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ce-ch2-risk-land-intro-0324-part1

ce-ch3-eco-overshoot-0324-part1

ce-ch4-hum-syst-0324-part1

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Chapter 6: Advanced Tech\_ZAK\_DRAFT

near-final-ce-ch7-violent-conflict-0324-part1

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## Ch 2: Introducing The New State of Global Catastrophic Risk: the Metacrisis

As civilization has grown, so has the total complexity and consequentiality of the risks facing humanity. Recall that, historically, *successfully solving some problems has often led to new and more complex problems as a result*. Innovations in fertilizers helped feed a growing population, but did so in ways that led to environmental catastrophes like dead zones in the ocean<sup>1</sup>. Nuclear weapons helped end a global war but radically increased the potential destruction of future warfare as a result. Many of the “successes” of civilization are what have led to its need for profound restructuring.

The Metacrisis is the accumulation of consequences from this process, where the unintended outcomes of human problem-solving have become increasingly consequential given increasingly powerful technologies. This process has brought us beyond certain *thresholds*, where the problems humanity now faces are in the domains of globally catastrophic, and even existential, risk<sup>2</sup>. The crossing of these thresholds necessitates deep structural changes to how

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<sup>1</sup> Schulte-Uebbing, L.F., Beusen, A.H.W., Bouwman, A.F. et al. “From planetary to regional boundaries for agricultural nitrogen pollution.” *Nature* 610, (2022): 507–512. <https://doi.org/10.1038/s41586-022-05158-2>

<sup>2</sup> For seminal discussions of global catastrophic and existential risks see Beard, S. J., Rees, Martin J., Rojas, Clarissa, R., and Richards, Catherine, eds. *The era of global risk: An introduction to existential risk studies*. Open Book Publishers, 2023.

Ord, Toby. *The Precipice: Existential Risk and the Future of Humanity*. Hachette Books, 2020.

humans solve problems, such that many basic patterns of human behavior and institutional design are untenable as structures underpinning the future of civilization.

Due to the crossing of these thresholds, responding to the Metacrisis in ways which cause more problems is no longer a viable option<sup>3</sup>. Each part of this book explores the consequences of this basic insight. Part one expands on two essential implications of it. First, the metacrisis is somewhat continuous with threats humans have faced in the past, but it is a genuinely novel situation. It will require us to repattern basic ways of relating to problem solving, such as our tendency to treat individual problems in isolation as if a response to a problem in one area (e.g., increasing agricultural production) won't have unintended consequences somewhere else (e.g., agricultural runoff in the oceans). The second insight of part one is, therefore, that the various challenges of the Metacrisis must be seen as an interconnected whole<sup>4</sup>. Efforts too narrowly focused may appear to succeed on their own terms while displacing harm elsewhere.

Individual risks such as those from biodiversity loss, total war, and misaligned AI are incredibly wicked, seemingly intractable, and can lead to global catastrophes. Taken together, the metacrisis is the most complex and consequential challenge of human ingenuity, wisdom, and cooperation in history. However, considering the risk landscape as a unified whole actually serves to clarify the overall situation and potentially reveals responses appropriate to a problem of this magnitude. It is also necessary to do so. In order for even our best intended actions not to cause more problems, the entirety of the Metacrisis must become the object of shared coordination.

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<sup>3</sup> Consilience Project. *Development in Progress*. 2024.  
<https://consilienceproject.org/development-in-progress/>

<sup>4</sup> This insight – of the interactions between different categories of risk – has recently been popularized in work on the Polycrisis. See, for example, Homer-Dixon, Thomas, Renn, Ortwin, Rockstrom, Johan, Donges, Jonathan F., and Janzwood, Scott. “A call for an international research program on the risk of a global polycrisis.” December 16, 2021. Available at SSRN: <https://ssrn.com/abstract=4058592> or <http://dx.doi.org/10.2139/ssrn.4058592>

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# Global Catastrophic Risk: A Taxonomy

With this in mind, the chapters which follow provide an overview of the catastrophic and existential risks that characterize the Metacrisis. We begin here by describing a set of five highly interconnected, partially overlapping categories spanning the various dimensions of the risk landscape. These include **ecological overshoot**, **human systems failures**, **natural disasters**, **advanced technologies**, and **violent conflict**. This taxonomy (see Table 1) is only one of many ways to classify the various threats involved in the Metacrisis and should be thought of as a hopefully useful tool for envisioning the landscape of global catastrophic and existential risks as a whole<sup>5</sup>.

The first category considered is **ecological overshoot**. It includes all of the issues related to unrenewable resource depletion such as biodiversity loss and deforestation as well as humans' general effect on the natural environment such as climate change and exponentially increasing waste and pollution.

In many scenarios, risks in all categories dovetail into **human systems failures** such as supply chain disruptions in energy, medicine, food, water, communications, and other resources. This category includes any major breakdown in human created life support systems arising from factors such as environmental degradation, natural disasters, institutional overwhelm, or human error.

Next are **natural disasters**. Events such as droughts, floods, and heatwaves can be more devastating and disruptive in a world with billions of people dependent upon global supply chains. In addition, some natural disasters can be partially attributed to human activity, such as increases in floods due to tree loss from deforestation.

In chapter six we define a class of risks involving **advanced technologies**, including cyber weapons, drones, robotics, artificial intelligence, and genetic engineering. These innovations are

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<sup>5</sup> For an overview of the literature reviewed in the creation of this taxonomy, see our risk literature bibliography [Risk Report Bibliography](#)  
Avin, Shahar, Bonnie, Wintle, C., Weitzdörfer, Julius, S. Ó hÉigeartaigh, Sean, Sutherland, William, J., and Rees, Martin, J. "Classifying global catastrophic risks." *Futures*, Volume 102, (2018): 20-26.  
<https://doi.org/10.1016/j.futures.2018.02.001>

achieving unprecedented speeds of growth and scale of impact, while requiring fewer people and resources. The next wave of human innovation will be incredibly powerful and could lead to both unimaginable benefits and harms.

AI systems, for example, could rapidly optimize complex and costly processes such as those involved in manufacturing or medical science. However, anything AI can be used to optimize, it can also be used to damage<sup>6</sup>. Machine learning algorithms trained on massive chemical databases are able to rapidly generate thousands of new pharmaceutical prospects to treat disease. But models used for drug discovery are easily reversed for use in the design of decentralized chemical weapons<sup>7</sup>. AI protein folding that can advance immuno-oncology can also make better bioweapons. Machine learning models optimizing supply chain efficiencies can also optimize effective attacks.

Advanced technologies may be used as advanced weaponry, leading to more destructive **violent conflict**. Acts of terrorism or war can be major contributors to global catastrophes in the form of increased deaths from combat, infrastructure collapse, and ecological toxicity<sup>8</sup>. The rapidly increasing destructive capacity of advancing technology requires deeper solutions to the perennial problem of war.

For example, emerging technologies such as AI and biological engineering can potentially enable weapons of comparable consequence to that of nuclear weapons<sup>9</sup>. However, these technologies are vastly easier to manufacture and thus more complex to manage. Nuclear technology was exclusively developed by the militaries and governments of the few most powerful nations in the world and was bound by strictly monitored and enforced international agreements<sup>10</sup>. Biotech and AI, on the other hand, are advancing in the military and commercial

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<sup>6</sup> Brundage, Miles, Avin, Shahar, and Clark, Jack et al. *The Malicious Use of Artificial Intelligence: Forecasting, Prevention, and Mitigation*. 2018. ArXiv [Cs.AI]. <https://arxiv.org/pdf/1802.07228>






<sup>7</sup> Urbina, Fabio, Lentzos, Filippa, Invernizzi, Cedric, and Ekins, Sean. "Dual use of artificial-intelligence-powered drug discovery." *Nat Mach Intell* 4, (2022): 189–191. <https://doi.org/10.1038/s42256-022-00465-9>

<sup>8</sup> Savell, Stephanie. *How death outlives war*. Watson Institute for International & Public Affairs, 2023. <https://watson.brown.edu/costsofwar/files/cow/imce/papers/2023/Indirect%20Deaths.pdf>

<sup>9</sup> Bulletin of the Atomic Scientists. *2024 Doomsday Clock Statement*. 2024. <https://thebulletin.org/wp-content/uploads/2024/01/2024-Doomsday-Clock-Statement.pdf>

<sup>10</sup> Zaidi, Waqar, and Dafoe, Allan. *International Control of Powerful Technology: Lessons from the Baruch Plan for Nuclear Weapons*. Centre for the Governance of AI, 2021. <https://www.governance.ai/research-paper/international-control-of-powerful-technology-lessons-from-the-baruch-plan-for-nuclear-weapons>

sector, across many industries, and in many countries. Unlike nuclear, these technologies are not only being developed but also deployed at scale, largely commercially, before international agreements to mitigate risks are in place. These novel innovations are being propelled forward by massive economic incentives and potentially profound applications, but this only further increases how difficult they are to monitor, contain, and control.

RISK TAXONOMY		
THREAT CATEGORY	EXAMPLES	NEW FEATURES
<b>Ecological Overshoot</b>   <i>The set of all issues related to human's general effect on the natural environment such as unrennewable resource depletion and pollution</i>	<ul style="list-style-type: none"> <li>• Biodiversity loss</li> <li>• Species extinction</li> <li>• Climate change</li> <li>• Ocean acidification</li> <li>• Desertification</li> <li>• Deforestation</li> <li>• Waste Accumulation</li> <li>• Oceanic dead zones</li> <li>• Chemical pollution</li> </ul>	<ul style="list-style-type: none"> <li>• The integrity of the biosphere is threatened, rather than a local region</li> <li>• Humans are surpassing planetary-scale "tipping points" with irreversible consequences</li> </ul>
<b>Human System Failure</b>   <i>Breakdown of human-created life support systems</i>	<ul style="list-style-type: none"> <li>• Breakdown of food and water supply</li> <li>• Emergency response failures</li> <li>• Financial system crashes</li> <li>• Public health crises</li> </ul>	<ul style="list-style-type: none"> <li>• Eight billion person population</li> <li>• Dependence on complex, potentially fragile, global systems</li> <li>• Complexity of human systems overwhelms management capacity</li> </ul>
<b>Natural Disasters</b>   <i>Catastrophic events that are not always human caused, but can be influenced by human activity and partially attributed to it</i>	<ul style="list-style-type: none"> <li>• Droughts</li> <li>• Heat waves</li> <li>• Flooding</li> <li>• Earthquakes</li> <li>• Tsunamis</li> <li>• Hurricanes</li> <li>• Asteroids</li> <li>• Solar flares</li> </ul>	<ul style="list-style-type: none"> <li>• Humans are increasing natural disasters due to ecological overshoot</li> <li>• The consequences of local disasters can spread globally due to fragile human systems (see below)</li> </ul>
<b>Advanced Technology</b>   <i>Recent innovations that are achieving unprecedented speed of growth and scale of impact with fewer people and resources required</i>	<ul style="list-style-type: none"> <li>• Artificial intelligence</li> <li>• Synthetic biology</li> <li>• Drones</li> <li>• Cyber and social technologies</li> <li>• Social media</li> </ul>	<ul style="list-style-type: none"> <li>• New tech has both civilian and military applications</li> <li>• Widely distributed through commercial sector</li> <li>• Potentially massively destructive</li> <li>• AI increases speed and complexity of all risks</li> </ul>
<b>Violent Conflict</b>   <i>Large-scale war between major powers or an increasing amount of smaller scale violence</i>	<ul style="list-style-type: none"> <li>• Nation state or terrorist conflict in conventional and hybrid warfare</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple nuclear armed nations</li> <li>• Nonstate actors have increasingly powerful technology</li> <li>• Erosion of previous basis of peace</li> </ul>

The risks within and across these categories are basic elements of the Metacrisis. They each trace different paths leading to potential global catastrophe. Many of their paths cross; some risks may exacerbate others. These categories are all deeply interwoven and mutually affect one another, even though they are often analyzed and responded to as if they were separate. Rather than treat each as an individual problem to be solved, they must collectively be seen as parts of an inseparable whole requiring ongoing and increasingly considerate responses.

## The Two Attractors: Chaos or Oppression

In addition to the risks described above, there is a distinct class of risks posed by increasing centralized power and control<sup>11</sup>. Advanced technologies enable new systems of surveillance that could be used to manage emerging risks and fragilities. The potential power and complexity of this security apparatus could give rise to new kinds of digital autocracy. Rather than civilizational collapse, this creates a unique kind of risk of dystopian oppression – an *autocratic risk*. Different from the physical death of all humanity would be *the death of our humanity*, through prolonged subjugation to inhumane technological conditions. In an age of big data, robotics, brain-computer interfaces, and AI, the possibility exists of living in an inescapable system of dystopian control whose power and extent has, till now, existed only in the realms of human imagination and nightmare.

Given the means of centralized control, autocratic states are able to respond more decisively to certain risks, such as those posed by novel technologies like social media and AI. So far some large democracies have succumbed to increasing disorder as they struggle to govern these new technologies, and the failure of open societies to respond to these challenges could create further support for potentially oppressive regimes. The swings and tensions between chaos and oppression are likely to become increasingly intense. Chapter eight elaborates on these attractors, and part four of this book frames ***the resolution to the metacrisis as an alternative path for humanity that avoids both chaos and oppression.***

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<sup>11</sup> For our discussion on this elsewhere, see The Consilience Project. *Teetering Between Oppression and Chaos*. 2022. <https://consilienceproject.org/teetering-between-oppression-and-chaos/>  
For a discussion on the historical tension between autocratic and republican forms of governance, see Deudney, Daniel, H. *Bounding Power: Republican Security Theory from the Polis to the Global Village*. Princeton University Press, 2007. <https://doi.org/10.2307/j.ctt7sj7t>

## Crossing the Global Risk Threshold

The new state of risk demands fundamentally new means of human coordination. Critical thresholds have been crossed where the current world-system is no longer capable of avoiding global catastrophe or dystopia and is actively accelerating into increasingly dangerous territory. Part one concludes by discussing how civilization is approaching a pivotal moment where long-standing human behaviors, which were once viable and perhaps even rational, are now reaching their limits and are imminently driving global catastrophic risks.

For example, up until recently humans have been able to treat the Earth as if it were an endless resource. Even when faced with deforestation or overhunting, it was often possible to ‘move west’ and continue. Though it may seem otherwise from this historical arc, it is not the case that ecologically destructive behavior and other human tendencies underlying the metacrisis are culturally universal or are inescapable elements of human nature. There were societies that prioritized sustainability and harmony with the earth, which demonstrated that such behavior has precedent in the human experience<sup>12</sup>. Some of these societies were viable for many generations, but they were often outcompeted when they encountered other groups prioritizing extraction, expansion, and conquest<sup>13</sup>. A controlling and dominating relationship to nature – such as in agriculture, animal husbandry, and the general accumulation of surplus – was adopted, in part, as an existential necessity posed by competitive pressures.

However, the exponentially growing global economy is incompatible with the planet’s biosphere and finite resources. Today’s economic system employs industrial technology capable of

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<sup>12</sup> Throsby, David, and Petetskaya, Ekaterina. “Sustainability Concepts in Indigenous and Non-Indigenous Cultures.” *International Journal of Cultural Property*, 23(2), (2016): 119–140. <https://doi.org/10.1017/S0940739116000084>

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<sup>13</sup> Waring, Timothy M., Wood, Zachary T. and Eörs, Szathmáry. Characteristic processes of human evolution caused the Anthropocene and may obstruct its global solutions. *Phil. Trans. R. Soc.* (2024): B 379:20220259. <http://doi.org/10.1098/rstb.2022.0259>



removing the tops of mountains and creating oil fields and tar sands the size of small nations<sup>14</sup>. Extraction and pollution have increased faster than the biosphere can replenish itself or process all of the excess waste and novel chemicals. The result has been a series of ecological catastrophes as civilization pushes beyond the safe operating limits of the biosphere. **This economic relationship to the earth is one of several patterns of human behavior which must be reimagined.**

Another unsustainable pattern is the rapid development of new technologies within high-stakes competition. This includes arms races in military conflict and races to capitalize on emerging markets in the commercial sector. Keeping up with the competition may be necessary for national security or corporate viability. It may also potentially lead to innovations that improve some measures of quality of life. But the capabilities of technology - such as splitting the atom, decoding the genome, and simulating human intelligence - are reaching a critical point. Regardless of their possible positive applications, these technologies are imminent causes of global catastrophic risks, both from acts of war and from the ubiquitous, unintended consequences of goal driven behavior inconsiderate of the true power it wields.

These are examples of generative dynamics underlying many different conflicts and risks. The many visible crises are the result of a smaller number of deeper causes which often do not receive adequate attention. Generative dynamics begin to be discussed throughout Part One but are covered in depth in Part Two. Analysis of these deeper structures underlying the metacrisis reveal the need for **new design efforts to resolve unsustainable features in the architecture of civilization itself. Fundamental changes in how humans relate to the earth, to violence, and to technology are now an existential necessity.**

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<sup>14</sup> Alberta tar sands cover 142,000 square kilometers –10,000 square kilometers larger than England. CAPP. "Oil Sands." Accessed June 10th, 2025.  
<https://www.capp.ca/en/oil-natural-gas-you/oil-natural-gas-canada/oil-sands/>



[NOTE TO ALEX/ZAK - THERE IS A DESIGN QUESTION HERE AS TO WHETHER OR NOT WE WANT THIS BIBLIOGRAPHY TO BE AN APPENDIX, A LONG FOOTNOTE, ETC. – THE FRAME IS THAT IT IS A REPRESENTATIVE SAMPLE OF THE RISK LITERATURE REVIEWED IN THE PROCESS OF MAKING THIS RISK TAXONOMY]

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