

### Pathways for Systems Transformation in Response to Global Polycrisis

Zack Walsh, Institute for Ecological Civilization Korea at Hanshin University, 5-6:30 pm PST, September 13, 2022

### Increasing use of the term "polycrisis"





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#### World Is Facing Unprecedented Polycrisis, Warns WTO | Countercurrents

The world, now more complex, is facing unprecedented polycrisis, the World Trade Organizatio...



## What is a global polycrisis?

"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" (Janzwood and Homer-Dixon, 2022)." Table 1 summarizes the distinctions between systemic risk, GCR, 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

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



### **Presentation Structure**

The definition of global polycrisis highlights the relationship between three phenomena:

PART I: Interacting systemic risks PART II: Social and environmental collapse PART III: Existential risk and recovery



## PART I: Interacting Systemic Risks

# Properties of Systemic Risk



Figure 1.2. Terminology for key attributes of systemic risk

Source: Based on Sillmann et al. (2022)

# Global Crisis Model

Fig. 1. Synchronous failure: a conceptual framework showing the emerging causal architecture of global crisis. SS = simultaneous stresses; LFBB = long fuse big bang; RC = ramifying cascade.



Pressures: Structural conditions that build up slowly (amenable to prediction)

Triggers: Sudden releasing events which precede social or geological eruption (hard to predict, but often caused by pressures)

# Example of Global Crisis Model

**Fig. 2**. The 2008 financial-energy crisis. SS = simultaneous stresses; LFBB = long fuse big bang; RC = ramifying cascade; EROI = energy return on investment.



### United Nations Disaster Risk Reduction



## Climate change risk assessment



#### Consequences

#### Migration and displacement of people

- Rural to urban
- Refugee crisis
- Forced/unsafe migration
- Forced immobility (trapped populations)

#### Armed conflict

- Regional conflicts
- Rise of extremist groups
- Police/military intervention
- Organized crime and violence
- Conflict between people and states
- Civil war and war

#### Destabilization of markets

- Commodity price spikes
- Fall of asset prices
- Large-scale asset sell-off
- Falling stock markets
- Underfunded pension funds
- Financial market collapse

## Surveys on risk perception





The network of potentially synergistic risks with the potential to lead to a global systemic crisis. The colour of the node indicates the category of risk (*green*=environmental; *pink=societal; orange= geopolitical; yellow=technological; blue=economic*). The thickness of the lines connecting two risks represents the frequency of responses identifying a synergistic interconnection between them.

# Today's global polycrisis





POTENTIAL UNRAVELING OF CIVILIZATION

## PART II: Social and Environmental Collapse (the other side of growth)

The end of exponential growth, the beginning of protracted breakdown and collapse

#### Boom and bust

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In most runs of the World3 computer model, rapid growth is followed by sharp decline. So far the standard run (main graphic) corresponds well with measurements of real-world equivalents (dotted lines)





- Has any growth in the past 20 years been financially sustainable?
  - The stock market bubble of the 1990s
  - The housing bubble of the 2000s
  - The bubble in Europe's periphery in the 2000s
  - Japan's stagnation in the 1990s and 2000s
  - Quantitative easing in the 2010s
- Answer seems to be no
  - This points to a long-term problem: 'secular stagnation'

The global economy is in a phase of secular stagnation





Source: UNDESA 2019b.

#### Ball & cup resilience for different system states/ regimes -- Global



#### Neil Davidson 2015

#### **The Adaptive Cycle**



source: Holling, Gunderson and Ludwig, In Quest of a Theory of Adaptive Change, 2002



# **Danger signs**

History suggests that when these indicators rise, the likelihood of collapse is greater.
Climate change
Inequality





**Environmental impact** 







Fig. 4. Different classes of generic observations that can be used to indicate the potential for critical transitions in a complex system.

Table 2. Summary of 14 Mechanisms, or Hypotheses, That May Lead to Collapse in Social-Ecological Systems. Examples of cases for which researchers have invoked many of these mechanisms are presented in Table 1

Family of mechanism	Specific mechanism	Summary of mechanism		
Top-heavy mechanisms	Overshoot	Ecological degradation and excessive resource consumption; collapse caused by climate change or other impact on productivity [4,34,94].		
	Complexity threshold	Complexity creates problems that only more complexity can solve; diminishing marginal returns mean burden becomes too great for society to support, and collapse occurs [22,43].		
	Elite capture	Wealthy become parasitic on the poor. Resentment, revolution, or technological change can cause collapse [87].		
	Overspecialization and inability to adapt	Specialization on a particular resource, sunk cost effects [20], and/or a lack of diversity create other vulnerabilities that lead to collapse [8,95].		
Mismatch mechanisms	Scale mismatch	Scales of environmental variation and governance, or production and regulation, become misaligned. This can cause system dysfunction and collapse [22,90,96].		
	Upscaling	Getting resources remotely can detach people from environmental degradation, creating an overconsumption feedback and potential for collapse [80].		
	Speculation	Success leads to a decreasing investment in regulation; returns to speculation exceed those on investments in productive capacity. If expectations about future growth are threatened, abrupt collapse of speculation and general economic activity due to borrowing can occur [93].		
Lateral flow mechanisms	Collapse by contagion	Perturbation or negative impact is transmitted through lateral connections [75].		
	Collapse by fragmentation	Loss of modularity and reliance on connections result in collapse if connections are broken [22].		
Obliteration	External disruption	A force from outside the system destroys or undermines it [86].		
	Grinding down	Gradual depletion of key resources, such as biodiversity or soil fertility, eventually leads to collapse [91].		
Transition and boundary mechanisms	Vulnerability threshold	Systems (or individual components) grow from less vulnerable sizes through more vulnerable sizes and may collapse during a vulnerable stage [97].		
	Leakage	Semipermeable boundaries that are important for sustainability become permeable, leading to loss of key resources and/or influx of problem-causing agents [69].		

## Overshoot



# Peak resources

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Uranium       Nuclear energy, defence, glass industry       12035       50%         Zinc       Anti-rust, fencing, roofs, batteries       12046       20%         Chromium       Stainless steel, coating on metal       12051       22%         Copper       Coins, electrical wiring, pipes       12044       60%         Lithium       Batteries, air purification, medicines       2060       10%         Rare Earth +       Electronics, catalysts, magnets       12045       15	Rhenium	Gas turbines, aircraft engines			2042	40%
Zinc       Anti-rust, fencing, roofs, batteries       12046       20%         Chromium       Stainless steel, coating on metal       12051       22%         Copper       Coins, electrical wiring, pipes       12044       60%         Lithium       Batteries, air purification, medicines       2060       10%         Rare Earth +       Electronics, catalysts, magnets       12045       15	Uranium	Nuclear energy, defence, glass industry		2035		50%
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Rare Earth + Electronics, catalysts, magnets 2045 🗾 15	Lithium	Batteries, air purification, medicines			2060	10%
	Rare Earth +	Electronics, catalysts, magnets			2045	15

#### WHEN DO WORLD STOCKS OF RESOURCES END?

+ Are also on the list of "Critical Raw Materials" EU

Source: Harald Sverdrup and Anna Olafsdottir

# Energy descent







PART III: Existential Risk and Recovery



Figure 3. Rough sketches of human civilization trajectories measured in terms of total human wellbeing, including humanity at baseline wellbeing (A), global catastrophe (B), human extinction (C), adaptation (D), and recovery (E). Based on Maher and Baum (2013).



Figure 26-6b Biology: Life on Earth, 8/e © 2008 Pearson Prentice Hall, Inc.

# **Tipping Points and Critical Transitions**



**Biosphere Components** 

Ar Am Aw As BS BW Cr Cs Cw Do Dc Eo Ec FT

FI

### PARIS EMISSIONS PATH & CLIMATE RISKS



"Hot House Earth Scenario" kicks in between 1.5-2°C

#### Effect of current pledges and policies

Global greenhouse gas emissions



Global Warming by 2100

Very likely [5-95%]: 2.3 - 4.7°C

Likely [17-83%]: 2.6 - 3.9°C, 3.1°C median (1)



**Understanding ecofascism, white** nationalists' extreme reaction to the coming environmental apocalypse



Governments, Defense Departments, insurance agencies, and private investors are already developing adaptation, investment, and security plans for a 3°C world.

Climate Exploring the Implications

of Climate Change for UK Defence and Security

na Knack, Martin Robsor Pauline Paillé, Jon Freema < and Ruth Harris

& RISK DREWORD BY SHERRI GOODMAN





Figure 1. The challenge: To define, and navigate toward, a safe and just future for people and the planet.



We need a systemic transformation on a democratic basis, otherwise the transition will be unjust.

### Four Futures Matrix







Everyone's universal basic needs are met within sustainable environmental limits



# **Essential Requirements**





#### A familiar pattern



Annual global fossil emissions, billion metric tons of CO<sub>2</sub>

## Drawdown

Carbon emissions must decline 7% per year for 30 years to stabilize the climate at 1.5 °C. Emissions declined by 6.4% in 2020 due to the pandemic.

1.5°C scenario map under different levels of energy-GDP decoupling, RE speed and NETs



GDP per capita



## Degrowth

High consuming countries need to reduce GDPpc 4x at a yearly pace of -3% until 2050, while the Global South increases GDPpc 3x. Some countries currently in the convergence range display levels close to the UN 'high development' threshold (greater or equal to .8 HDI).



## Meet Universal Basic Needs

If we are successful at drawdown and degrowth, we can reduce global energy consumption in 2050 to the levels of the 1960s, and still provide decent material livings to the entire global population. We must lower the ceiling and raise the floor.



# WHAT DOES THIS SOCIETY LOOK LIKE?

## Cosmolocalism

Commons can decrease matter-energy throughput by up to 80%. By sharing IP, the marginal costs of production decreases and production relocalizes as supply and distribution chains shorten.



#### **Figure 2: Examples of Solidarity Economy Practice**

### SE exists in all sectors of the economy. Tremendous foundation to build on!

#### **Production/Reproduction**

#### Worker co-ops

- DIY
- Care work
- Community gardens
- Mutual aid
- Skill shares
- Community production

#### **Distribution & Exchange**

- Social currencies
- Time banks
- Fair trade
- Toy/tool shares
- Swap meets
- Gifting

#### Consumption

- Community land trusts
- Resident-owned communities
- Food co-ops
- Electric co-ops
- Housing co-ops

#### Finance

- Credit unions
- Peer lending
- Community loan funds
- Direct public offerings
- Public banking
- Family & friends

#### Governance

- Participatory budgeting
- Community governance
- Public sector, schools
- Policies
- Universal basic income
- Commons

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# **THEMATIC STRATEGIES**



### Postcapitalist Landscape Map

ECONOMICS Q 次 WEAll IEO SEN FOUNDATION NEW ECONOMY ripess COALITION PURPOSE DOUGHNUT ECONOMICS TWN FOR THE COMMON GOOD INSTITUTE FOR SOCIAL ECOLOGY DEMOCRACY COLLABORATIVE BIEN bloom Cooperativis START CUSP casse DEMOS COMMONS HELSINK/ Steady State Economy FOUNDATION Research & Degrowth Sustainabl RFAI P GLOBAL COMMONS ALLIANCE ECONOMY Economies Dm Law Cente A PLAN FOR THE PLANET LAB 0.0 S SEED COMMONS EIZE Social and Solidarity Economy THE WORKING WORLD

Institutes and Networks for the New Economy

Social Justice, Labor, and Democracy Movements



Environmental Movements and Organizations



**Research and Print Media** 

**Online Media** 



Television





Practical Community- and Company-based Experiments



Technologies for Distributed Data, Finance, and Governance





Indigenous and Land-based Movements



### **Open Digital Platform**

Protopolis runs its economy on a full stack of interoperable programs (1-4) that provide the information, analytics, deliberation tools, and forms of exchange that organize the economy, effectively aligning individual's wants and needs with collective goals and biophysical limits.



#### DIGITAL COMMONS: Develop an open digital infrastructure GPT-Neo SPACE AGENCY Copyleft Creative Commons CØSMOS ixo CRYPTO COMMONS

An open digital infrastructure (E) provides the interface between the software (1-4) running the economy and the economy's various provisioning systems (A-D).



owned and managed provisioning systems (A-D).

### Welcome to **Protopolis!**

Protopolis is a city working to become a commons-based postcapitalist society. This inforgraphic illustrates how to build Protopolis!

### Radical Democracy



Protopolis' government is run by civil society following principles of radical democracy.

# Stay in touch!

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International Conference for Ecozoic Culture 2018

Ecological Transformation on the Korean Peninsula and in East Asia