Beyond Single-Hazard Thinking: The Future of Climate Risk Assessments

Climate impacts are not isolated events. Organizations are experiencing multiple climate-related disruptions back-to-back, exposing limitations in both risk assessments and responses. Most climate risk models evaluate hazards one at a time, overlooking how events may compound, reinforce and accelerate operational and financial stress.

Why it matters

When climate risks are evaluated in isolation, organizations underestimate aggregate climate exposure, overlook vulnerabilities and struggle to respond effectively.

What the evidence shows

Climate hazards (e.g., drought, wildfire, flood risk) are not independent phenomena because they share atmospheric drivers. When the conditions are right, the physics of our climate system makes hazards occur simultaneously and in rapid succession. This increases cumulative fatigue on infrastructure, supply chains and the workforce.

In September 2024, Baxter International's manufacturing plant in North Carolina, supplying about 60% of the IV fluids for the US, was forced to temporarily shut down due to Hurricane Helene's rainfall and storm surge. Closure of this single plant disrupted medical supply chains across the US and led to a 19-year low in the company's stock price. In this example, Multiple compounding impacts, including heavy rainfall, high winds, power outages and damage to roads, slowed recovery and contributed to widespread shortages. Production capacity was not restored until February 2025, leading hospitals to secure alternative sources and adopt conservation measures.

Pacific Gas and Electric Company (PG&E) faced repeated Public Safety Power Shutoffs in recent years when combinations of high winds, dry vegetation due to drought and elevated fire danger emerged simultaneously. In 2024, PG&E pre-emptively cut electricity to thousands of homes and businesses in northern California to reduce wildfire risk, interrupting operations and economic activity. Similarly, in 2019, coordinated shutoffs affected up to 800,000 customers, with an estimated three million people experiencing outages as PG&E reacted to extreme fire-weather conditions. These overlapping climate conditions illustrate how compounding hazards can disrupt business continuity in ways that are not captured by single-hazard assessment models.

The blind spot for business

- **Risk management processes often struggle to assess the interdependencies and dynamic nature of risk, and climate is no different.** Existing climate risk assessment tools evaluate risk scores by hazard but often do not take the next step of overlaying multiple risks and assessing the interconnectivity and dynamism.
- **Current climate risk assessments are not designed for interconnected risks.** Most hazard maps and scoring tools do not capture interactions between acute climate events (e.g., extreme fire year) and chronic climate conditions (e.g., long-term degraded air quality). This can cause organizations to underestimate their true risk and overlook the impact of multiple climate events in the same season.
- **Black swan events are becoming routine, but many climate assessments still treat extremes as outliers.** Climate-driven disruptions do not always build gradually; systems can hit tipping points where failures cascade and accelerate rapidly. Failing to develop contingency plans for these scenarios can threaten the effectiveness of business continuity plans.

What you can do about it

A risk assessment is not the end goal; it's a starting point for making better decisions and taking the right actions. If your assessment only looks at one hazard at a time, it can miss how risks build on each other and create bigger disruptions than any single event would suggest. Expanding from single hazard scoring to compounding and interconnected hazards can show where impacts stack, cascade or trigger secondary failures across operations and supply chains. With that clearer picture, organizations can prioritize the right interventions, coordinate across teams and move faster from analysis to more effective actions supporting resilience.

Here's how you can expand your climate risk assessment in 2026:

1. **Assess climate risks as interconnected, not independent.** Expand scenario analysis to assess how multiple hazards interact within the same timeframe.
2. **Update assumptions on frequency and duration of disruption.** Reflect the increasing likelihood of multiple events with less time to recover in between and consider business continuity in the face of black swan events.
3. **Review mitigation actions through a systems lens.** Evaluate how risk mitigation actions are affecting exposure across multiple criteria (e.g., price, operational efficiency, reliance on critical suppliers), to support decisions that strengthen resilience instead of shifting risk.
4. **Integrate climate risk into risk management, business continuity and operations planning.** Make sure climate risk assessments go beyond presentation of results and are integrated into the day-to-day decisions and actions of the business.
5. **Invest in more dynamic and iterative risk analysis.** Keep a pulse on how climate risk evolves throughout the year through indicator monitoring and stress testing.

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