



# What Is a Global Polycrisis?

And how is it different from a systemic risk?

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## Summary

We define a **global polycrisis** as any combination of three or more interacting systemic risks with the potential to cause a cascading, runaway failure of Earth's natural and social systems that irreversibly and catastrophically degrades humanity's prospects.

A **systemic risk** is a threat emerging within one natural, technological, or social system with impacts extending beyond that system to endanger the functionality of one or more other systems.

A global polycrisis, should it occur, will inherit the four core properties of systemic risks—extreme complexity, high nonlinearity, transboundary causality, and deep uncertainty—while also exhibiting causal synchronization among risks.

### 1. A brief history of the polycrisis concept

The concept “polycrisis” was first and very briefly introduced by the French philosopher, sociologist, and complexity theorist Edgar Morin and co-author Anne Brigitte Kern in their 1999 book *Homeland Earth: A Manifesto for a New Millennium*. These authors wrote of “interwoven and overlapping crises” affecting humanity and argued that the most “vital” problem of the day was not any single threat but the “complex intersolidarity of problems, antagonisms, crises, uncontrollable processes, and the general crisis of the planet”—a phenomenon they labeled the polycrisis (Morin and Kern 1999, 74).

Adopting the concept from Morin and Kern in 2013, South African sociologist and sustainable-transition theorist Mark Swilling defined a polycrisis as “a nested set of globally interactive socio-economic, ecological and cultural–institutional crises that defy reduction to a single cause” (2013, 98). Swilling has since used the concept as a comprehensive label for the multiple interconnected crises facing the global political economy, including climate change, rising inequality, and the threat of financial crises (Swilling 2019; 2013).

These authors use the definite article “the”—as in “the polycrisis”—to indicate they are referring to a singular phenomenon that is already occurring. They all emphasize the simultaneity of crises and the connections between them, but Swilling more explicitly proposes that these connections produce complex interactions that multiply the crises' total impact.

More recent scholarship (2018-2022) has used “polycrisis” to refer to the simultaneous crises the European Union faced in the aftermath of the 2008-9 global financial crisis. Most of this writing appeared in a 2019 special issue in the *Journal of European Public Policy* entitled “The European Union beyond the Polycrisis? Integration and Politicization in an Age of Shifting Cleavages” (Zeitlin, Nicoli, and Laffan 2019). The authors of this special issue use the term somewhat loosely to describe the simultaneous occurrence of several crises the EU faced in the mid- and later-2010s, including the sovereign debt crisis of southern European states, the refugee and

migration crisis precipitated substantially by the Syrian civil war, Brexit, and the rise of far-right authoritarianism. Their usage implied that a polycrisis can be contained or limited to a particular geopolitical area (although the European refugee crisis and Brexit had ramifying global impacts).

A 2018 speech by then-President of the European Commission Jean-Claude Juncker encouraged the use of the polycrisis concept in this context. Juncker declared that after years of dealing with challenges on multiple fronts, the EU had “slowly but surely turned the page from this so-called polycrisis” (Juncker 2018). He implied that the European polycrisis was a temporary confluence of risk events.

In the philanthropic community, the [Omega Resilience Funders Network](#) (ORFN) has explicitly adopted the polycrisis concept to frame its philanthropic interests. It describes the polycrisis on its website as “the sum total of all stressors affecting planetary health,” distinguishing between “biosphere stressors” (e.g., climate crisis, biodiversity loss, ocean acidification), “societal stressors” (e.g., poverty, supply chain vulnerabilities, war), and “technological stressors” (e.g., automation and AI, cyber threats, data threats to democracy). ORFN also describes the polycrisis as unprecedented, suggesting that it is not simply the aggregation of discrete stressors at any given time—but a novel phenomenon emerging from the stressors’ convergence and interaction (Lerner 2022).

These various uses of the term “polycrisis” raise four questions:

1. How is a polycrisis distinct from a systemic risk?
2. How many interacting risks are required for a polycrisis?
3. What are the core properties of a polycrisis?
4. What is the difference between a polycrisis and a *global* polycrisis? (And is there value in referring to *the* global polycrisis?)

We will address these questions in turn.

## 2. Systemic risk

Several scholars have recently summarized the technical literature’s various conceptualizations of systemic risk and arrived at a comprehensive list of the phenomenon’s core properties (Sillmann et al. 2022; Renn et al. 2020; 2019). While not authoritative (Sillmann et al. 2022), Renn et al. (2020) provide perhaps the clearest definition, describing systemic risks as potential threats that endanger the functionality of systems of critical importance for society whose impacts may extend beyond the system of origin to affect other systems and functions.”

## Core properties

A consensus has developed among scholars that systemic risks exhibit four properties:

1. **extremely complex and dynamic networks** of multiple, synergistic causes and feedback loops (Renn et al. 2020; 2019; Schweizer and Renn 2019);
2. **highly nonlinear cause-effect relationships** (disproportional causation), with numerous equilibria, unpredictable tipping points, and hysteresis (Schweizer and Renn 2019; Renn et al. 2019);
3. **causal processes that cross boundaries** of administrative and political units, social sectors, and scientific disciplines and that operate on multiple time scales across natural, social, and technological systems (Renn et al. 2020; Schweizer and Renn 2019); and
4. **deep uncertainty** about both underlying causes and ultimate consequences (Renn et al. 2020; Schweizer and Renn 2019).

Some scholars argue that systemic risks must operate at the global scale (Schweizer and Renn 2019; Renn et al. 2019), while other say they may arise and remain at sub-global scales (Sillmann et al. 2022). Many emphasize that high stochasticity characterizes systemic-risk consequences (Schweizer and Renn 2019; Renn et al. 2019) and that this property increases uncertainty surrounding these risks and leads to “black swan” outcomes (i.e., unknown unknowns).

## How many systems?

Systemic risk is generally understood to arise within a single system (often called “the system of origin”), and then cascade beyond that system’s boundary into neighboring systems (“spillover systems”). A literature scan shows the concept is generally used to describe a risk originating within one system of origin (for example, a financial, climate, food, or health system) that then cascades into *one or two* spillover systems. For example, a drought affecting crop yields in one region (system of origin) leads to food shortages in another region (spillover system #1) that in turn trigger social unrest and violence (spillover system #2) (Gaupp 2020). In this case, the systemic risk includes the initial drought and the cascading consequences in two spillover systems.

The systemic risk literature acknowledges that systems and their boundaries are difficult to define (Sillmann et al., 2022). Identifying a system of origin and tracing a risk’s transboundary spillover effects are inherently intersubjective and often negotiated exercises.

Scholarship on systemic risk does acknowledge the importance of interactions and interconnections *among* systemic risks (for instance, between the COVID-19 pandemic and climate change), which provides a useful bridge between the concepts of systemic risk and global polycrisis.

### 3. What is a (global) polycrisis?

#### How is a polycrisis distinct from a systemic risk?

Compared to systemic risk originating within a *single system*, a polycrisis describes the aggregate risk emerging from systemic risks that arise simultaneously in *multiple systems*. This aggregate risk often feeds back to produce additional impacts on the system of origin and on the spillover systems that each systemic risk implicates.

For example, the systemic risk described above (drought → food scarcity and price increases → social unrest and violence) could interact with another systemic risk (global geopolitical competition among great powers → foreign election interference) to magnify negative outcomes in the social systems in question (in the form of, for example, election of authoritarian regimes and further domestic instability). These latter outcomes could then feed back to worsen the underlying food crisis. Interactions among systemic risks can also produce ramifying consequences that extend to additional systems; in this case, for example, heightened domestic instability in multiple nations could reduce international cooperation to address future pandemics.

#### How many interacting risks are required for a polycrisis?

The prefix “poly-” means many or several. Interactions between two systemic risks (for instance, between the pandemic and climate change), while perhaps complex, can be analyzed effectively without invoking the polycrisis concept. But interactions among *three or more interconnected systemic risks* are generally far harder to analyze, because the number of combinatorial possibilities arising from these interactions explodes. We argue that the “polycrisis” concept is a useful label for the *emergent risk* in such cases.<sup>1</sup>

#### What are the core properties of a polycrisis?

Because a polycrisis arises from systemic risks, it inherits those risks’ four core properties: extreme complexity, high nonlinearity, transboundary causality, and deep uncertainty. In addition to these four core properties, a polycrisis also exhibits, we argue, the property of *synchronized inter-systemic behavior*.

In physics, synchronization refers to the alignment of periodic orbits (i.e., oscillators) of coupled systems (Pikovsky and Rosenblum 2007). For instance, randomly ticking metronomes will quickly synchronize their oscillations if placed close together on a lightweight platform (which we refer to as a “substrate”) that allows some lateral movement.

In a polycrisis, this type of phase synchronization, we argue, produces a temporal alignment of systemic risks. As a result, they can “go critical” simultaneously or in quick succession; this simultaneity can then produce the “synchronous failure” of the interconnected systems (Homer-Dixon et al. 2015).

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<sup>1</sup> By “emergent” risk we mean risk that is greater than the sum of the individual systemic risks.

**What is the difference between a polycrisis and a *global* polycrisis?**

A polycrisis is any combination of three or more interacting systemic risks that produces a single, emergent crisis. The consequences could be confined to a particular geographical region or geopolitical jurisdiction and not escalate to the global scale. A *global* polycrisis, in contrast, must be planetary in scale. Specifically, we define a global polycrisis as *any combination of three or more interacting systemic risks with the potential to cause a cascading, runaway failure of Earth’s natural and social systems that irreversibly and catastrophically degrades humanity’s prospects.*

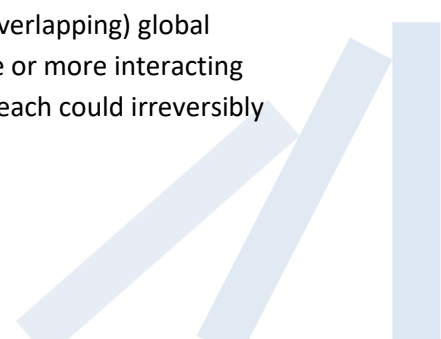
This threshold of harm—referred to as the “catastrophe threshold”—is borrowed from the related concept of global catastrophic risk (GCR). GCR refers to global risks (such as asteroid impacts or mega-volcanic eruptions) that originate in a single source system but have consequences of an unprecedented magnitude on the entire human species. Sometimes scholars express the catastrophe threshold separating normal risks from GCRs in terms of the number of human lives lost or negatively affected, such as 10 percent of the global population (Cotton-Barratt et al. 2016; Turchin and Denkenberger 2018); other times they describe the threshold qualitatively as an irreversible collapse of civilization (Baum 2010; GCRI 2022).

Table 1 summarizes the distinctions between systemic risk, GCR, polycrisis, and global polycrisis.

**Table 1: Distinctions between systemic risk, global catastrophic risk, polycrisis, and global polycrisis**

Type of risk	Number of “systems of origin”	Scale of outcomes	Magnitude and reversibility of outcomes
Systemic risk	One	Possibly regional, continental, or global	Typically sub-catastrophic, probably reversible
Global catastrophic risk	One	Global	Irreversible and catastrophic degradation of humanity’s prospects
Polycrisis	Three or more	Possibly regional, continental, or global	Sub-catastrophic, possibly reversible
Global polycrisis	Three or more	Global	Irreversible and catastrophic degradation of humanity’s prospects

As a final note, we hope our proposed definition avoids overextending the global polycrisis concept. Using the locution “*the* global polycrisis” to refer to the aggregate of *all* systemic risks facing humanity reduces the concept’s analytical value. It becomes analogous to “the global problematique.” The conceptualization we propose here makes it possible, instead, to identify and analyze multiple discrete (or overlapping) global polycrises that are developing at the same time—so long as (1) they each involve three or more interacting systemic risks, (2) they unfold on a global scale, and (3) the emergent consequence of each could irreversibly and catastrophically degrade humanity’s prospects.



## Sources

- Baum, Seth. 2010. 'Is Humanity Doomed? Insights from Astrobiology'. *Sustainability* 2 (2): 591–603. <https://doi.org/10.3390/su2020591>.
- Cotton-Barratt, Owen, Sebastian Farquhar, John Halstead, Stefan Schubert, and Andrew Snyder-Beattie. 2016. 'Global Catastrophic Risks 2016'. Global Challenges Foundation, Global Priorities Project. <http://globalprioritiesproject.org/wp-content/uploads/2016/04/Global-Catastrophic-Risk-Annual-Report-2016-FINAL.pdf>.
- Gaupp, Franziska. 2020. 'Extreme Events in a Globalized Food System'. *One Earth* 2 (6): 518–21. <https://doi.org/10.1016/j.oneear.2020.06.001>.
- GCRI. 2022. 'About'. Global Catastrophic Risk Institute. <https://gcrinstitute.org/about/>.
- Homer-Dixon, Thomas, Brian Walker, Reinetta Biggs, Anne-Sophie Crépin, Carl Folke, Eric F. Lambin, Garry D. Peterson, et al. 2015. 'Synchronous Failure: The Emerging Causal Architecture of Global Crisis'. *Ecology and Society* 20 (3): art6. <https://doi.org/10.5751/ES-07681-200306>.
- Juncker, Jean-Claude. 2018. 'Speech by President Jean-Claude Juncker at the Opening Plenary Session of the Ideas Lab 2018 "Europe – Back on Track" of the Centre for European Policy Studies'. *European Commission* (blog). 22 February 2018. [https://ec.europa.eu/commission/presscorner/detail/en/SPEECH\\_18\\_1121](https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_18_1121).
- Lerner, Michael. 2022. 'Changing Times'. *Angle of Vision* (blog). 7 April 2022. <https://angleofvision.org/2022/04/07/changing-times#more-915>.
- Morin, Edgar, and Anne Brigitte Kern. 1999. *Homeland Earth: A Manifesto for the New Millenium*. Advances in Systems Theory, Complexity, and the Human Sciences. Cresskill, N.J: Hampton Press.
- Pikovsky, Arkady, and Michael Rosenblum. 2007. 'Synchronization'. *Scholarpedia* 2 (12): 1459. <https://doi.org/10.4249/scholarpedia.1459>.
- Renn, Ortwin, Manfred Laubichler, Klaus Lucas, Wolfgang Kröger, Jochen Schanze, Roland W. Scholz, and Pia-Johanna Schweizer. 2020. 'Systemic Risks from Different Perspectives'. *Risk Analysis*, December, risa.13657. <https://doi.org/10.1111/risa.13657>.
- Renn, Ortwin, Klaus Lucas, Armin Haas, and Carlo Jaeger. 2019. 'Things Are Different Today: The Challenge of Global Systemic Risks'. *Journal of Risk Research* 22 (4): 401–15. <https://doi.org/10.1080/13669877.2017.1409252>.
- Schweizer, Pia-Johanna, and Ortwin Renn. 2019. 'Governance of Systemic Risks for Disaster Prevention and Mitigation'. *Disaster Prevention and Management: An International Journal* 28 (6): 862–74. <https://doi.org/10.1108/DPM-09-2019-0282>.
- Sillmann, Jana, Ingrid Christensen, Stefan Hochrainer-Stigler, Jo-Ting Huang-Lachmann, Sirkku Juhola, Kai Kornhuber, Miguel D. Mahecha, et al. 2022. 'ISC-UNDRR-RISK KAN Briefing Note on Systemic Risk'. International Science Council. <https://doi.org/10.24948/2022.01>.
- Swilling, Mark. 2013. 'Economic Crisis, Long Waves and the Sustainability Transition: An African Perspective'. *Environmental Innovation and Societal Transitions* 6 (March): 96–115. <https://doi.org/10.1016/j.eist.2012.11.001>.
- . 2019. 'Long Waves and the Sustainability Transition'. In *Handbook of Green Economics*, 31–51. Elsevier. <https://doi.org/10.1016/B978-0-12-816635-2.00003-1>.
- Turchin, Alexey, and David Denkenberger. 2018. 'Global Catastrophic and Existential Risks Communication Scale'. *Futures* 102 (September): 27–38. <https://doi.org/10.1016/j.futures.2018.01.003>.
- Zeitlin, Jonathan, Francesco Nicoli, and Brigid Laffan. 2019. 'Introduction: The European Union beyond the Polycrisis? Integration and Politicization in an Age of Shifting Cleavages'. *Journal of European Public Policy* 26 (7): 963–76. <https://doi.org/10.1080/13501763.2019.1619803>.

