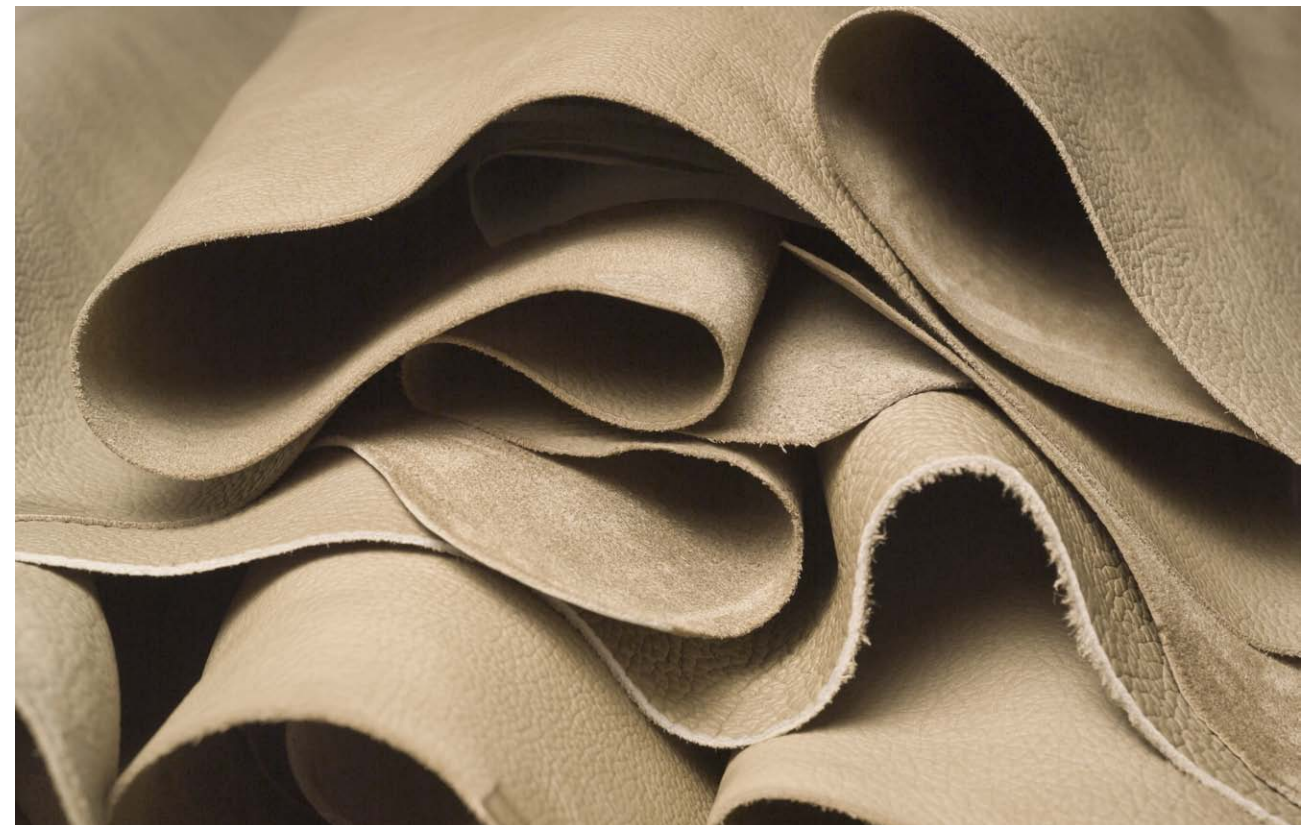
the majority of which were cashmere goats, due to the convergence of a drought the preceding summer, which led to a reduction in available forage, and a particularly harsh winter. Importantly, breeding and raising livestock such as cashmere goats employs nearly 50 percent of Mongolians, and nearly one-third of the country lives below the poverty line. In an effort to buffer the effects of climate change and price volatility, many Mongolian producers have increased the size of their flocks. However, this can lead to overgrazing which, in turn, contributes to land degradation and desertification, and increases the pressure on ever scarcer land and water resources.³⁵

(see Fig. 4)

³⁴ Hewston, Allan, Dobson and Nichols, 2015.

³⁵ Bachofen and Cameron.

BEEF LEATHER



Cattle hides and skins are the most common source of leather, and calfskin is generally preferred in luxury fashion due to its softness, suppleness, and fine texture. Cow and calf leather may be used in a variety of luxury products, including coats, gloves, shoes, wallets, and bags.

While cattle are raised in many countries around the world (*e.g. China, Brazil, and the United States*), Europe dominates the international import and export trade of calfskin, though trade patterns are shifting with an increase in activity in Turkey³⁶ and a decrease in Italy³⁷. The Kering-Maplecroft study finds that calfskin is less likely to be directly affected by climate change than products derived from cattle reared outdoors because calves are generally reared indoors. However, cattle production in general is at risk from increasing water scarcity, degradation of pasture and livestock feed, and increasing heat stress for the animals.

The analysis in the Kering-Maplecroft study shows that the number of bovine heat stress days will increase in many sourcing countries, leaving herds vulnerable, with consequences for the dairy, meat, and hide production industries. Brazil demonstrates particularly high exposure to climate threats, but hotspots are also predicted in Russia, Mexico, South Korea, and China (see Fig. 5).

³⁶ Istanbul Leather and Leather Products Exporters' Association, 2012, as cited in Hewston, Allan, Dobson and Nichols, 2015.

³⁷ FAO, 2015, as cited in Hewston, Allan, Dobson and Nichols, 2015.

SHEEP AND LAMB LEATHER



Sheep leather is produced from sheepskin or lambskin and is valued by luxury fashion for its softness and stretchability—and it is thinner than beef leather. The highest quality sheep leather comes from ‘hair sheep’ breeds as opposed to wool sheep. It is lightweight, warm, and delicate, and it is typically used in the production of luxury products such as garments, footwear, and bags.

Sheep leather comes from all over the world, with China a key producing country. Developing countries in Asia account for a large portion of global production, with India, Spain, Turkey, and Italy cited as major producers of sheep and goat leather.³⁸ Maplecroft finds that sheep are generally a versatile form of livestock, and that hair sheep’s coarse coat may inherently make them more adaptable to a changing climate. Yet, sheep can be sensitive to temperature extremes and humidity, and the quality of grazing pasture can affect hide quality. Sheep are mostly produced on semi-arid lands on ‘natural grasslands’ where pasture conditions and water availability are particularly vulnerable to climate change.

As shown in Fig. 6, risk hotspots for sheep leather are present around the world. In addition, desertification is already an issue of concern in many Mediterranean countries, and is likely to be exacerbated by climate change, which poses a risk for grazing livestock. Climate impact on sheepskin production will be complex, vary by region, and include increased risk of disease.

³⁸ Food and Agriculture Organization of the United Nations, 2015, as cited in Hewston, Allan, Dobson and Nichols, 2015.

³⁹ Hewston, Allan, Dobson and Nichols. 2015.

⁴⁰ Paul, 2015.

SILK



The highest quality silk, called Mulberry silk, is coveted by luxury fashion for its consistent fibres, sheen, smoothness, strength, and durability, and is used in a wide range of luxury products

The silkworms for mulberry silk are nourished exclusively on the leaves of the mulberry tree. Silk farming (known as sericulture) was developed thousands of years ago in China, which is still the largest silk producer today. Together, China and India account for over 95 percent of global silk production.³⁹ Mulberry silk is distinct from lower quality silk as the worms are domesticated: they have been raised indoors for thousands of years. This ‘domestication’ and the resulting genetic make-up of the silk worms has reduced their ability to cope with extreme fluctuations in temperature or humidity. As such, where conditions are not artificially controlled, these worms would be unable to survive outside of particular climatic zones.

As shown in Fig. 7, both China and India exhibit medium risk for climate impacts on silk in the near term, although the picture is mixed in both countries. In China, silk is a

relatively resilient material due to the ability to control the indoor environments where the worms are raised and the ability of mulberry trees to tolerate dry conditions as well as a range of soil types and temperatures. However, Chinese silk farmers may need greater resources in order to maintain indoor environments.

In India, the ability to control indoor environments is more limited, which has resulted in using strains of silkworms that are better suited to warmer temperatures and fluctuations in humidity, but that produce lower quality silk. India’s silk production is also vulnerable to extreme weather conditions. For example, in 2014, Cyclone Hudhud caused US\$115,000 worth of damage to the country’s silk industry, and the cocoons that did survive were of low quality.⁴⁰ Indian silk farmers face prospects of increasing temperatures and fluctuating weather patterns, which drive down production and require more substantial adaptation efforts, like re-locating production areas or using new species varieties.

THE EFFECTS OF CLIMATE CHANGE ON RAW MATERIAL AVAILABILITY AND QUALITY

For all of the six key raw materials evaluated, the Kering-Maplecroft study shows that both availability and quality are—and will continue to be—affected by climate change. The fact that luxury companies rely on high-quality materials that are often from restricted geographic ranges (eg, vicuña and cashmere) makes the business particularly vulnerable to climate change risks and impact. For all of the six key raw materials evaluated, the Kering-Maplecroft study shows that both availability and quality are—and will continue to be—affected by climate change. The fact that luxury companies rely on high-quality materials that are often from restricted geographic ranges (eg, vicuña and cashmere) makes the business particularly vulnerable to climate change risks and impact.

The vulnerability to climate change impact on the quality and availability of strategic raw materials is, without effective interventions, predicted to become more acute in the future. The consequences of declining availability and quality of raw materials include increased costs, price volatility, increased competition, and/or even a total disruption in production when raw materials become unavailable. These challenges will, of course, in turn, disrupt business continuity, decrease margins and financial performance, and ultimately undermine clients' expectations for high-quality products.

While the impact of climate change on raw materials is significant for companies' supply chains and businesses, there are broader risks to consider. The social impact of climate change is also important. Many raw materials, notably cotton, cashmere and vicuña, depend on small-scale farmers, and these communities are in jeopardy with declining productivity of agricultural systems, water scarcity, etc. Companies, as they look to their own supply chain solutions in the face of climate change, should integrate approaches that address the social consequences these changes are having—and will continue to have—on some of the poorest people in the world.⁴¹

41 Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

table 1 (BELOW) HIGHLIGHTS THE KEY VULNERABILITIES AND CLIMATE SENSITIVITIES AFFECTING THE AVAILABILITY OF AND QUALITY OF EACH RAW MATERIAL DISCUSSED ABOVE.

RAW MATERIAL	CLIMATE CHANGE EFFECTS ON AVAILABILITY	CLIMATE CHANGE EFFECTS ON QUALITY
COTTON	Reduced water availability can reduce yields. Temperature increases may have beneficial or adverse effects on production in different countries depending on current temperature and the upper limit of cotton's temperature threshold.	Increasing temperatures lead to increased occurrences of pests/diseases, which diminish cotton quality. Degradations in cotton crop quality results in lower end-fabric quality and reduced ease of processing.
BEEF LEATHER	Extreme and prolonged droughts contribute to reductions in cattle hide production. Availability of water for feed may also restrict expansion of cattle rearing in some countries. Warming climates likely to allow pests and diseases to spread into new regions, which will impact cattle productivity.	Higher temperatures lead to increased incidents of pests like lice and ringworm that cause marks on the skin and reduce the quality of beef and calf hides.
SHEEP AND LAMB LEATHER	Warming climates likely to allow pests and diseases to spread into new regions, which will affect sheep productivity. Ongoing desertification increases vulnerability for sheep flocks, including in Mediterranean countries and the Patagonian steppe. Much of the sheep leather is coming from small-scale producers who do not have the resources to adapt to changing conditions.	Higher temperatures lead to increased incidents of pests like lice and ringworm, which cause marks on the skin and reduce the quality of sheep hides. Large inter-annual variation in weather, particularly precipitation, can decrease the quality of grazing pasture, which in turn can affect hide quality.
VICUNA	Restricted water availability and variations in temperature decrease quantity of fibres produced. Vicuña have daily water requirements and must live near water sources to survive. Increasing drought length, more prevalent dry years, glacial melt, and irregular precipitation may restrict water availability. Increased vulnerability due to limited geographical range.	Restricted water availability and variabilities in temperature diminish the quality of fibres produced, as vicuña have evolved to have very fine hair or wool to keep them warm and dry. The animal will respond to changing temperatures and rainfall patterns, which may result in changes to the quality of their hair.
CASHMERE	Increased vulnerability due to limited geographical range. Major production habitat (Mongolian steppe) already suffering from degradation and desertification.	Degradation of habitats and foraging sources leads to undernourished goats with coarser hairs. Rising temperatures projected in regions like Mongolia can also constrain goats' winter hair growth, which is the source of high quality cashmere fibres.
SILK	Increased temperature and fluctuating humidity can reduce yields. Highest quality silk from indoor production is insulated from direct climate impacts while outdoor production is directly exposed to changes in climate. Drought decreases availability of mulberry trees, the main source of silkworm food—an indirect effect for indoor silk production.	The quality of silk fibres is strongly influenced by environmental conditions like temperature and humidity.

THE WAY FORWARD: A RESILIENCE AGENDA FOR LUXURY FASHION

IT IS IMPERATIVE THAT COMPANIES DEVELOP A STRATEGIC APPROACH TO TACKLING THE CHALLENGES POSED BY CLIMATE CHANGE TO THEIR BUSINESS AND ACROSS THEIR SUPPLY CHAINS.

Part of this includes an agenda for priority actions to build resilient supply chains that: **1)** identifies where companies need to focus; **2)** outlines the actions and targets that need to be implemented; and **3)** specifies the mechanisms for monitoring impacts. Guidance for companies on how to create a resilience agenda can be found in BSR's recent reports.⁴²

The below agenda derives from the 'resilience wedges' framework that outlines how private and public sector actions should be designed to meet the goal of keeping global warming within the 2°C limit necessary to stave off the worst of climate change's consequences for both natural and social systems.⁴³

The resilience wedges cover the dual aspects of mitigation and adaptation and present ways in which companies can benefit from opportunities in addressing climate change.

There are three critical steps luxury fashion companies can take to build resilience and manage climate change risks:

- First, **'Invest in Targeted Raw Material Resilience'** through a series of actions to address the critical impacts and dependencies at the base of their supply chains;
- Second, **'Prepare Your Operations for a Low-Emissions Future,'** with key considerations for reductions in emissions and adaptation in their own operations;
- Third, **'Make Climate Action Irresistible,'** by harnessing the leadership position of luxury fashion brands to promote increased climate action.

1. INVEST IN TARGETED RAW MATERIAL RESILIENCE

As this report has illustrated, the effects of the changing climate will be significant to luxury fashion brands particularly in their supply of raw materials. Business risk will increase as the availability and quality of raw materials decline. In addition, the livelihoods of the raw material producers and their communities will become more fragile. Without implementing approaches that adapt to changing conditions, luxury brands are likely to become increasingly vulnerable to impacts and risks.⁴⁵

Approaches to mitigating risk can be developed within a strategic framework, such as the BSR Climate-Resilient Supply Chain framework, which offers a three-step process for companies to design and develop climate resilient supply chains. This framework⁴⁶ is as relevant for broad supply chain and business initiatives as it is for more focused initiatives around raw material production.

The key elements of this framework are outlined overleaf.

⁴² Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015, and Norton, T.; Ryan, M.; and Wang F., 2015.

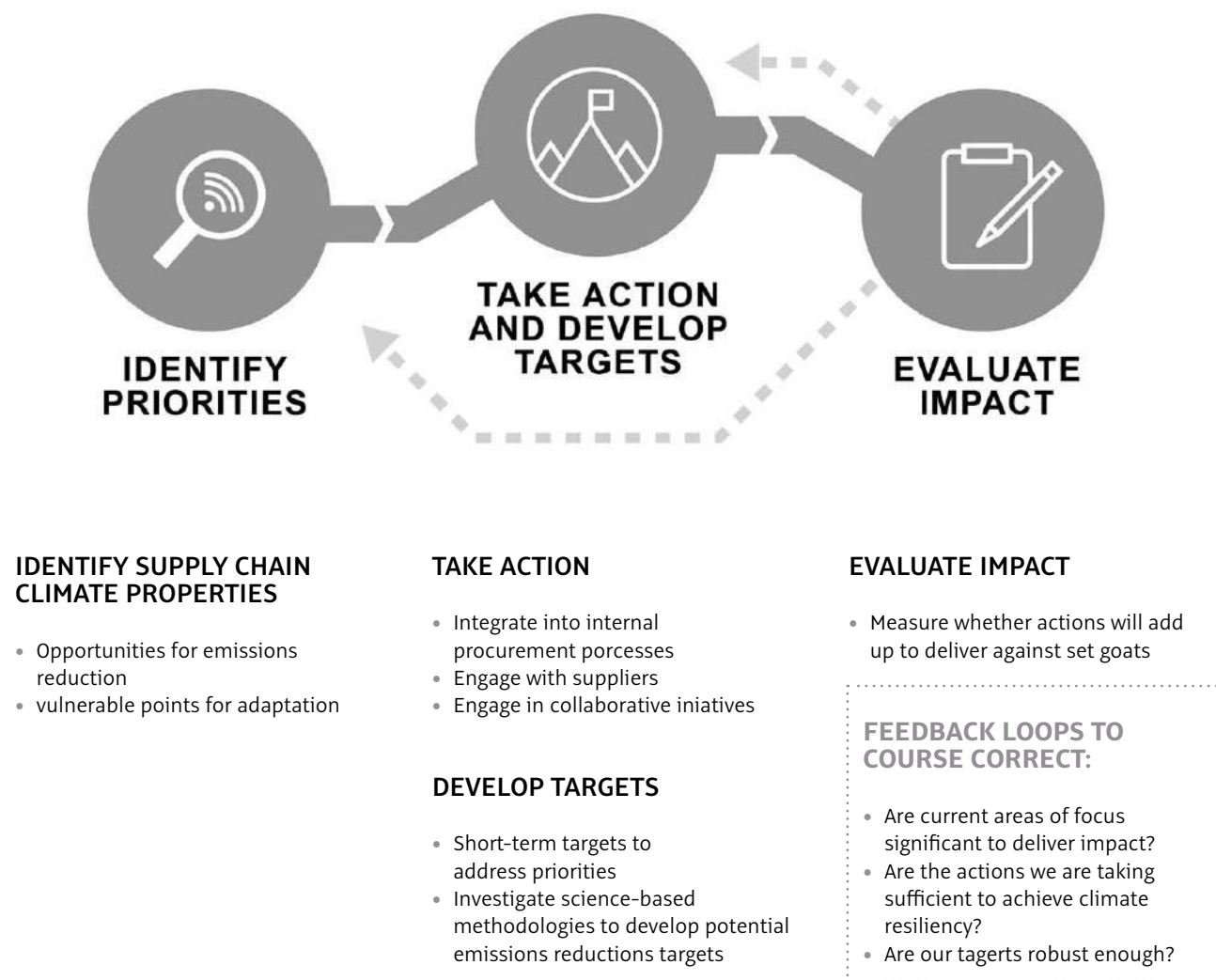
⁴³ For more information on the 2°C limit, please see Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

⁴⁴ For more information on resilience and adaptive capacity, please see Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

⁴⁵ Hewston, Allan, Dobson and Nichols, 2015.

⁴⁶ Norton, T., Ryan, M. and Wang, F., 2015.

figure 1: FRAMEWORK FOR CLIMATE RESILIENT SUPPLY CHAINS FROM BSR'S REPORT, 'BUSINESS ACTION FOR CLIMATE RESILIENT SUPPLY CHAINS.'



STEP 1: IDENTIFY PRIORITIES

Mapping supply chains and identifying where there are vulnerabilities to climate change is a key first step for companies. Tools and methodologies such as the E P&L and Lifecycle analyses (LCAs) can help identify which 'inputs' are at risk. Knowing where raw materials are produced is essential.

STEP 2: TAKE ACTION AND SET TARGETS

Once there is transparency in the supply chain, knowledge of raw material sourcing, and awareness of risk, the next step is to design actions that will build resilience and help the company successfully adapt in the face of change.

ACTIONS THAT ENGAGE WITH SUPPLIERS:

Raw material production poses particular challenges because this is often beyond the scope and expertise of the company itself. Collaboration with suppliers, therefore, is essential. In addition, partnerships with NGOs and other technical experts are key. It is through these partnerships that companies can define the characteristics of 'resilient' systems of raw material production.

Some examples of actions to build resilient raw material production:

- Putting in place **early warning systems** to alert producers in advance of extreme weather events such as high temperatures, impending floods, droughts, tornados, typhoons, etc. These systems can take many forms, including mobile text alerts, data monitoring and collaborative information sharing.⁴⁷ Of course, to be effective, the early warning systems need to be tailored to local context and adapted to the producers' level of access to technology.

- Identify appropriate interventions to ensure **more resilient production systems**. One of the more complex but necessary actions is to work with experts to identify the best practices and approaches that will build more resilient production systems in specific geographies (eg, Savory Institute Holistic Management for grazing). These systems should be focused not only on building resilience, but also on reducing the intensification of climate change (mitigation), eg, reduction in fossil-fuel based chemical inputs that contribute to climate change.

- Improving **disaster-risk management** for producers. This involves any number of actions that will depend on geographic location and on the resources available for and capacity of the producer. Some actions include support of extension services for improved farm management and capacity development of producers, financial mechanisms (such as micro-loans) for producers to diversify their production and implement better practices (eg, drip irrigation), and/or insurance schemes to help producers survive through extreme weather events.⁴⁸ It is often small-scale producers on the edge of poverty that are important in the production of raw materials. Therefore, supporting these people to address and survive disasters brought on by climate change is an imperative.

- **Increasing process efficiency.** A simple rule that can be used across the entire supply chain, including raw materials production, is to increase process efficiency by finding ways to reduce waste, and being more efficient and effective in the use of materials. This may include seeking out raw materials from new sources. For example, in Africa, cattle hides are often discarded or processed according to inferior standards, reducing their quality and value.⁴⁹ Helping cattle farms to modernize their processes can build resilience and increase the amount of high-quality cattle hides entering the market from Africa.

⁴⁷ PwC, 2013.

⁴⁸ ISDR, 2008; IFAD, 2013.

⁴⁹ Ibid.

CASE STUDY: IDENTIFYING PRIORITIES AT IKEA



IKEA has identified their priority inputs in their sustainability report. Under the strategic banner of 'resource and energy independence,' the company has global programs in place specific to their largest raw materials, including timber, cotton, and leather, as well as specific programs to address the key inputs of water and energy relevant to their suppliers.

According to the report, IKEA has 1,002 home furnishing suppliers with whom the company works to reduce energy and water usage. IKEA reports that this helps, not only in achieving its own environmental objectives, but also in saving money for customers, suppliers, and the company itself. For more information, reference the IKEA Group 2014 Sustainability report 'Resource and Energy Independence' section that starts on page 24.

*http://www.ikea.com/ms/en_US/pdf/sustainability_report/sustainability_report_2014.pdf

CASE STUDY: ORGANIC COTTON GROWS LIVELIHOODS FOR INDIAN PRODUCERS



Indian farmers who were initially persuaded to move away from organic cotton growing methods to conventional farming are now reverting to their traditional techniques. Government schemes in the late 1990s and early 2000s encouraged swathes of farmers in the district of Andhra Pradesh to use agro-chemicals by promising higher yields and greater profits. But many found that the high cost of using pesticides and cultivation of just one crop actually saw net profits fall and supplies become unreliable.⁵⁰

In 2007, local NGO Chetna Organic launched an organic cotton programme aimed at returning to growing crops without pesticides. Since returning to organic methods, some farmers have found yields are now 50 percent higher and the cotton grown is of a higher quality.⁵¹

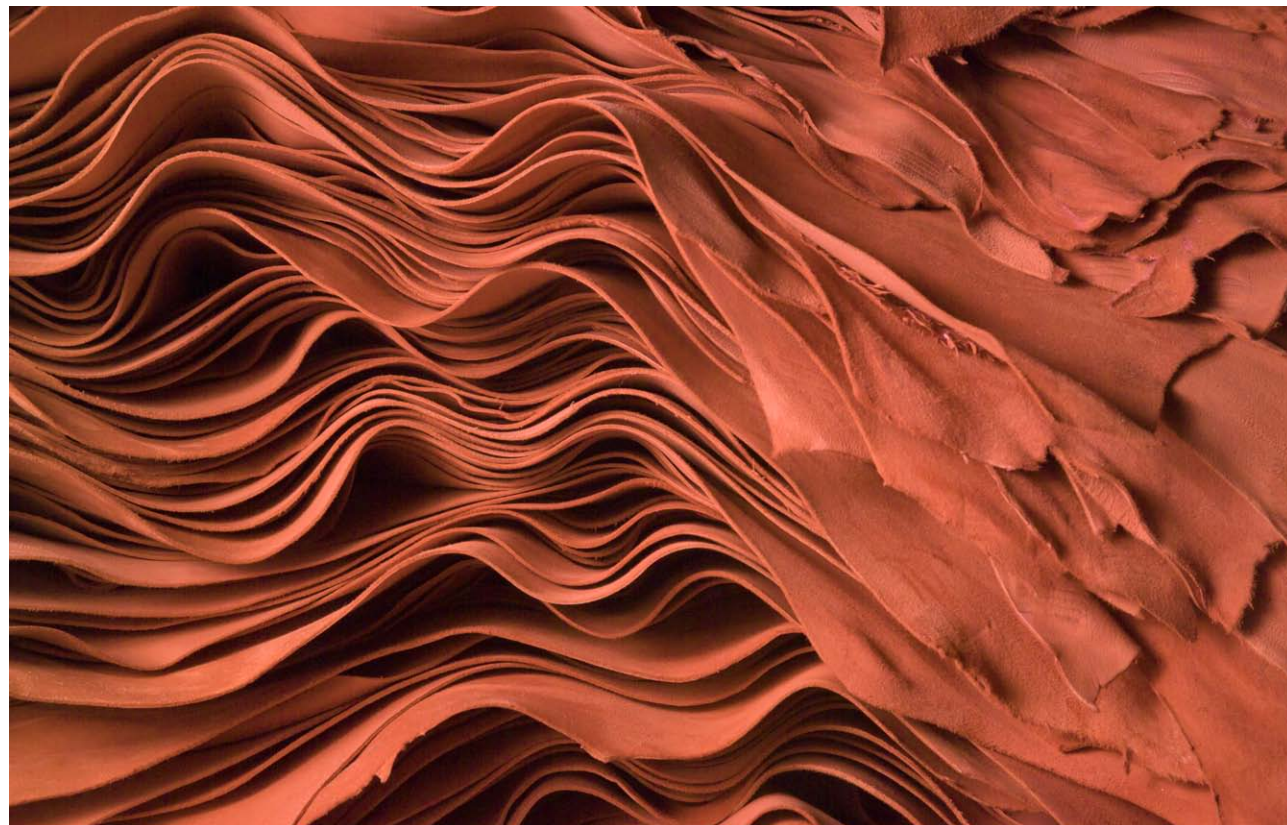
Farmers under the programme have reported net profits doubling and a greater level of self-sufficiency as they can grow peppers, cabbages, turnips, onions, green beans, sweet potatoes, peanuts, and other vegetables rather than adhering to the monoculture demanded of conventional cotton production. This additional produce is used to feed the family or livestock, while any surplus can be sold at market.

IN PAMULAWADA, A VILLAGE IN THE ADILABAD DISTRICT OF ANDHRA PRADESH, ALL COTTON FARMS HAVE CONVERTED TO ORGANIC COTTON PRODUCTION OVER THE LAST 10 YEARS. ACCORDING TO THE UK SOIL ASSOCIATION, 170 ACRES OF THE 334 ACRES HELD BY ORGANIC COTTON FARMERS NOW PRODUCES FOOD, WITH AN AVERAGE OF 12 FOOD CROPS GROWN IN ADDITION TO COTTON.⁵²

⁵⁰ Pimbert and Wakeford, 2002.

⁵¹ For more information, see chetnaorganic.org

CASE STUDY: FARMERS MILK BENEFITS OF COOLER COWS



Australian producers are moving to address fears that quality cattle hides could be in short supply as the effects of expected temperature increases and water shortages start to bite. A government-backed programme in Australia dubbed 'Cool Cows' encourages farmers to reduce heat stress that can harm the quality of cattle hides.⁵³

Heat stress can cause cows to eat up to 20 percent less dry matter, limit a cow's ability to take in nutrients, and have a negative effect on the animal's fertility.⁵⁴ A cow's body temperature can rise significantly in holding yards, where the high temperatures can be exacerbated by the sun, concrete, or other animals.

Cool Cows has worked to help farmers bring temperatures down by reducing the number of animals in the holding yard at any one time and providing water troughs. Other simple measures, such as sprinklers that cycle off and on to promote evaporative cooling, planting trees in fields, and changing grazing rotations, are also encouraged. Such methods are already common in the United States, but far less widespread in Australia.

A COOL COWS EMAIL ALERT SERVICE HAS ALSO BEEN INTRODUCED TO WARN FARMERS WHEN HIGH TEMPERATURES ARE EXPECTED. MEANWHILE, THE INITIATIVE'S WEBSITE CONTAINS TOOLS FOR IDENTIFYING THE BEST HEAT STRESS REDUCTION MEASURES FOR DIFFERENT SPECIES AND GEOGRAPHIES. IT ALSO ENABLES FARMERS TO CALCULATE THE POTENTIAL SAVINGS FROM ENSURING THEIR CATTLE ARE NOT OVERHEATING.

⁵² Emberson, 2014.

⁵³ For more information, see coolcows.com.au

⁵⁴ NADIS, 2015.

COLLABORATIVE ACTIONS:

Raw material production presents an opportunity for companies to work together in a 'pre-competitive' space. Collaboration among companies and other stakeholders, such as NGOs and government organizations, is key to promoting changes in production systems that will benefit everyone. Sharing lessons learned, building 'proof of concept' on best practices, supporting certification initiatives, and raising awareness in the policy arena are part of a collaborative approach. It is a challenge for any single company to create meaningful change at the base of its supply chain. Moreover, other companies are likely sharing this sourcing. It makes sense, therefore, to collaborate to leverage support and incentives for improved practices.

Three recommended areas for collaborative action around building resilient raw materials production are:

- **Developing improved production.** Define the best practices for the production of the raw material in specific geographies that will build resilience. For example, methods of improving soil productivity can lead to improved water retention along with improved yields. Similarly, holistic management of grazing can lead to the regeneration of pastureland. Improved and more resilient production may require investment in research to ensure that the best practice delivers the impact and results that are needed. In addition, it's important that incentives are aligned for producers to embark on new practices that require 'on the ground' experience and knowledge.
- **Combating human-induced over-grazing** and desertification in sensitive areas can be a good focus for collaborative initiatives. For example, the UK-Mongolian Sustainable Fibre Alliance (SFA) works with major luxury fashion brands, including Kering, to create a more resilient cashmere industry by focusing on animal welfare initiatives and more sustainable grazing and herding practices. These kinds of initiatives sustain high quality breeds, while helping to maintain viable revenues for local communities.
- **Animal husbandry and cross-breeding.** This can ensure the availability and quality of raw materials by ensuring the existence of species varieties tolerant to the climate conditions of the present and near future. Along with technical partners, companies can invest in research that will identify, through traditional breeding practices, varieties of animals and plants that will survive new climatic conditions.

- **Improving traceability.** Traceability is a tool to build transparency in supply chains and identify risk. For example, several South American countries export vicuña fibres, but Peru exports the largest quantity and highest quality, due in large part to their rigorous system for traceability, which contributes to improved habitat and environmental conditions. Peru's stringent regulations require that the animals are tagged and monitored, which not only benefits local communities through their role as custodians, but also ensures that the fibres leaving the country are high quality and pure.⁵⁵

Luxury fashion brands should also be aware of the collaborative initiatives and expert groups that already exist as platforms to develop improved resilience of raw material production.

Along with these actions, companies can present important public-facing targets and goals. Public targets will help drive change and foster collaboration. Companies should consider developing short-term targets to address climate priorities and, alongside this effort, investigate science-based methodologies to develop more robust, longer-term emissions reduction targets.⁵⁶ Most companies that have targets in place also have related metrics to enable them to measure progress. Some companies have already made public their targets for climate resilience in key raw materials, such as leather, paper, and packaging.⁵⁷

As part of the company's overall sustainability targets, Kering has put in place public targets for its specific raw materials.

The targets are as follows:

- 100 percent of leather from domestic livestock within Kering's products will be from responsible and verified sources that do not result in converting sensitive ecosystems into grazing lands or agricultural lands for food production by 2016.
- 100 percent of paper and packaging for Kering have to be sourced from certified sustainably managed forests with a minimum of 50 percent recycled content by 2016.

⁵⁵ Hewston, Allan, Dobson and Nichols. 2015

⁵⁶ Science-based methodologies and targets allow companies to work toward the goal of limiting the increase in global average temperature to below 2°C by aligning corporate GHG reductions with global emissions budgets generated by climate models.

⁵⁷ Norton, Ryan and Wang, 2015.

table 2 OVERVIEW OF COLLABORATIVE INITIATIVES AND PLATFORMS

RAW MATERIAL	COLLABORATIVE INITIATIVES AND PLATFORMS
COTTON	Textile Exchange, Organic Cotton, Organic Cotton Accelerator
BEEF LEATHER	Leather Working Group, Global Roundtable on Sustainable Beef, BSR's Sustainable Luxury Working Group
SHEEP AND LAMB LEATHER	Textile Exchange – Responsible Wool Standard
VICUNA	IUCN Camelid Specialist Group
CASHMERE	Sustainable Fibre Alliance (SFA), Wildlife Conservation Society, The Nature Conservancy, Vétérinaires sans Frontières
SILK	BSR's Fur Luxury Industry Roundtable (fur), UN initiatives to combat desertification and land degradation

STEP 3: MONITOR IMPACT

Showing progress against company targets and goals is essential as it is only through understanding impact that a positive feedback loop can be created to ensure continuous improvement and adaptive management. Tools such as the E P&L or other forms of Natural Capital Accounting that are used regularly can be one means of measuring and monitoring impact. Other methodologies, more tailored to specific production systems (eg, water use, yield, pasture regeneration) can also be put in place.change.

2. PREPARE YOUR OPERATIONS FOR A LOW-EMISSIONS FUTURE

Luxury fashion brands can contribute to the transition to a new low-emissions economy that is already underway by reducing their own emissions (mitigation) and by implementing approaches that enhance adaptive capacity. This can be done at a raw materials level, as outlined above, but also at other points along the value chain through a focus on: **1)** product design and manufacturing; **2)** more effective energy and fuel management in manufacturing facilities, offices, stores, and logistics; **3)** more efficient siting of stores and other facilities; and **4)** investment in and procurement from companies practicing climate resilience.⁵⁸

PREPARE YOUR OPERATIONS FOR A LOW-EMISSIONS FUTURE⁵⁹

- 1)

Reduce energy, water, and chemical use in product design and manufacturing
- 2)

Reduce energy and fuel in operations and logistics; switch to renewable alternatives
- 3)

Site facilities to make use of renewable energy and decrease emissions from mobility
- 4)

Direct investments and procurement spend to companies and suppliers that are climate resilient

ADAPT PRODUCT DESIGN AND MANUFACTURING PRACTICES

Improving the energy, water, and chemical impacts of product design and manufacturing entails exploring innovation along the entire product lifecycle. This involves techniques such as raising awareness with designers, improving sourcing strategies, developing less impactful materials,⁶⁰ improving raw material processing,⁶¹ and changing manufacturing processes. At NIKE, for example, materials innovation and sustainable product design is fundamental to achieving its ambition of helping athletes perform better.⁶² It recently launched a partnership with the Massachusetts Institute of Technology (MIT) to bring innovation in materials to the forefront of the climate conversation, acknowledging that materials account for 60 percent of the environmental impact of its shoes.⁶³ The Clean by Design Initiative⁶⁴ is an example of driving efficiency in manufacturing as part of a low emissions future. This program, developed by the Natural Resource Defense Council (NRDC), engages brands such as Gap, Levi's, H&M and Target, to work with suppliers to reduce their water and energy footprints in their fabric dyeing and finishing in Asia. Kering brands such as Stella McCartney are applying similar methods to Europe-based luxury fashion suppliers as part of the program.

58 This list is not exhaustive. For additional options, see Cameron, E., Erickson, C., Prattico, E. and Schuchard, R., 2015.

59 Ibid.

60 Including recycled or upcycled materials.

61 Kering's E P&L found that a quarter of its impacts are associated with raw material processing in Tier 3, including leather tanning, refining metals, and textile spinning.

62 Nike Sustainability Homepage, 2015.

63 Nike, 2015.

64 NRDC, 'Clean by Design'.

RE-THINK ENERGY AND FUEL

More effective energy and fuel management is an important way that luxury companies can enable the shift to a low-emissions economy. Many companies are already engaging in activities to measure their energy use in stores and offices and to reduce their consumption through more efficient technology and processes and also by switching to renewable energy. Initiatives such as the Carbon Disclosure Project (CDP) and The Climate Group's RE100 encourage companies to increase their use of renewable energy by committing to procure 100 percent of their electricity from renewable sources in the shortest practical timescale.⁶⁵ To date, 28 companies have joined the initiative, including H&M, Marks and Spencer Group plc, and Yoox.

Luxury fashion, like many global companies, relies on global distribution networks using air, land, and sea freight to deliver products to market. Implementing approaches for fuel efficiency, transport optimization, and use of alternative fuels can lead to multiple benefits, including a reduction in climate impacts and air pollution along with cost savings. Macy's department store, for example, saves emissions along with \$1.75 million a year by reducing its empty trucks on the road.⁶⁶ BSR, through its Future of Fuels and Clean Cargo initiatives, also offers ways for luxury brands to contribute to more sustainable fuel choices and shipping methods.⁶⁷

LEVERAGE SITING

Wherever possible, it is important to reflect on the climate implications of siting manufacturing, distribution centres, and stores and to look for options that will support climate-friendly transport and energy choices.

PROCUREMENT PRACTICES

Companies can also leverage climate action through their procurement practices by directing investment and procurement to companies and suppliers that are also committed to mitigating climate change and by building resilience through meaningful efforts to reduce emissions and adapt their practices. Supporting women suppliers in areas vulnerable to climate change can help to achieve this goal because women are disproportionately affected by the health and poverty impacts of climate change.⁶⁸

⁶⁵ CDP is an organisation that collects data from thousands of companies and cities across the world's largest economies who measure and disclose their environmental information. It uses this information to guide decision-making in business, investment and policy. The Climate Group is an organisation that works with corporate and government partners to develop climate finance mechanisms, business models that promote innovation, and supportive policy frameworks. Together, they lead RE100, a global initiative to engage, support, and showcase influential companies committed to using 100 percent renewable power. CDP and The Climate Group are among the seven co-founding partners of the We Mean Business Coalition, which also actively supports RE100.

⁶⁶ NRDC, 'Clean by Design'.

⁶⁷ BSR Collaboration Homepage.

⁶⁸ Ibid.

3. MAKE CLIMATE ACTION IRRESISTIBLE

Luxury brands occupy a unique place in the business world because of their power to influence. Luxury clients are generally society's elite and are influencers in their own right. Luxury brands are a reference point for many in society.⁶⁹ They set the trends in fashion, in media, and through their support of culture, the arts, and, increasingly, women's empowerment and environmental conservation. Today, luxury brands have the opportunity to exercise this influence and do what they do best—inspire people to desire and dream—in support of a climate-smart world. Luxury brands can use their voice with both clients and in the public sphere.

CLIENTS ARE PART OF THE SOLUTION

Brands have a huge opportunity to make climate action irresistible, using the messages and mediums that fit their brand's unique voice for their clients, consumers, and stakeholders.⁷⁰ They can do this through communicating their position on climate change in addition to showcasing products with strong environmental and social credentials. In this way luxury brands meet consumers' desires for meaning and solutions and help drive consumer preferences for more responsible products.⁷¹

TAKE A STAND PUBLICLY

Likewise, luxury brands are in a position to show support to policymakers as they design the regulatory frameworks that will enable the private sector in general, and luxury companies in particular, to reduce the risks of climate change on their business. Companies can show their support by showing their own internal commitments and actions and by actively encouraging the implementation of public policies for combating climate change. There are also platforms for companies to join for collective action on climate change. For example, We Mean Business is a coalition of organizations, including BSR, which works with businesses and investors to accelerate the transition to a low-carbon economy. At the time of writing, 218 companies with revenues totaling US\$4.9 trillion, and 144 investors with US\$8.5 trillion in assets under management, have now made 571 ambitious commitments to climate action through the We Mean Business Platform.⁷²

Companies can also show their support for the UN-REDD program CODE REDD and can offset carbon emissions through investing in reforestation and land use carbon sequestration projects, through verified REDD+ projects that are also Climate, Community, and Biodiversity Alliance (CCBA) certified. Such projects not only help mitigate climate change, but also support adaptation and resilience of local communities.⁷³

⁶⁹ Pinkhasov, 2014.

⁷⁰ Niemtzwow, 2011.

⁷¹ Pinkhasov, 2014.

⁷² We Mean Business Homepage.

⁷³ REDD was launched in 2008 and builds on the expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Program (UNDP), and the United Nations Environment Program (UNEP). The UN-REDD program supports nationally-led processes and promotes the involvement of all stakeholders.

CONCLUSION

WITH THE LAUNCH OF THE GLOBAL SUSTAINABILITY DEVELOPMENT GOALS AND THE PARIS-BASED COP21, 2015 IS A HISTORIC YEAR.

These initiatives are likely to mark a turning point in the collective response to climate change in the context of sustainable development and growth. The three largest GHG emitters—China, the United States, and the European Union—have announced their commitments to reduce emissions and build climate resilience as part of the Paris Agreement, joining 126 other countries and covering nearly 87 percent of global emissions (at time of writing).⁷⁴ Increasingly ambitious climate regulation is clearly on the horizon, but better management of regulatory risks is only one benefit of acting on climate change. Business has an

opportunity to help craft and implement a suite of solutions that will not only address climate change but also many of the other 16 Sustainable Development goals. The companies that build resilience into their supply chains will be best positioned for success and growth as they will have an adaptive advantage in the face of change and volatility.

In particular, luxury fashion companies that focus on innovative approaches to resilience in raw material production will preserve their value proposition at its core. They will ensure an adequate supply of raw materials of exceptional quality that are necessary to create their beautiful products. Furthermore, by promoting climate-smart approaches at the base of their supply chains, brands will be leaders in the way they also address vital issues such as preserving natural systems and biodiversity, protecting livelihoods, and promoting adequate and safe water supplies. The countdown to the 'Paris moment' around COP21 has begun and there is no better time for luxury fashion brands to help catalyze powerful action.

⁷⁴ CAIT Climate Data Explorer: Paris Contributions Map. See more at: <http://cait.wri.org/indc/>.

RAW MATERIAL HOTSPOT MAPS

The following maps highlight climate risk hotspots based on the risk index for each raw material for the time period 2036-2060

figure 2: CLIMATE CHANGE RISK INDEX FOR VICUNA (2036-2060)

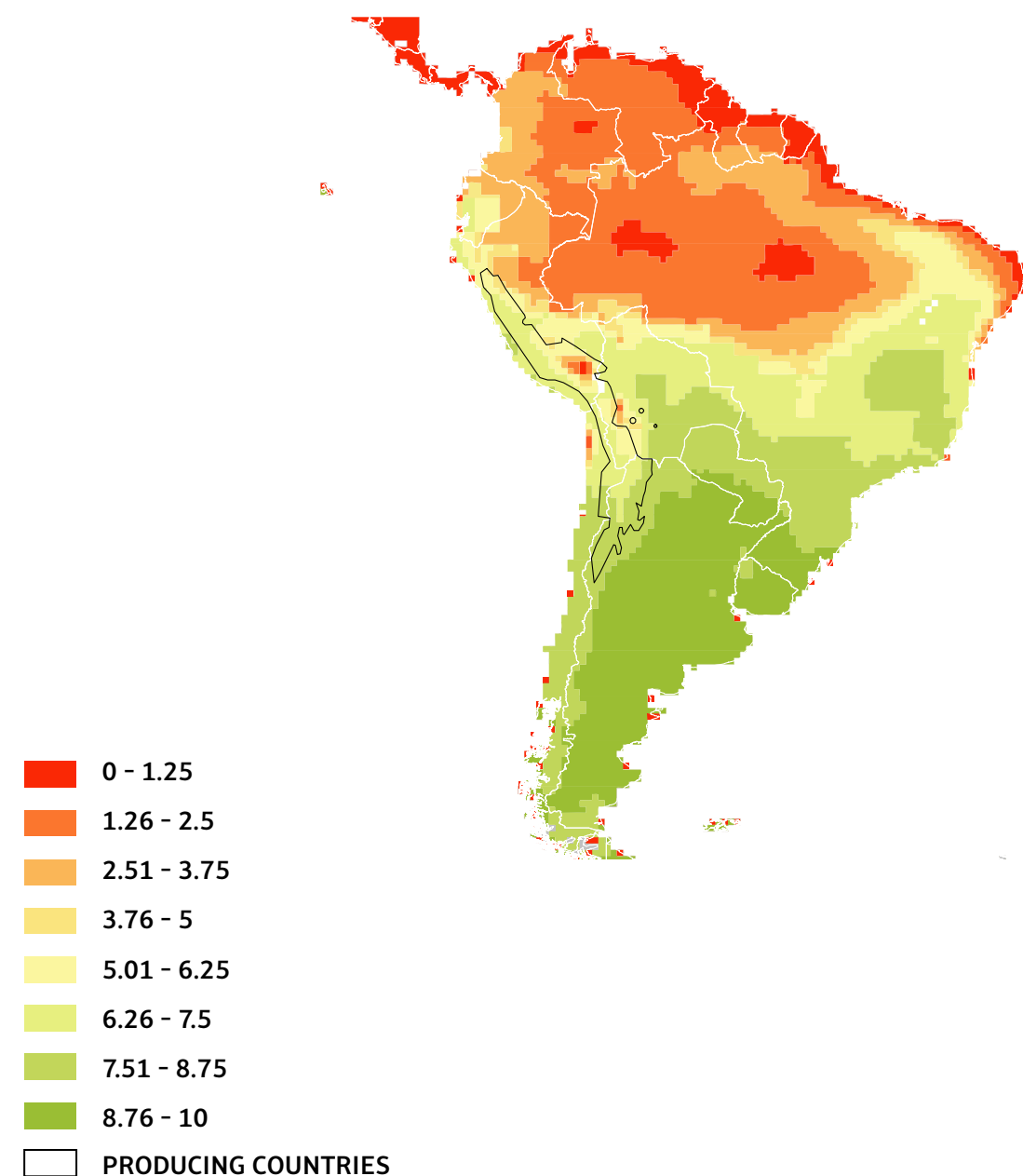


figure 3: CLIMATE CHANGE RISK INDEX FOR COTTON (2036-2060)

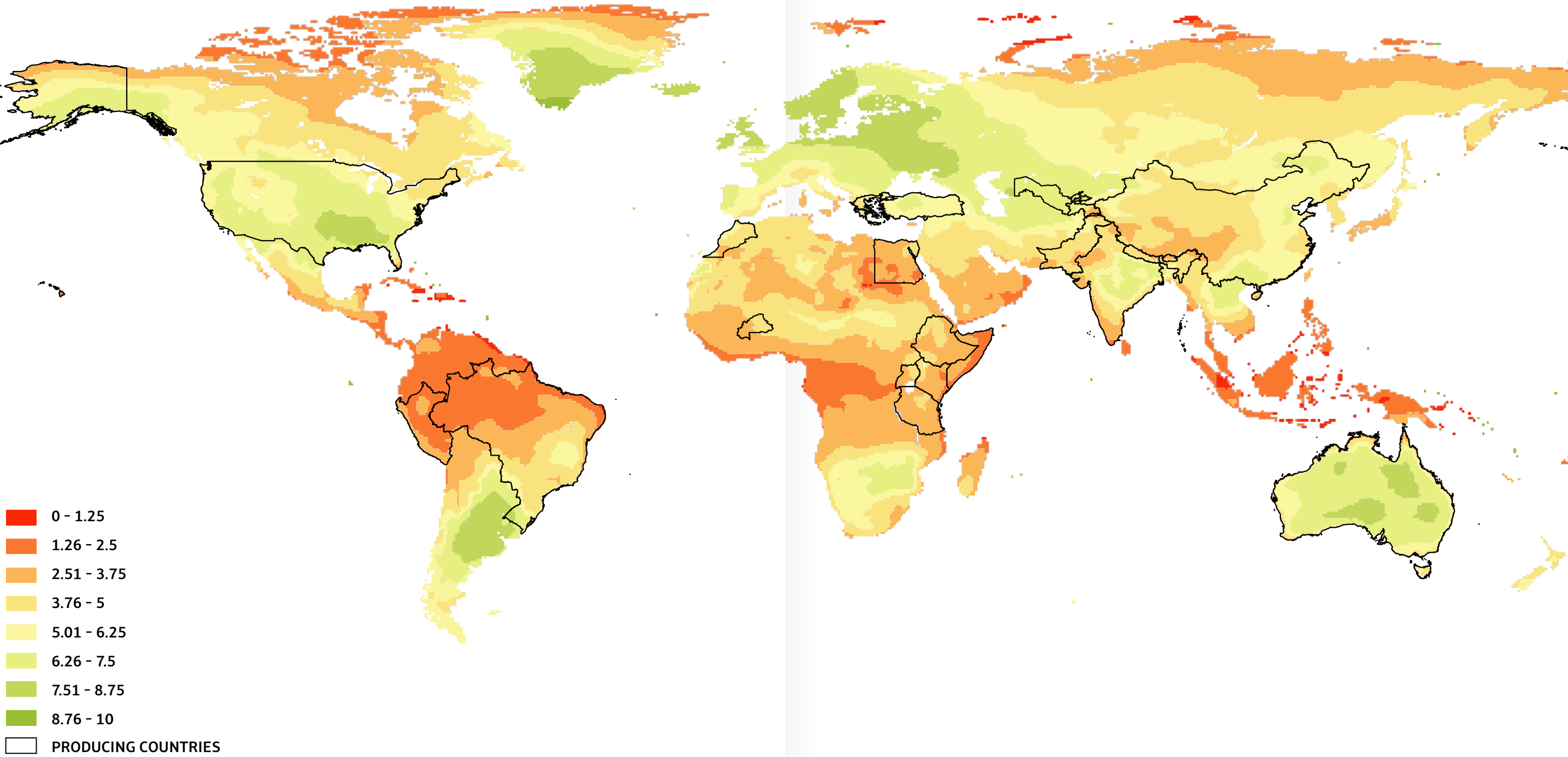


figure 4: CLIMATE CHANGE RISK INDEX FOR CASHMERE (2036-2060)

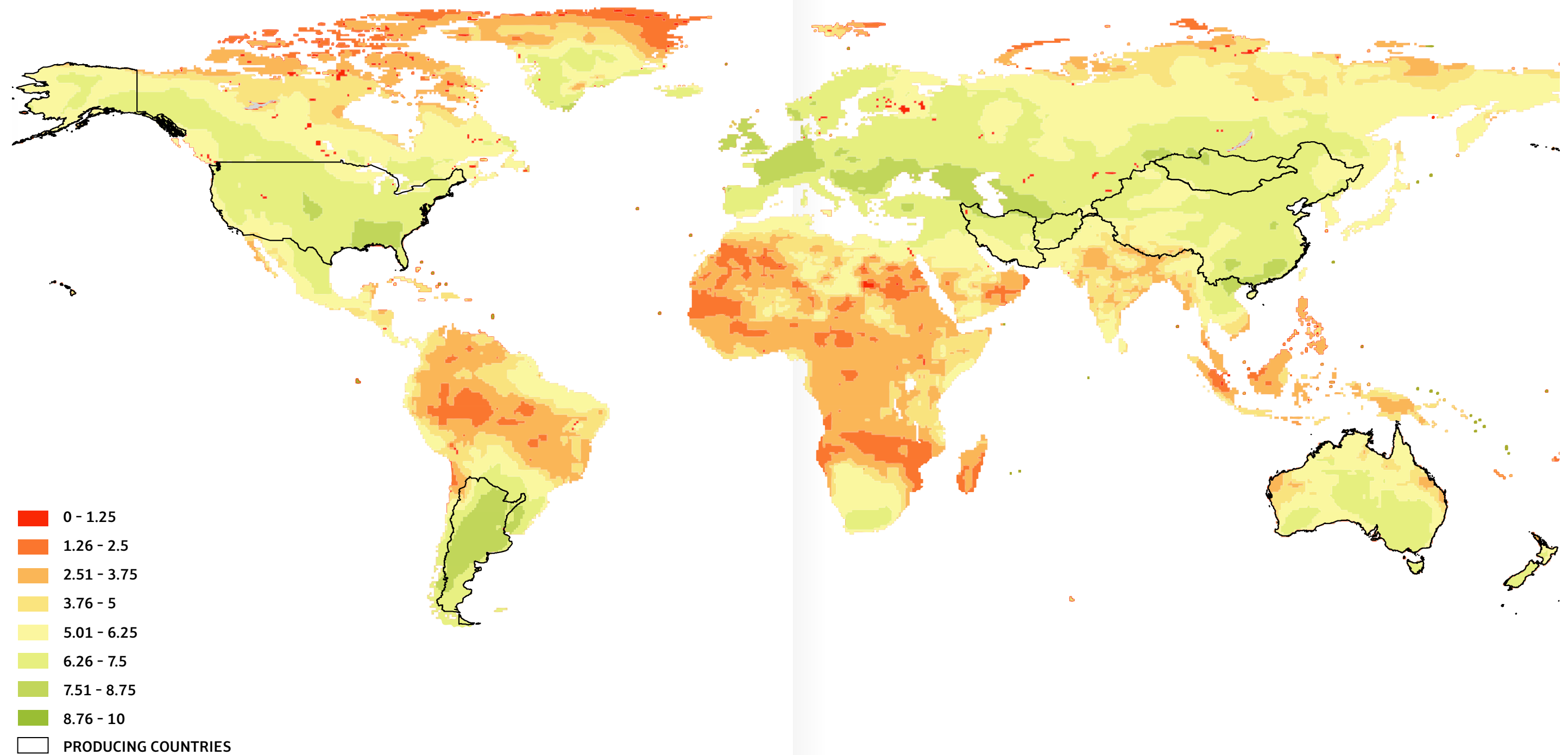


figure 5: CLIMATE CHANGE RISK INDEX FOR BEEF LEATHER (2036-2060)

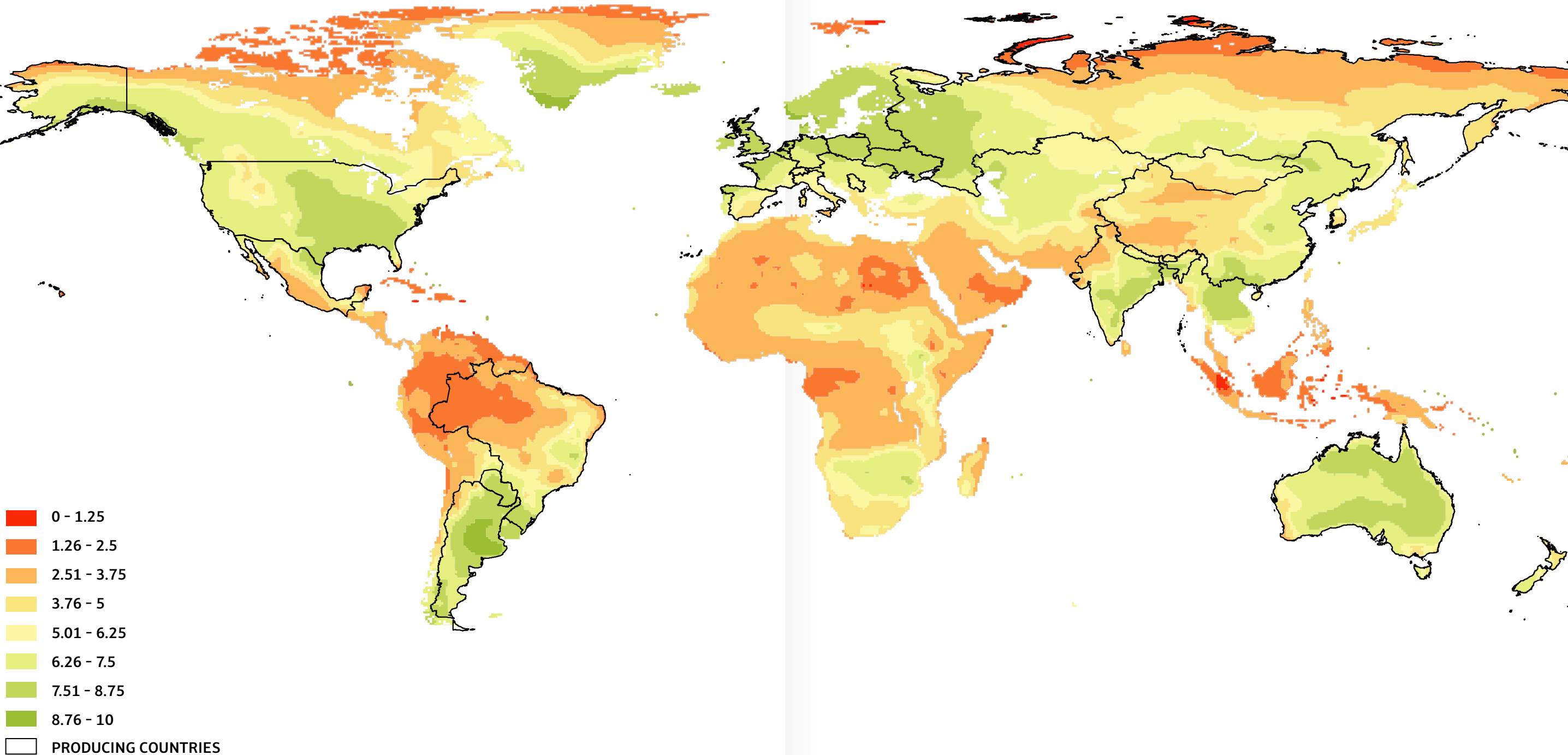


figure 6: CLIMATE CHANGE RISK INDEX FOR SHEEP AND LAMB LEATHER (2036-2060)

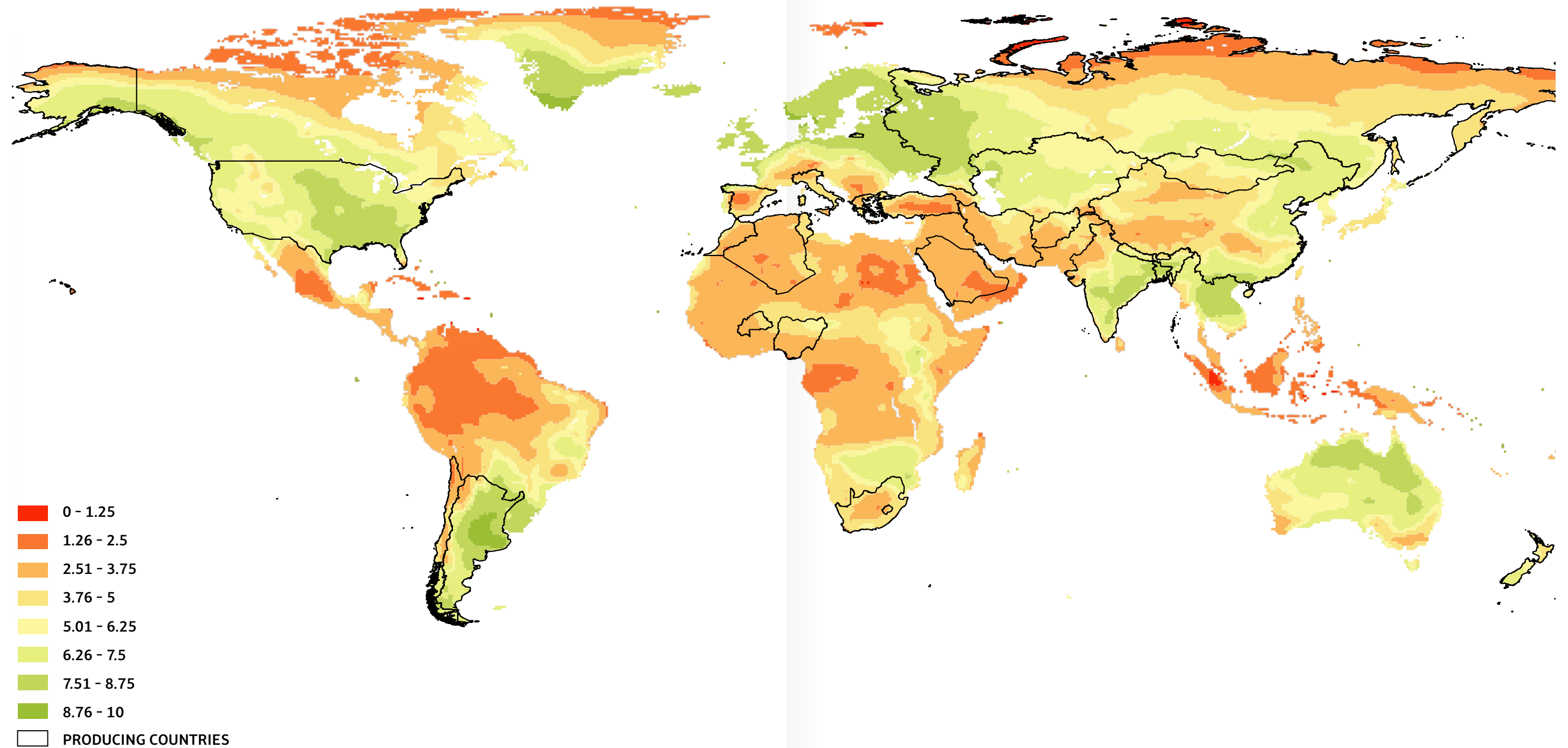
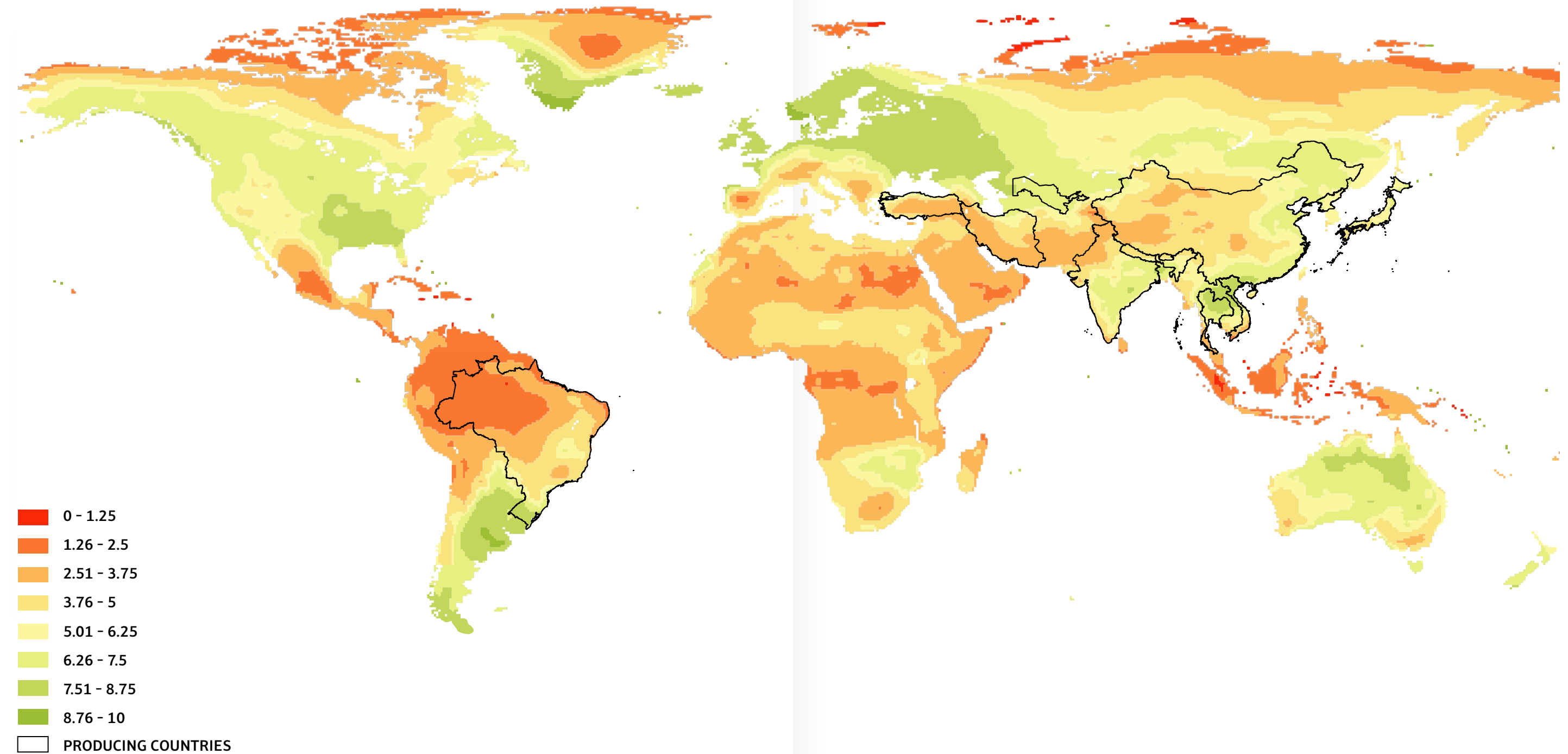


figure 7: CLIMATE CHANGE RISK INDEX FOR SILK (2036-2060)



GLOSSARY

ADAPTATION

The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In natural systems, human intervention may facilitate adjustment to expected climate and its effects.

BIODIVERSITY

The variability among living organisms (at the genetic, species, and ecosystem level) from terrestrial, marine, and other ecosystems.

CLIMATE CHANGE

Any significant change in climate that persists for an extended period, typically decades or longer.

CLIMATE HAZARD

Climate hazards are the result of increased concentrations of GHGs in the atmosphere, including a rise in global mean temperature in the range of 1.5°C to 4°C; an increase in the intensity and frequency of extreme weather events; as well as ocean acidification, sea-level rises, and changes in precipitation patterns affecting the availability of fresh water.

CLIMATE RISK

Risk of climate-related impacts for business results from the interaction between climate-related hazards, the vulnerability and exposure of human and natural systems, and the private sector's own sensitivity to a range of specific risks, including those relating to raw materials, operations, and finances.

GREENHOUSE GAS

A gas in the atmosphere, of natural and human origin, that absorbs and emits thermal infrared radiation. Water vapor, carbon dioxide, nitrous oxide, methane, and ozone are the main greenhouse gases in the Earth's atmosphere. Their net impact is to trap heat within the climate system.

MITIGATION

A human intervention to reduce the sources or enhance the sinks of greenhouse gases.

NATURAL SYSTEM

A system that exists in nature, independent of human involvement, consisting of all the physical and biological materials and their intertwined processes.

RESILIENCE

The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation; the ability to manage and rebound from risks.

REFERENCES

A.T. Kearney. 2011. "Supply Chain Report 2011: Migrating to a low carbon economy through leadership and collaboration". Carbon Disclosure Project. Accessed online 23 October 2015. www.cdp.net/CDPResults/CDP-2011-Supply-Chain-Report.pdf.

Bachofen, C. and Cameron, E. 2009. "Case Study—Bolivia: enhancing assets to reduce vulnerability". The World Bank. Accessed online 5 October 2015. siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/resources/244362-1232059926563/5747581-1254257427238/Learning_In_Focus_Bolivia.pdf.

———. n.d. "Case Study—Mongolia: climate impacts threaten national development". The World Bank. Accessed online 5 October 2015. siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/resources/244362-1232059926563/5747581-1254257427238/6456041-1259771328567/Mongolia.pdf.

Bain & Company. 2013. "2013 Luxury Goods Worldwide Market Study". Accessed online 24 September 2015. www.slideshare.net/ukaszSzymula/2013-luxury-goods-worldwide-market

Baranowski, M. and Miller, R. 2014. "Coca-Cola, Microsoft, Samsung, Tata, Unilever and Nestlé Top List of World's Most Responsible Companies". BBMG and GlobeScan. Accessed online 24 September 2015. www.globescan.com/news-and-analysis/press-releases/press-releases-2014/314-coca-cola-microsoft-samsung-tata-unilever-and-nestle-top-list-of-world-s-most-responsible-companies.html.

Bloomberg, M.; Paulson, H. and Steyer, T. 2014. "Risky Business: The Economic Risks of Climate Change in the United States". Risky Business. Accessed online

6 October 2015. riskybusiness.org/uploads/files/RiskyBusiness_Report_WEB_09_08_14.pdf.

"BSR Collaboration Homepage". BSR. Accessed online 24 September 2015. www.bsr.org/en/collaboration.

Cahan, S. "Perceptions, Millennials and CSR: How to Engage the New Leaders of Tomorrow". Cone Communications. Accessed online 24 September 2015. www.conecomm.com/csr-and-millennials.

Cameron, E.; Erickson, C.; Prattico, E; and Schuchard, R., 2015. "Business in a Climate-Constrained World (Second Edition): Creating an Action Agenda for Private-Sector Leadership on Climate Change." BSR Working Paper. BSR, San Francisco.

Cameron, E. & Wei, D. 2015. "Words Matter in the Paris Agreement". BSR. Accessed online 24 September 2015. www.bsr.org/en/our-insights/blog-view/words-matter-in-the-paris-climate-agreement.

Cotton Incorporated. 2015. "Agriculture: Water". Cotton. Accessed online 15 October 2015. cottontoday.cottoninc.com/agriculture/water/

Daniels, J. 2015. "California drought: LA braces as cotton acreage falls." CNBC. Accessed online 13 October 2015. www.cnbc.com/2015/04/17/california-drought-la-braces-as-cotton-acreage-falls.html.

Danziger, P. 2011. Putting the Luxe Back in Luxury. Paramount Market Publishing, Inc.

Emberson, L. 2014. "Organic Cotton Helps to Feed the World". Soil Association. Accessed 23 online October 2015. www.soilassociation.org/LinkClick.aspx?fileticket=sdODqL88zFk%3D&tabid=2128.

Food and Agriculture Organization (FAO). 2015. "Crop Water Information: Cotton". FAO Water Development and Management Unit. Accessed online 15 October 2015. www.fao.org/nr/water/cropinfo_cotton.html.

Fuchs, B. 2013. "August 2013, Drought and Impact Summary." National Drought Mitigation Center. Accessed online 13 October 2015. drought.unl.edu/NewsOutreach/MonthlySummary/august2013DroughtandImpactSummary.aspx.

Goldenberg, S. 2014. "Climate change: the poor will suffer most". The Guardian. Accessed online 24 September 2015. www.theguardian.com/environment/2014/mar/31/climate-change-poor-suffer-most-un-report.

Hewston, R.; Allan, J.; Dobson, O. and Nichols, W. 2015. "Assessing climate change risks in commodity supply chains". Verisk Maplecroft.

Howard, E. 2015. "A beginner's guide to fossil fuel divestment". The Guardian. Accessed online 22 October 2015. www.theguardian.com/environment/2015/jun/23/a-beginners-guide-to-fossil-fuel-divestment.

International Fund for Agricultural Development (IFAD). 2013. "Smallholders, food security, and the environment". IFAD & UNEP. Accessed online 7 October 2015. www.ifad.org/climate/resources/smallholders_report.pdf.

International Panel on Climate Change (IPCC). 2007. "Projections of Future Changes in Climate". IPCC Fourth Assessment Report: Climate Change. Accessed online 24 September 2015. www.ipcc.ch/publications_and_data/ar4/wg1/en/spmsspm-projections-of.html.

Kering. 2012. Environmental Profit & Loss account (E P&L)". Kering. Accessed online 15 October 2015. www.kering.com/en/sustainability/whatisepl.

Meiers, R. 2015. "Business and the Sustainable Development Goals: What to Expect and How to Lead". BSR. Accessed online 15 October 2015. www.bsr.org/our-insights/blog-view/business-and-the-sustainable-development-goals.

Mellery-Pratt, R. 2014. "Tapping Travellers Beyond Traditional Corridors": Business of Fashion. Accessed online 24 September 2015. www.businessoffashion.com/articles/intelligence/as-sector-shifts-travel-retail-taps-travellers-beyond-traditional-corridors-global-blue-dfs-group.

National Animal Disease Information Service (NADIS). 2015. "Managing Heat Stress in Dairy Cows". NADIS. Accessed online 23 October 2015. www.nadis.org.uk/bulletins/managing-heat-stress-in-dairy-cows.aspx.

National Oceanic and Atmospheric Administration (NOAA). 2014. "Billion-Dollar Weather and Climate Disasters: Table of Events". NOAA. Accessed online 23 October 2015. www.ncdc.noaa.gov/billions/events.

Natural Resources Defense Council (NRDC). "Clean by Design". Accessed online 15 October 2015. www.nrdc.org/international/cleanbydesign/

Natural Resources Defense Council (NRDC). "Clean by Design: Transportation". Accessed online 24 September 2015. www.nrdc.org/international/cleanbydesign/transportation.asp.

Niemtzow, E. 2011. "2011 in Retrospect: What Luxury Brands Teach Us about Sustainability". CSR Wire. Accessed online 24 September 2015. www.csrwire.com/blog/posts/250-2011-in-retrospect-what-luxury-brands-teach-us-about-sustainability.

Nike. 2015. "MIT Climate CoLab and Nike Call for Materials Innovation to Combat Climate Change". Nike. Accessed online 15 October 2015. news.nike.com/news/nike-inc-and-mit-climate-colab-materials-innovation-to-combat-climate-change.

"Nike Sustainability Homepage". Nike. Accessed online 24 September 2015. about.nike.com/pages/sustainability.

Norton, T.; Ryan, M., and Wang, F. 2015. "Business Action for Climate-Resilient Supply Chains". BSR. Accessed online 24 September 2015. www.bsr.org/en/our-insights/report-view/climate-resilient-supply-chains.

Notre Dame Global Adaptation Index (ND-GAIN). Accessed online 15 October 2015. index.gain.org/

Packham, C. 2014. "Australia cuts wheat output forecast on worries over drought". Reuters. Accessed online 13 October 2015. www.reuters.com/article/2014/12/01/australia-commodities-abares-idUSL3N0TSLVQ20141201.

Paul, S. 2015. "Erratic weather threatens India's poorest silk producers". Reuters. Accessed online 13 October 2015. www.reuters.com/article/2015/04/01/us-india-silk-climatechange-idUSKBNOMS4JQ20150401.

Pimbert, M. and Wakeford, T. 2002. "Prajateerpu: A Citizens Jury/Scenario Workshop on Food and Farming Futures for Andhra Pradesh, India." IIED & IDS. Accessed online 23 October 2015. pubs.iied.org/pdfs/9135IIED.pdf.

Pinkhasov, M. and Nair, R.J. 2014. Real Luxury. London and New York: Palgrave Macmillan.

Prattico, E. 2015. "Black Carbon: An Opportunity for Low Carbon Leadership," BSR and The Climate Group. Accessed online 15 October 2015. [www.theclimategroup.org/_assets/files/Health-briefing\(2\).pdf](http://www.theclimategroup.org/_assets/files/Health-briefing(2).pdf).

"RE100 Homepage". Accessed 24 September 2015. there100.org/

SRI-CONNECT. 2014. "The Independent Research in Responsible Investment 2014". Accessed online 24 September 2015. www.reprisk.com/marketing/wp-content/uploads/2014/12/IRRI_Results_B-1.pdf.

Economics and Statistics Administration. 2013. Economic Impact of Hurricane Sandy: Potential Economic Activity Lost and Gained in New Jersey and New York. U.S. Department of Commerce.

United States Department of Agriculture (USDA). 2015. "Planted Acreage Update". Accessed online 24 September 2015. www.usda.gov/nass/PUBS/TODAYRPT/crop0815.pdf.

"We Mean Business Homepage". Accessed 24 September 2015. www.wemeanbusinesscoalition.org/

Wong, J. and Schuchard, R. 2011. "Adapting to Climate Change: A Guide for the Consumer Products Industry". BSR. 23 May 2011. Accessed online 24 September 2015. www.bsr.org/en/our-insights/report-view/adapting-to-climate-change-a-guide-for-the-consumer-products-industry.

World Bank, Government of Thailand & Global Facility for Disaster Reduction and Recovery. 2012. "Thai Flood 2011: Rapid Assessment for Resilient Recovery and Reconstruction Planning". The World Bank. Accessed online 15 October 2015. reliefweb.int/sites/reliefweb.int/files/resources/Full_Report_3858.pdf.



ABOUT BSR

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



ABOUT KERING

A world leader in apparel and accessories, Kering develops an ensemble of powerful Luxury and Sport & Lifestyle brands: Gucci, Bottega Veneta, Saint Laurent, Alexander McQueen, Balenciaga, Brioni, Christopher Kane, McQ, Stella McCartney, Tomas Maier, Sergio Rossi, Boucheron, Dodo, Girard-Perregaux, JeanRichard, Pomellato, Qeelin, Ulysse Nardin, PUMA, Volcom, Cobra and Electric. By 'empowering imagination' in the fullest sense, Kering encourages its brands to reach their potential, in the most sustainable manner. Present in more than 120 countries, the Group generated revenues of €10 billion in 2014 and had more than 37,000 employees at year end. The Kering (previously PPR) share is listed on Euronext Paris (FR 0000121485, KER.PA, KER.FP).