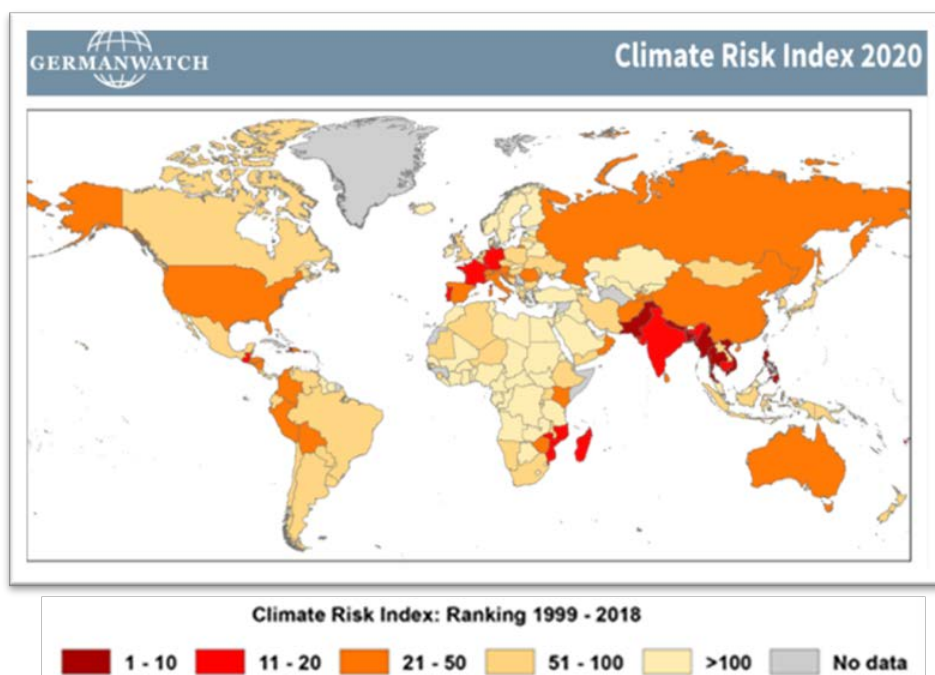


**What Are Extreme Weather Events?** A weather event that falls outside normal pattern is classified as extreme weather. Outside of normal patterns are defined as weather conditions that are unseasonal, unexpected, or intensity that's outside of local historical norm. Though the threshold is subjective, commonly, extreme events are those that occur in the highest or lowest 5% or 10% of historical measurements. The main types of extreme weather are:

- Blizzards
- Cyclones, Hurricanes, and Typhoons
- Droughts and Heat Waves
- Dust Storms
- Hail
- Monsoons
- Thunderstorms
- Tornados
- Wildfires

Due to the variety of types, there are no places in the world protected from extreme weather events. According to the 15th edition of the World Economic Forum (WEF) Global Risks Report 2020<sup>i</sup>, Extreme Weather Events is the number one ranked global risk in terms of likelihood and impact in the next 10 years. Advancements in technology have increased predictability, but many events occur or escalate with limited warning.

**What Global Regions Are Most Impacted By Extreme Weather Events?** Over the past decade, the top ten extreme weather events in the United States have resulted in more than \$400 billion in damages and more record-breaking catastrophes seem to be occurring every year, according to a report by Weatherwise<sup>ii</sup>. The following global map<sup>iii</sup> comparatively visualizes countries and regions affected by impacts of weather-related loss events using data from 1999 to 2018.



**Did You Know...**

These storm types are essentially the same but are given different names depending on geography: **Hurricanes** (North Atlantic Ocean and Northeast Pacific); **Cyclones** (South Pacific and Indian Ocean); **Typhoons** (Northwest Pacific Ocean)

(Source: [BBC](#))

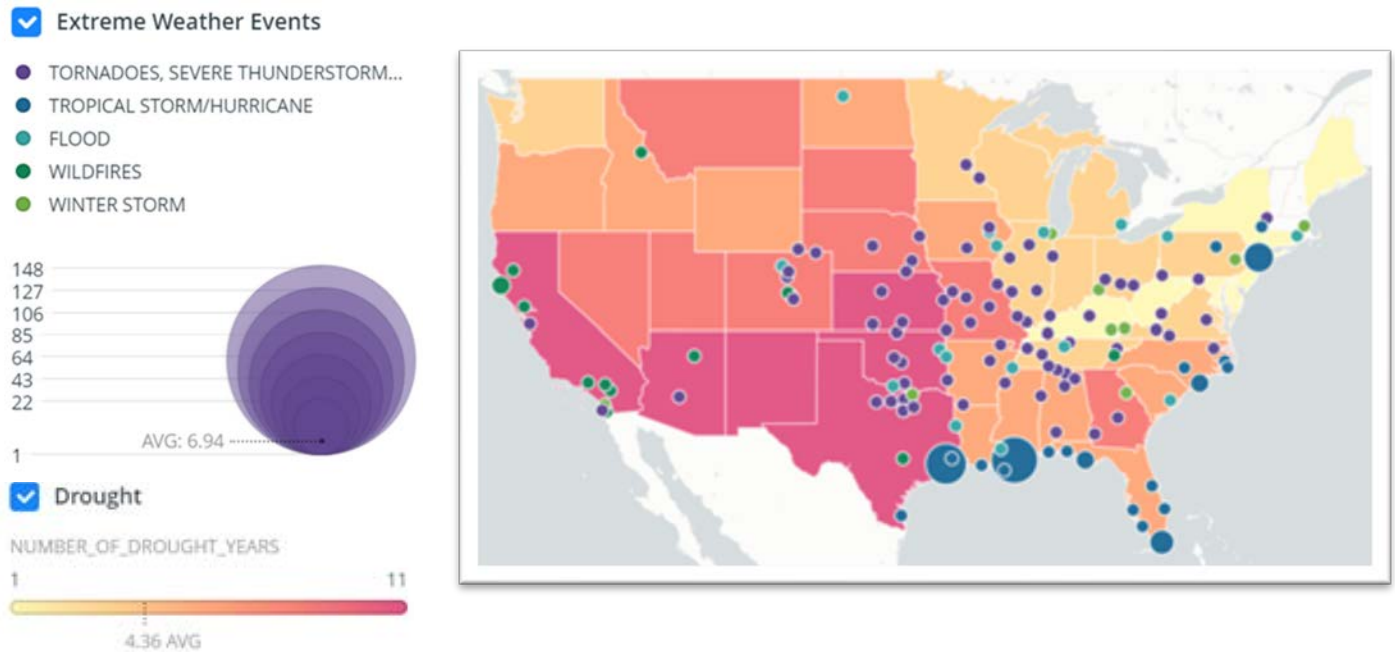
**“Weather”** refers to local changes in the climate we see around us, on short timescales from minutes to hours to days to weeks (snow storms, hurricanes, etc.). **“Climate”** refers to longer-term regional or global averages and can be thought of as the weather averaged over several seasons, years or decades.

(Source: [NASA](#))

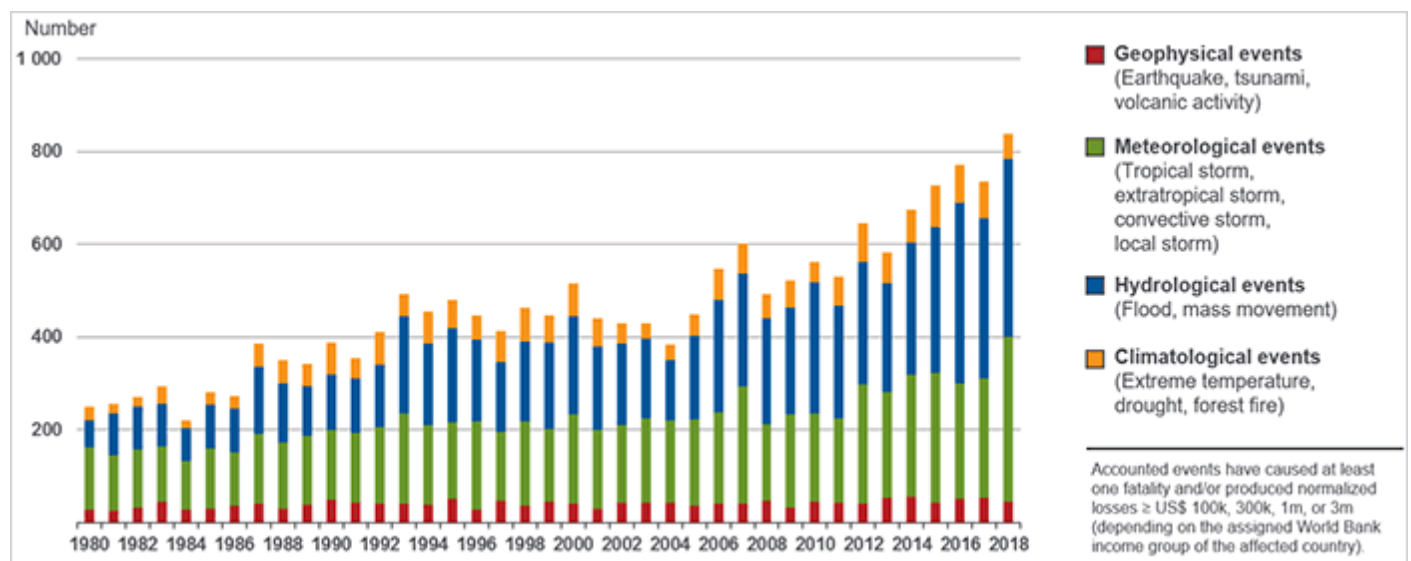
**The Global Climate Risk Index 2020: 10 Most Affected Countries<sup>iv</sup>**

1. Japan
2. Philippines
3. German
4. Madagascar
5. India
6. Sri Lanka
7. Kenya
8. Rwanda
9. Canada
10. Fiji

The following map<sup>v</sup>, from the Center for Climate and Energy Solutions (C2ES) provides a visual overview of Billion-Dollar Extreme Weather Events from 2000-2019 in the United States.



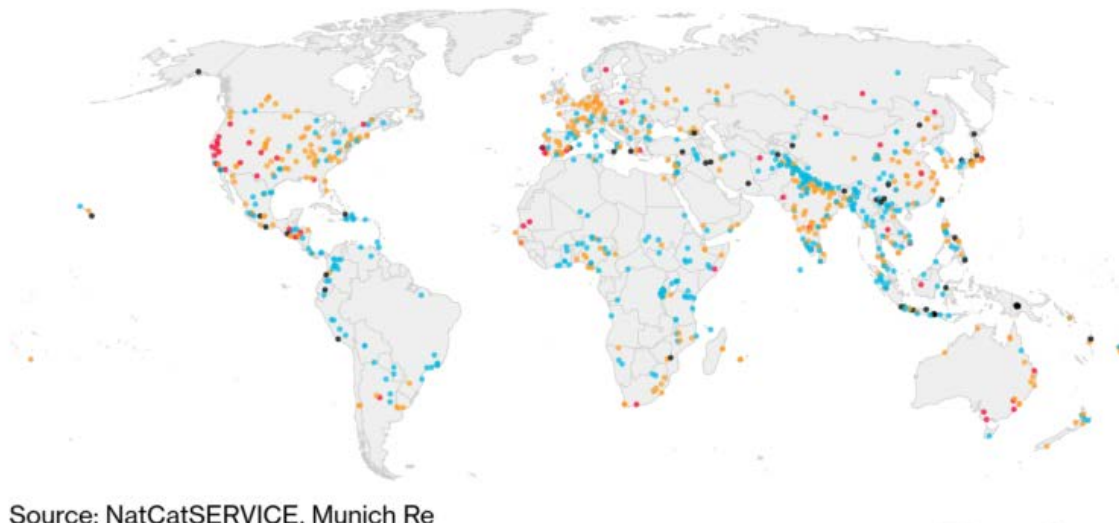
**What Are the Trends in Extreme Weather Events?** According to the National Oceanic and Atmospheric Administration (NOAA), the most recent winter (November 2019 – February 2020) was the second hottest based upon records dating back to 1880. The hottest winter was in 2015-2016. Additionally, extreme weather events have steadily progressed upwards as visualized in the following graphics and analyzed through over five decades of research by Munich Re<sup>vi</sup>.



Source: 2019 Munich Re, Geo Risks Research, NatCatSERVICE. As of March 2019.

## High-Loss Events in 2018

- **Geophysical**  
Earthquakes, volcanos and tsunamis
- **Hydrological**  
Floods, landslides and avalanches
- **Meteorological**  
Storms, typhoons and cyclones
- **Climatological**  
Wildfire, drought and extreme weather



Source: NatCatSERVICE, Munich Re

Source: Claims Journal. April 1, 2019. <https://www.claimsjournal.com/news/national/2019/04/01/290135.htm>

### What Are Some Leading Tools for Evaluating Extreme Weather?

[U.S. Climate Extremes Index \(CEI\)](#) – the CEI summarizes and presents a complex set of multivariate and multidimensional climate changes in the United States so that the results can be easily understood and used in policy decisions made by non-specialists in the field.

[Carbon Brief Map](#) – an interactive map to explore how climate change affects extreme weather around the world, including an assessment of human influence.

[Climate Impact Lab's Climate Impact Map](#) – a tool that allows users to see how temperatures will change on a county-by-county level in various climate change scenarios.

[Senses Earth](#) – a module to explore how the world could be affected by extreme events at different global warming levels.

[Severe Weather Information Centre 2.0 \(Beta\)](#) – a World Meteorological Organization (WMO) website that provides a single and centralized source for the media and the general public to access official warning and information on severe weather events.




[Worldwide Water Watch List](#) – a monthly update provided by iSciences forecasting global water anomalies with lead times from 1-9 months.

[Munich Re Analysis](#) – research and data analysis on category-specific natural disasters and weather events from an economic loss and insurance perspective.

[Climate & Disaster Risk Screening Tools](#) – an inventory of tools, maintained by the World Bank, providing information on climate data, climate change impacts and adaptation, and other useful information that can help you better understand climate and disaster risks to your national- or project-level activities.

[Global Climate Risk Index](#) – an index maintained by Germanwatch, which analyzes to what extent countries and regions have been affected by impacts of weather-related loss events (storms, floods, heat waves etc.). Data from 1999 to 2018 was utilized for the 2020 CRI Index.

**How Can Extreme Weather Impact the Beverage Industry?** Extreme weather can affect businesses across the value chain, as well as impacting the local community and environment. The following are common business considerations:

<p><b>Upstream / Sourcing</b></p> 	<ul style="list-style-type: none"> <li><input type="checkbox"/> Which first and second tier suppliers are most susceptible to extreme weather or natural disasters? Are any of these suppliers sole source or business critical?</li> <li><input type="checkbox"/> Do key suppliers have business continuity plans that include extreme weather events?</li> <li><input type="checkbox"/> How will the supply versus demand for goods and services change during an extreme weather event and how will that impact sourcing? Could there be material price volatility?</li> <li><input type="checkbox"/> Are sourcing disruptions incorporated into insurance (e.g. a stock throughput program (STP) for goods in transit and/or stock and inventory)?</li> </ul>
<p><b>Beverage Manufacturing</b></p> 	<ul style="list-style-type: none"> <li><input type="checkbox"/> Is your facility located in or near an area more likely to experience extreme weather? Is there a viable monitoring and alert system?</li> <li><input type="checkbox"/> Does the facility have adequate insurance? What is and is not covered?</li> <li><input type="checkbox"/> Can mechanical, electrical, HVAC, IT, and other critical equipment be better protected or moved to a more secure location?</li> <li><input type="checkbox"/> Does the facility's business continuity plan include extreme weather and natural disaster events?</li> <li><input type="checkbox"/> How sensitive are key utility sources (e.g. electricity, water quantity and quality, wastewater)?</li> <li><input type="checkbox"/> Is documentation necessary for federal, state, or local assistance during a disaster prepared and protected?</li> <li><input type="checkbox"/> How would employees be communicated with before, during, and after an extreme weather or natural disaster event?</li> </ul>
<p><b>Downstream / Market</b></p> 	<ul style="list-style-type: none"> <li><input type="checkbox"/> Does the local community have adequate disaster and resiliency plans that consider extreme weather and natural disasters?</li> <li><input type="checkbox"/> What are community expectations for businesses during such events?</li> <li><input type="checkbox"/> How does the facility communicate to customers during such events and what are main needs that the facility could support?</li> </ul>

**What Are the Potential Financial Impacts from Extreme Weather Events?** The following provides guidance on considering the potential financial impacts associated with extreme weather events and natural disasters. It is important to point out that while negative impacts are summarized in this section, proper assessment and mitigation of related risks can create positive impacts, cost avoidance, and competitive advantages.

Financial Category	Description	Potential Business Impacts
Revenue and Sales	Income from normal business activities, usually from the sale of goods and services	<ul style="list-style-type: none"> <li>▪ Loss of revenue from operational disruption (facility downtime, raw material supply, and/or distribution)</li> </ul>
Expenditures: OpEx	Ongoing operating expenditures to run a facility	<ul style="list-style-type: none"> <li>▪ Higher expenses for mitigation measures, insurance premiums, and/or recovery expenses</li> </ul>
Procurement Costs	Volatility in cost and/or availability of raw materials	<ul style="list-style-type: none"> <li>▪ Increased costs due to need for sourcing from alternative producers, delays in receiving materials, and/or supply versus demand price volatility</li> </ul>
Assets: CapEx	Capital expenditures where the benefit continues over a long period; non-recurring nature; results in acquisition of permanent assets	<ul style="list-style-type: none"> <li>▪ Higher capital expenditures for mitigation measures and asset protection</li> </ul>
Assets: Tangible	Changes in the value of tangible assets (land, equipment, facilities, reserves, cash, etc.)	<ul style="list-style-type: none"> <li>▪ Increased cost due to physical damage or impairment of assets</li> </ul>
Assets: Intangible	Changes in the value of intangible assets (brand, copyrights, goodwill)	<ul style="list-style-type: none"> <li>▪ Not material for extreme weather events</li> </ul>

Liabilities and Financing	Changes in current liabilities, long-term debt liabilities, and equity capital	<ul style="list-style-type: none"> <li>▪ Restricted access to capital and debt markets</li> <li>▪ Increased exposure to divestment risk</li> </ul>
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**What is BIER?** The Beverage Industry Environmental Roundtable (BIER) is a technical coalition of leading global beverage companies working together to advance environmental sustainability within the beverage sector and beyond. Formed in 2006, BIER aims to accelerate sector change and create meaningful impact on environmental sustainability matters. Through development and sharing of industry-specific analytical methods, best practice sharing, and direct stakeholder engagement, BIER accelerates the process of analysis to sustainable solution development. For more information, please visit: [www.bierroundtable.com](http://www.bierroundtable.com).

BIER is facilitated by Antea Group (<https://us.anteagroup.com>)



#### References

- <sup>i</sup> <https://www.weforum.org/reports/the-global-risks-report-2020>
- <sup>ii</sup> Douglas LeComte (2020) A Decade of Extremes: The Top-10 Record-Breaking Events of Recent Years, *Weatherwise*, 73:2, 14-23, DOI: 10.1080/00431672.2020.1705698
- <sup>iii</sup> [www.germanwatch.org/en/cr](http://www.germanwatch.org/en/cr)
- <sup>iv</sup> GERMANWATCH. Global Climate Risk Index 2020. <https://www.germanwatch.org/en/17307>
- <sup>v</sup> <https://www.c2es.org/content/extreme-weather-and-climate-change/>
- <sup>vi</sup> <https://www.munichre.com/en/risks/natural-disasters-losses-are-trending-upwards.html>