

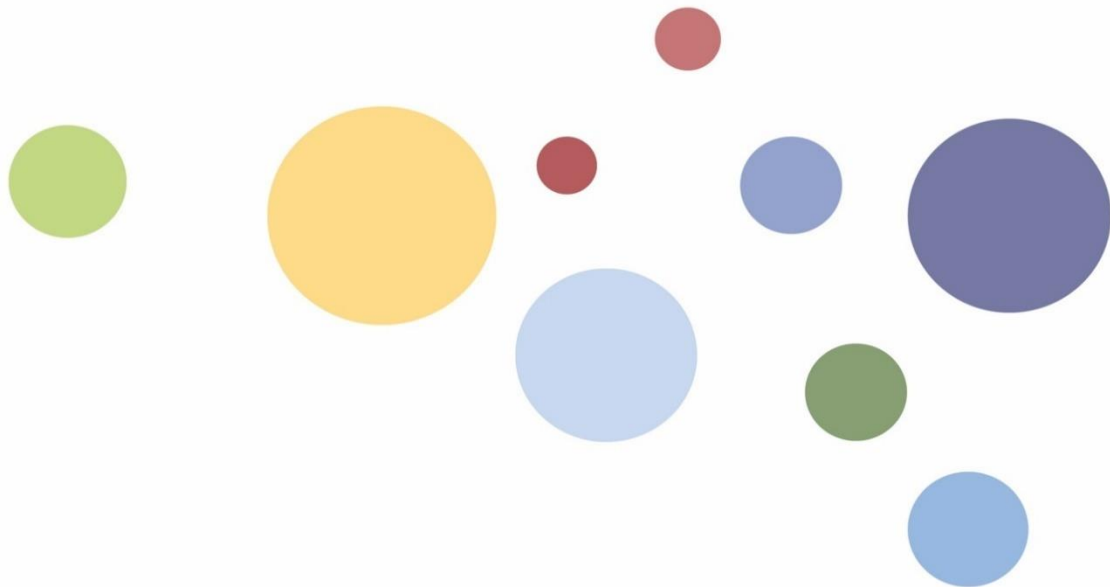
From Polycrisis to Polysolutions

An Interdisciplinary Approach to Complex Global Challenges

*Foundational
Policy brief no. 1**

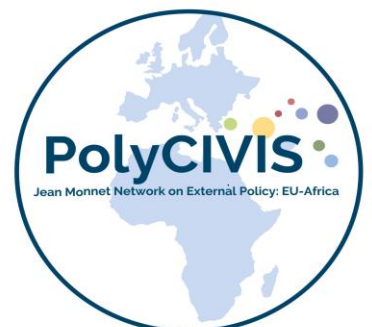
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**By: Dan Schreiber, Sarah Hassnaoui, Anne Weyembergh, Malte Brosig,
Kamatara Kanifa, Anthony Tibaingana**



*This policy brief is a preliminary version. Due to technical issues, some elements may not be fully resolved in this current iteration. An updated version will be published at a later stage, incorporating necessary corrections and improvements. We appreciate your understanding and look forward to sharing the final version with you.

The Polycrisis & Policy Brief Series is coordinated by the *Policy Work Package* which is part of the PolyCIVIS Network. The PolyCIVIS Policy brief series aims to provide actionable insights and recommendations for policymakers, at various levels and to foster dialogue among stakeholders on effective policy responses.



Executive Summary

This PolyCIVIS Foundational Brief explores the complexities of the 'polycrisis', an era defined by interconnected global challenges. Characterised by trans-boundary effects, multiple causality, and complex system properties, the polycrisis presents unique obstacles to traditional governance and policy responses. This paper examines the human dimensions of the polycrisis, focusing on governance, economic systems and public trust. It examines the historical context of crises, emphasising the need to move from short-term, reactive measures to long-term, systemic solutions. It also looks at the politics of framing the polycrisis and how existing governance structures can inadvertently contribute to its intricacy.

Intended Audience

As the cornerstone for the PolyCIVIS project's policy brief series, this Foundational Brief aims to set the stage for bridging the gap between insights from academia and the practical needs of policymakers. It therefore serves a dual purpose for these audiences:

- **Academic Researchers:** the Brief situates existing research and teaching within a comprehensive framework for understanding the polycrisis and its implications.
- **Policymakers and Practitioners:** the Brief aims to offer insights and guiding principles to navigate the complexities of the polycrisis in various fields, addressing the interconnectedness of challenges.

Through this collaborative effort, the PolyCIVIS project aspires to develop holistic strategies that address the root causes of global crises and promote a more resilient and sustainable future.

Key messages

- ❖ The polycrisis is a complex web of interconnected crises, sometimes with cascading effects, that transcend traditional policy boundaries.
- ❖ The dimensions of the polycrisis offer opportunities for concerted responses: global cooperation, resilient economic models, and improving public trust in institutions.
- ❖ While there are historical antecedents to the current polycrisis, its anthropogenic dimension (marked by human-induced amplifiers, such as climate change and globalisation) makes it unique in human history.
- ❖ Traditional governance and policy approaches, rooted in a state-centric model, are ill-equipped to address the dynamic and interconnected nature of the polycrisis.
- ❖ To address the complexities of the polycrisis, this Foundational Brief advocates 'polysolutions' – integrated, multifaceted approaches that address the root causes of interlinked crises. Developing effective polysolutions requires interdisciplinary cooperation, adaptive governance, resilience-building and strategic foresight.

(1) The Polycrisis: A Growing Global Challenge

First coined by two complexity theorists twenty-five years ago, the term “polycrisis” has gained popularity in the post-COVID19 era. [1] The global pandemic put into sharp focus the increasingly multi-directional transmission of complex crises – with human, political, social, economic, environmental and security dimensions – between countries of the North and South. [2] Seen through this lens, the polycrisis is a state of interconnected crises that unfold simultaneously and influence each other. This interconnectedness creates a system that cannot be reduced to single causes, addressed in isolation or as a geographically limited phenomenon. Climate change, migration, economic instability, geopolitical conflict and technological disruption are some of the key areas where polycrisis dynamics are evident. [3]

This PolyCIVIS Foundational Brief, the first in a series on polycrisis, offers a sweeping exploration of this complex phenomenon. It unpacks the defining characteristics of the concept, examines its historical antecedents, and explores the human factors that both drive and amplify its interrelated challenges. Ultimately, this brief argues for a more holistic, adaptive and collaborative approach to managing the polycrisis and building a resilient future. The PolyCIVIS network, bringing together 21 universities from Africa and Europe, is itself embracing this call to action by fostering interdisciplinary and collaborative knowledge exchange between policymakers, researchers, and civil society.

Unpacking the Concept: Beyond Ordinary Challenges

Drawing on complex systems thinking, recent writings from international relations have helped define the polycrisis as characterised by trans-boundary effects, multiple causality, and complex system properties. [4] Trans-boundary effects refer to the ability of the polycrisis to transcend

specific domains and impact various aspects of society. Multiple causality means its chain of events can trigger unexpected consequences. As for its complex system properties, it refers to its self-sustaining nature, caused by a complex web of causal relationships and feedback loops.

Events in recent years can provide useful illustrations. Consider, for example, how climate change can exacerbate food insecurity, which in turn can lead to social unrest, population movements, and political upheaval, as evidenced by the Syrian Civil War and the Arab Spring. [5], [6], [7], [8] These cascading effects illustrate the trans-boundary effects of the polycrisis. In turn, the impact of Russia’s war of aggression against Ukraine on development budgets in other countries is an example of the multiple causality of the polycrisis. Finally, the polycrisis has complex system properties, as seen in how the global financial crisis of the late 2000s and the food crisis of 2010 quickly morphed into interlinked sovereign debt crises, social unrest and political tensions that reinforced each other’s effects, leading to a downward spiral that was difficult to contain.

While these characteristics are fundamental to understanding the polycrisis, they should not be interpreted fatalistically. An ordinary challenge escalates into a crisis when coping capacities are overwhelmed, resulting in urgency and profound disruption. [9] The polycrisis, characterised by multiple, interconnected crises, exacerbates this disruption and severely strains traditional response mechanisms. However, while the polycrisis transcends traditional policy boundaries, it does not expand infinitely; its non-linearity does not rule out the existence of causal links; and its emergent nature does not necessarily translate into an ever-worsening spiral. This understanding, coupled with a recognition of the overwhelmed capacities inherent in a crisis, allows us to identify a clear way forward: the pursuit of ‘polysolutions’, i.e. comprehensive strategies, designed to enhance resilience and adaptability, transcending traditional policy boundaries to

effectively address the interconnected challenges of the polycrisis.

Three Human Dimensions of the Polycrisis: Governance, Economics and Public Trust

The term 'polycrisis' is often used in conjunction with the term 'Anthropocene', highlighting the human drivers of our crisis-prone era. [10], [11] Indeed, 'Anthropocene' describes our current era as characterised by the profound impact of human activity on the planet. The historian and author Adam Tooze, for example, emphasises that anthropogenic factors like industrialisation, deforestation, and fossil fuel use have accelerated environmental degradation, contributing to the complex web of global challenges known as polycrisis. By placing human activity at the centre of our analysis, we can see how the polycrisis connects to three man-made core challenges: effective global cooperation, resilient economic models, and robust public trust in institutions. [12] These three challenges are critical to mitigate its adverse effects and build a sustainable future.

Challenges to Global Governance: Cooperation or Paralysis?

As discussed in the next section, this era of polycrisis poses unprecedented challenges to traditional state-centred approaches and global governance. The post-World War II liberal order and its institutions, designed to address distinct global challenges, are increasingly being tested. Global governance institutions across policy domains are weakening exactly at a time when more cooperation is needed to address the negative consequences of the polycrisis. [13] [14] Effective multilateral cooperation between nations, civil society organisations, the private sector, and the scientific community is essential to share burdens, coordinate action and ensure the equitable distribution of resources. However, rising nationalism, power rivalries and diverging priorities often hamper such cooperation, leading to paralysis and fragmented responses. [15] The United Nations Security Council, for example, is struggling to address complex, multi-faceted conflicts fuelled by interconnected factors such as resource scarcity, political instability and climate change-induced migrations, among other. [16] This illustrates how the polycrisis is overwhelming traditional governance structures, necessitating a rethinking of international cooperation.

Box 1: Why We Fail to Act on Climate Change: On Political Inertia and Collective Indecision

The urgency of the climate change crisis is undeniable, yet global actions remain insufficient.

Part of the challenge lies in the difficulty of translating scientific knowledge about complex Earth systems and climate change into actionable recommendations, amplified by intentional disinformation campaigns. [1]

Political inertia is also compounded by socio-cognitive factors. The concept of "unknown knowns" – facts that are known but not fully grasped or acted upon – plays a significant role. Indeed, while the severe consequences of climate tipping points are undeniable, uncertainties about their exact timing can lead to resistance to change and a discounting of future risks.

Several cognitive biases further impede action, especially when compounded with political realities. For example, hyperbolic discounting, our tendency to favour immediate rewards over larger future ones, is exacerbated by short political cycles that favour visible policy outcomes within a political term. This, coupled with the unequal distribution of climate impacts, [1] where vulnerable communities often bear the brunt of the crisis while having limited influence over decision-makers, further exacerbates the latter's preference for immediate gains.

In addition, optimism bias, the tendency to underestimate one's vulnerability to negative events, combined with our natural tendency to avoid unpleasant information, may lead to delayed responses and inadequate preparation for the climate crisis. [2] Similarly, loss aversion, where the pain of a loss outweighs the pleasure of an equivalent gain, can make us reluctant to adopt necessary innovations. This is particularly worrying as the effects of climate change are already being felt in many regions, underlining the urgency of proactive measures.

Climate techno-solutionism, the belief that technological innovation can sustain existing Western lifestyles and consumption patterns despite the accelerating climate crisis [3], poses a significant threat. This belief can lead to complacency and blind spots, delaying crucial emission reductions, diverting resources away from proven solutions, and creating a false sense of security. Indeed, while technological advances are crucial, they are most effective when combined with broader systemic changes and sustainable practices.

Overcoming these barriers requires not only better communication about the causes and effects of the climate crisis, but also addressing the underlying psychological and political factors that impede collective decision-making.

Global Markets: Engines of Growth or Catalysts for Crisis?

Capitalism, with its emphasis on continuous growth and expansion, often lauded as its strengths, is increasingly recognised as a contributing factor to the polycrisis. [17]

While capitalist systems have driven

innovation and wealth creation, their prioritisation of profit maximisation and the accumulation of monetary value may come at the expense of long-term sustainability and social well-being. [18] Financial markets exemplify this tension, as their interconnectedness and rapid response to triggers can amplify small events into global

crises, particularly when coupled with inadequate regulation and risk management practices, as seen in the subprime mortgage crisis. This inherent vulnerability to cascading failures underlines the urgent need to rethink the role of capitalism in both inducing and exacerbating the polycrisis. It highlights a fundamental disconnect between the principles that drive capitalist systems and those that govern ecological systems, which rely on stable, sustainable transformations of matter and energy that prioritise long-term 'use value' over short-term monetary gain. [17] [19]

To manage the polycrisis effectively, it is necessary to explore alternative economic models and financial mechanisms. [20] Thus, instead of simply amplifying crises, economic systems would need to be transformed to provide effective solutions. Short-term, reactive measures are insufficient to address the interconnected and long-term nature of these challenges. A critical reassessment of capitalism is therefore needed, leading to the development of new economic regulations and governance policies that prioritise resilience, interconnected risk management and long-term sustainability. This requires a paradigm shift that goes beyond treating the symptoms of the polycrisis to addressing its root causes embedded in current economic systems, [21] harnessing the strengths of capitalism while mitigating its vulnerabilities.

Public Trust: An Eroding Bedrock for Managing the Polycrisis

In times of heightened stress and uncertainty, such as those caused by the polycrisis, public trust in institutions becomes a critical factor in effective crisis management. [22] The COVID-19 pandemic was a stark reminder of this, and of the serious consequences that can result from the erosion of trust. [23] Declining trust in institutions can fuel support for extreme political views, public discontent and even violent conflict, hindering progress in addressing global challenges. Furthermore,

the pandemic has exposed the links between scepticism about government actions, increased social distrust, and disengagement from democratic processes. [24] This erosion of trust also undermined the legitimacy of institutions, making it difficult to secure public compliance with critical policies, such as pandemic-related public regulations. [22] Thus, without trust, effective governance and crisis response are severely hampered, particularly in democratic societies with a strong culture of the rule of law, where public cooperation has to be won through persuasion.

Research has highlighted the critical role of government action in maintaining public trust. [23] Effective response measures, transparency and truthful communication are essential to ensure that the public believes in the competence and integrity of their institutions. When trust falters, the ability to manage crises and implement necessary policies is severely compromised. Rebuilding trust is therefore not just a moral imperative; it's a strategic necessity to navigate the complexities of the polycrisis. Institutions must prioritise transparency, accountability and effective communication, while demonstrating their legitimacy by acting in the best interests of the people they serve, actively involving citizens in decision-making processes and valuing diverse perspectives. [22], [24] Only by rebuilding trust and legitimacy can we foster the collective action needed to address the interconnected challenges of the polycrisis.

A Closer Look: Crisis? What Crisis?

Having established the defining characteristics of the polycrisis, this section takes a closer look at its historical and conceptual complexities, offering three key insights. First, it examines the polycrisis in the broader context of historical crises, questioning its uniqueness while acknowledging the amplifying factors of the contemporary world. By introducing the

concept of punctuated equilibrium, it presents the polycrisis as a critical juncture with the potential for transformative change. Second, it exposes the power dynamics and inherent biases in framing the polycrisis, highlighting the need for inclusive and equitable perspectives for all those affected by it. Finally, it critically analyses how existing governance structures and policy approaches may inadvertently contribute to the very challenges they seek to address, examining the role substantive, strategic and institutional complexity in policy networks.

Is the Polycrisis Really Unique to Our Time?

The polycrisis is not entirely new; history is full of complex, interconnected crises. However, factors such as climate change and globalisation are exacerbating the speed and scale of today's challenges, requiring a shift from short-term crisis responses to long-term, systemic solutions. This section analyses what history, biology and non-linear dynamics teach us about the processes by which the polycrisis unfolds.

History's Mirror: Recurring Patterns and Systemic Vulnerabilities

Historians point out that complex, self-reinforcing crises are a constant in history. From this perspective, the concept of "polycrisis" should not be understood as a new phenomenon, but rather as a new conceptual framework for analysing these interrelated challenges. The 20th century, for example, saw several distinct crises with global reach – pandemics such as the Spanish flu, financial instability such as the Great Depression, and the politics leading to the devastation of two world wars. Each of these singular crises highlights the recurring patterns and systemic vulnerabilities that have existed at different times in history, where a crisis in one system (e.g., financial instability) can trigger spillover effects in another (e.g., political upheaval).

Nevertheless, new factors may lead to a more rapid and widespread propagation of crises across domains, territories and spaces. These factors include climate change and the heightened interconnectedness of systems due to globalisation – fuelled by advances in finance, capitalism, communication, transport and technology – which may amplify the impact of today's polycrisis.

Moreover, past crises have shown the limits of the "crisis narrative", which justifies rapid responses and short-term public policies that lack attention to root causes. Indeed, the focus on short-term solutions in 'crisis times' has often had counterproductive side-effects, neglecting the long-term dynamics inherent in phenomena such as environmental crises, financial crises, or demographic change. Building on the work of historians like Fernand Braudel, understanding and addressing the polycrisis thus requires grasping both its immediacy and the longer patterns in which its driving forces unfold. [25]

Punctuated Equilibrium: Navigating Ruptures and Stability

The theory of punctuated equilibrium provides a useful framework for understanding the historical patterns within which polycrises occur, revealing the alternation between periods of stability and of transformative rupture. This concept, borrowed from evolutionary biology [26] and non-linear dynamics, emphasises that complex systems can experience periods of relative stability (stasis) that are interrupted by periods of accelerated change (critical junctures), where the system undergoes a fundamental shift. The application of this theory has demonstrated its explanatory power in multiple areas, including artificial intelligence and cognitive science (to study deep neural networks' management of complex information), Earth sciences (to explore the impacts of climate change), medicine (to understand the progression and spread of cancer in the body), and

international relations (to analyse the multidimensional ramifications of Great Power competition).

The mechanisms driving these shifts are notably explained by three critical concepts: forcing functions or “forcings” (pressures exerted on the system), tipping points (thresholds beyond which change becomes self-perpetuating), and bifurcations (branching points with multiple potential outcomes). Forcing functions can be internal or external to the system, encompassing factors like technological advancements, social movements, economic shocks, and environmental changes.¹ Tipping points are critical events that make a system move from one stable state to the next. As for critical junctures, they represent moments of temporary suspension, where different pathways open up, creating a period of heightened uncertainty and different possible futures.

A good example of the application of punctuated equilibrium theory to polycrisis phenomena is climate change. The Earth, as a complex system, can respond gradually to a forcing (such as warming) until a threshold is crossed. Beyond this threshold, the system can “tip” into a completely new state, with changes that may be difficult to reverse within human-relevant time scales. Rather than isolated tipping points, recent research highlights the potential for cascading ones, where one change triggers another in a domino effect. For example, the collapse of the Greenland ice sheet could trigger a collapse of the Atlantic Overturning Circulation, which in turn could destabilise other Earth systems. Early warning signals, such as “critical slowing down” – where a system becomes less resilient and slower to

recover from perturbations – can help anticipate these tipping points.

In sum, two lessons can be drawn from the application of punctuated equilibrium to the polycrisis. The first lesson is that, while the current polycrisis has historical antecedents, periods of accelerating change such as the one we are experiencing do not appear to be the historical norm. The second lesson is that recognising and acting on the driving patterns of polycrisis phenomena allows us to proactively prevent and mitigate (some of) their impacts. In the case of climate change, for example, identifying forcings provides levers to reduce the severity of the risks involved. This highlights the role of human agency in addressing crises, through informed action to prevent cascading adverse tipping points and promote resilience in global systems.

The Politics of Framing the Polycrisis: Narratives, Power and Communication

Defining and framing the concept of polycrisis is inherently value-laden. Narratives and discourses play a performative role, actively shaping how we understand and respond to this multifaceted phenomenon. The existing academic literature on complex polycrisis spans various disciplines, including economics and business, history, communication, environment, political science, social psychology, international relations and biology, and offers different perspectives. For example, some scholars see polycrisis as a symptom of capitalism's inherent contradictions, while others see it as a challenge to global governance. These differing interpretations stem from the varied disciplinary perspectives, goals and contexts of those engaging with the concept.

¹ The use and connotation of the concept of tipping points varies somewhat across domains. In the climate system, tipping points are seen as “leading to substantial, widespread, frequently abrupt and often irreversible [negative] impact”, [6] and should therefore be avoided at all costs. By contrast, in social systems, tipping points can be either positive or negative, such as the widespread adoption of new technologies or patterns of behaviour, and can sometimes be considered as reversible.

Consequently, proposed solutions range from radical systemic change to incremental policy reforms. In addition, the choice between 'polycrisis' (singular) and 'polycrises' (plural) influences our perception. While English publications prefer 'polycrisis', emphasising the need for comprehensive, urgent action, other languages like German, Italian and Spanish often use 'polycrises', inviting more nuanced analyses of manifestations across geographies and sectors. Any attempt to define polycrisis must acknowledge these inherent biases and strive for a reflexive way of framing the concept.

It has also been observed that narratives of crisis often reflect the perspectives of those in power, whether institutional elites [27] or those who “come out on top”. While this does not automatically make such narratives irrelevant, they may overlook the experiences and needs of marginalised groups.

For example, recent academic analysis of the framing of the 2008 financial and post-2015 migration crises within EU studies and comparative regionalism reveals a tendency towards Western-centric perspectives, a disproportionate focus on institutional actors, and an alignment with dominant narratives - often at the expense of the perspectives of vulnerable groups most affected by these crises. [28] Recognising the power dynamics inherent in these discourses is crucial to developing more inclusive, equitable and effective solutions to the polycrisis.

When More is Less: How Governance and Policy May Exacerbate the Polycrisis

Ironically, the very governance structures and public policies designed to address the polycrisis may inadvertently contribute to its complexity and severity. Indeed, research suggests that public organisations (at national and international level) in charge of intricate policy challenges often have the unintended effect of contributing to their complexity. [29], [30] This can be attributed to the inherent

complexity within governance networks, which encompasses three key dimensions: [31]

- **Substantive complexity:** The multifaceted nature of policy problems and the lack of consensus on their definition and potential solutions.
- **Strategic complexity:** The autonomy of actors within governance networks and the absence of hierarchical control.
- **Institutional complexity:** The presence of multiple, often overlapping and sometimes conflicting institutional rules and norms within governance networks.

Traditional governance approaches are ill-equipped to handle these complexities.

These approaches, often rooted in a strongly state-centric model, struggle to address the dynamic and interconnected nature of complex issues as part of complex policy networks. As Edgardo Mosqueira & Martin Alessandro observe, traditional administrative processes, the division of labour into ministries and agencies with clearly defined competencies, and even management-by-results tools are “useful when dealing with problems that have relatively linear and predictable cause-and-effect relationships, where success depends on the faithful execution of a predefined plan”, but ill-equipped to deal with complex policy problems, as manifesting in the polycrisis. [32] Navigating the polycrisis thus demands more adaptive, collaborative, and networked approaches.

Substantive Complexity

Substantive complexity arises from the multifaceted nature of policy problems and the lack of consensus on their definition and potential solutions. Diverse actors with differing perspectives and frames of reference interpret information differently,

which can lead to contested knowledge and conflicting truths. This complexity is further compounded by the limitations of human rationality. As Herbert Simon's concept of "bounded rationality" suggests, decision-makers often rely on mental shortcuts or heuristics to navigate complex situations. [33] However, these shortcuts can lead to biases and errors, especially when applied to multifaceted challenges like the polycrisis. Similarly, Nassim Nicholas Taleb's "Procrustean bed" metaphor [34] serves as a cautionary tale against the tendency to oversimplify complex realities by forcing them to fit into pre-existing mental frameworks. In the context of the polycrisis, such a Procrustean approach – or the over-reliance on best practice – can lead to ineffective or even harmful policies, as these "one size fits all" solutions may not be applicable in complex, dynamic situations. [35]

A corollary of this substantive complexity is the widespread lack of timely, consistent, comparable, policy-relevant and privacy-protected data and information for evidence-based decision-making. Indeed, research shows the importance of harmonising data and information to guide, assess and improve policy directions in times of complex crises. Standardising data collection methods is therefore crucial to ensure the consistency, comparability and reliability of data. Implementing consistent approaches can improve the accuracy of analyses and limit duplication in the production of evidence. However, data privacy concerns pose significant challenges in crisis management, requiring the development of appropriate regulatory frameworks to protect personal data and maintain public trust. Rather than building these efforts in the heat of crises, such as the COVID19 pandemic, international cooperation and a data-driven systems approach can best be developed during "business as usual" periods in anticipation of future crises. [4], [5]

Strategic Complexity

Strategic complexity in governance networks arises from the autonomy of actors and the absence of strict hierarchical control. While this can lead to conflicting strategies and unpredictable interaction, it also allows for innovation and the mobilisation of diverse resources. Each actor, driven by their own interests and perspectives, can contribute specific knowledge and capabilities to addressing the polycrisis. This is evident in the growing role of actors beyond the central state – such as civil society organisations, the private sector, and local governments – in managing complex challenges. Their agility, expertise, and resource mobilisation can complement or even surpass state efforts, [36] as seen in the outsized role of Médecins sans Frontières in the West African Ebola crisis, pharmaceutical companies in COVID-19 vaccine production, and cybersecurity firms protecting critical infrastructure. Similarly, cities are increasingly recognised for their important role in addressing dimensions of the polycrisis, such as climate change.

However, traditional governance models (designed for hierarchy) struggle to effectively harness the contribution of most of these actors, potentially leading to fragmentation, duplication, and missed opportunities. [29] This mismatch also raises concerns about legitimacy and coordination. [37] At the level of the European Union, for example, this is visible in how institutional complexities and fragmented policy entrepreneurship affect EU decision-making, highlighting the need for more adaptive and collaborative governance models. [38], [39] In other words, the polycrisis demands a shift towards less top-down models of governance that navigate complex global challenges by empowering non-state actors, while ensuring transparency and accountability.

Institutional Complexity

The presence of multiple, often overlapping, and sometimes conflicting institutional rules and norms within governance networks can create ambiguity and hinder effective coordination. This is particularly evident when dealing with complex challenges that cut across organisational and administrative boundaries. The fragmentation of governance capacity, coupled with the challenges of aligning diverse institutional frameworks and overcoming bureaucratic inertia, can impede the development and implementation of coherent and effective policies. The polycrisis, with its transboundary nature and systemic risks, further exposes the limitations of rigid institutional arrangements, highlighting the need for more adaptive and flexible governance models.

Applied to supranational governance in the European Union (EU), challenges arise due to overlapping institutional rules and norms, which can create ambiguity and hinder effective coordination. Christensen and Lægreid's (2010, 2011) research shows how the layered accumulation of policies and reforms, coupled with the rise of hybrid systems that combine bureaucratic and market approaches, creates convoluted and often contradictory governance structures.

This internal complexity, compounded by the phenomenon of "policy sedimentation", where policies accumulate in contradictory layers over time, results in a tangled regulatory landscape that hinders agility and responsiveness. [40] [41] The fragmentation of governance capacity complicates the alignment of diverse institutional frameworks, particularly in addressing complex transboundary threats. [42]

In essence, the polycrisis reveals a paradox: the very systems and structures designed to address complex challenges can inadvertently contribute to their complexity. The pursuit of effective "polysolutions" demands a shift away from traditional governance and policy approaches towards more adaptive, collaborative, and context-sensitive models that embrace complexity, recognise uncertainty, and harness the collective intelligence and resources of diverse actors. Only by acknowledging and addressing the unintended complexities of governance can we navigate the challenges of the polycrisis and foster a more resilient and sustainable future.

(2) Beyond Band-Aids: Polysolutions for Systemic Change

Given the above limitations of inadequate traditional policy responses to the polycrisis, an alternative paradigm is needed that emphasises integrated, multifaceted approaches that address the systemic roots of the polycrisis. The PolyCIVIS project's search for "polysolutions" recognises that problems such as climate change, economic inequality and geopolitical conflict are not isolated but deeply intertwined and require holistic interventions. This focus on polysolutions can foster interdisciplinary collaboration, leading to a deeper understanding of the complex causal relationships within the polycrisis and helping to bridge disagreements arising from different disciplinary lenses. Polysolutions should also promote long-term thinking, shifting the focus from short-term crisis management to building resilience and precluding future crises.

Guiding Principles for Effective Polysolutions

In developing "polysolutions", we propose eight principles, based on the challenges raised in this paper:

1. **Balancing robustness and adaptability:** Polysolutions should be designed to withstand shocks and stresses (robustness) while being flexible enough to adapt to changing circumstances (adaptability). This follows the concept of "resilient systems", which emphasises the ability to anticipate, absorb and recover from disruptions. [43]
2. **Encouraging interdisciplinary cooperation:** Effective polysolutions require the integration of diverse expertise from different fields such as natural science, economics and business, social sciences and humanities inter alia. This collaborative approach can help ensure that solutions are comprehensive and address the multifaceted nature of the polycrisis. [44]
3. **Promoting adaptive governance:** Adaptive governance models emphasise flexibility, learning and experimentation. They allow institutions and policies to evolve in response to new information and changing circumstances, ensuring that solutions remain relevant and effective over time. [45]
4. **Building resilience at multiple levels:** Resilience needs to be built into systems at different levels, from individuals and communities to national governments and international organisations. This includes strengthening social safety nets, diversifying economies and enhancing ecological resilience to mitigate the impact of the polycrisis. [46]
5. **Exploring mixed forms of governance beyond the state:** The polycrisis requires collaboration at different levels, from local communities and grassroots organisations to national governments and international bodies. This multi-level approach – mobilising public, private and civil society actors – ensures solutions are tailored to local contexts while addressing the global dimensions of the polycrisis. [47] [48]
6. **Contextualising solutions:** Addressing crises requires that attention be paid to the specific context of the problem. One-size-fits-all solutions should be avoided, as they rarely take into account contextual realities and can prevent those experiencing the challenge from finding their own solutions. [44]
7. **Identifying positive tipping points:** The literature on the polycrisis is usually concentrating on the negative consequences of interconnected crises. However, cascading effects are not always bringing harm. In a complex world the opportunities to identify positive effects should not be discarded. For example, production costs per kwh from solar power have fallen

drastically causing a massive shift in investment away from fossil fuels to renewable energy. [49], [50][51]

8. **De-risking and diversifying partnerships:** Polysolutions should involve a diversified network of partners, including state and non-state actors, to mitigate the risks associated with over-reliance on any single entity or sector. This approach can enhance resilience and adaptability in the face of unexpected shocks or disruptions. [52]

Strategic Foresight: Anticipating and Shaping Possible Futures

Strategic foresight methodologies are essential for anticipating crises and developing proactive polysolutions. These approaches, including horizon scanning, megatrend analysis and scenario building, help to identify emerging issues and long-term developments. [53] By integrating foresight into organisational structures, decision-makers can gain a more comprehensive understanding of possible future scenarios. This enables the development of robust and adaptable strategies. [54] The integration of horizon scanning and risk prioritisation can help policy discussions incorporate emerging issues and address biases in evidence-based policy making. [55] Foresight methodologies are particularly valuable in crisis and conflict prevention, offering different approaches that are appropriate for different purposes. By employing these tools, policymakers can shift from reactive crisis management to proactive crisis prevention, ultimately increasing societal resilience in the face of complex and interconnected challenges. [56]

(3) Conclusion: Towards a More Resilient Future

The polycrisis, as a complex and multifaceted phenomenon with deep

historical roots, requires a fundamental shift in our understanding of and response to global challenges.

This concept paper has explored the polycrisis from different disciplinary perspectives, highlighting its systemic nature and the limitations of traditional policy approaches. It has emphasised the need for a paradigm shift towards polysolutions – integrated, multifaceted approaches that address the root causes of interlinked crises rather than just their symptoms (thorough diagnosis and prognosis). The increasing complexity and scale of these challenges require a move away from siloed thinking, short-term fixes and linear solutions to a rather long-term contextual fix.

To navigate this complex landscape, policymakers must adopt a more holistic, long-term and collaborative approach, fostering interdisciplinary cooperation to develop integrated solutions.

Embracing adaptive governance models that prioritise flexibility, learning and experimentation is critical to responding to the evolving nature of the polycrisis. In addition, investing in strategic foresight, using tools such as horizon scanning and wild card analysis, can help anticipate potential crises and develop proactive polysolutions. Furthermore, policymakers can draw inspiration from Taleb's use of the concept of "via negativa", [57] which emphasises that in complex systems, removing harmful elements can often be more effective than adding new ones. By identifying and eliminating policies, regulations, or practices that create

vulnerabilities or exacerbate systemic risks, policymakers can streamline complex systems, reduce unintended consequences, and enhance overall resilience.

Box 2. Successful and Failed Cases of Polysolutions

The Sustainable Development Goals (SDGs) provide a comprehensive framework for addressing global challenges in the social, economic and environmental spheres. [58] They serve as a tool for public and private organisations to implement projects that simultaneously address multiple issues, such as poverty, gender equality, and climate action. [59] The SDGs have influenced various sectors, including finance, where they have become a reference for setting new priorities and rules. Financial institutions are increasingly aligning their strategies with the SDGs, focusing on long-term impact and value creation for the common good. [60] This alignment extends to Islamic finance, which shares parallel principles with sustainable development, promoting the well-being and rights of current and future generations. [61] Integrating the SDGs into business strategies and financial systems demonstrates its potential as a tool to address complex, interconnected global challenges by promoting holistic, long-term solutions. [60], [61]

Similarly, the PHYTOKAT project in Katanga illustrates a polysolutions approach to regional development. [62] It integrates environmental, economic, and social considerations to sustainably manage plant biodiversity and address interrelated agricultural, health, and environmental challenges. [63], [64] Its interdisciplinary, plurinational team fosters diverse expertise and “interweaves” different sources of knowledge to integrate a wide range of tools and address multiple, interconnected issues. [65] This is crucial in Katanga, where global drivers such as resource demand, climate change and health problems intersect with local issues such as resource conflicts, political instability and environmental degradation. [66], [67] PHYTOKAT demonstrates the potential of integrative, multi-partner approaches for innovative and sustainable solutions in regions facing complex problems.

By contrast, biofuels, once promoted as a solution to climate change and energy security, have been heavily criticised for their unintended consequences. [68] [69] Large-scale biofuel production has led to competition with food crops, contributing to food insecurity and price volatility. [70], [71] This has disproportionately affected vulnerable populations in developing countries. Land conversion for biofuel crops has led to deforestation and biodiversity loss, while also straining water resources. [70], [72] Ironically, many first-generation biofuels have been found to have higher lifecycle greenhouse gas emissions than fossil fuels. [72] While second-generation biofuels show some promise, they still compete for land and face technical and economic barriers. [73]

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